API 570

DAILY PRACTICE EXAMS

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Integrated Training

API 570 PREPARATORY
19 – 24 Feb 2005, Dammam

BENCH MARK QUIZ

Note: Tick only one alternative, which you think is most appropriate.

1. For 8" ND Sch 40 and 8" ND Sch 80 pipes,
   - (a) OD for both pipes will be same
   - b. IDs and ODs for both pipes will be different
   - c. Average pipe diameters for both will be same
   - (d) ID for both pipes will be same

2. Hot tapping is best described by statement:
   - a. It is technique of heating the pipe to specified temperature and gently tapping with 1lb. rounded hammer to detect thinning of pipe wall
   - (b) It is technique of providing a tapping connection while pipe system is in operation
   - c. It is technique of fixing a water tap on hot water lines for use during winter
   - d. It is act of using the tap and die for threading the pipe when the pipe is hot

3. Which of the following defines the term hold point?
   - a. The point at which a pipe hanger is attached to a pipe.
   - b. A point at which a U-clamp is fixed on the pipe.

(c) A point at pipe beyond which work may not proceed until inspections have been performed and documented

d. A trunnion, or sliding shoe used for piping support systems

4. Which of the following statements is true?

a. Flange rating indicates flange diameter.

b. Other factors remaining same, ERW pipes can withstand higher pressure than seamless pipes.

c. Dead legs means pipes with broken supports.

(d) API 570 is applicable for metallic pipes only.

5. Post weld heat treatment is carried out

a. To increase Hardness

b. To increase Tensile strength

(c) To release locked-up stresses in the weld

d. None of above.

6. What section of the ASME boiler and pressure vessel code is the basic document for welding procedure qualification?

a. Section III

b. Section VIII

(c) Section IX

d. ASME Section II C

7. What can be caused to ferrous metals by the low operating temperatures?
   a. Increase of ductility
   (b) Loss of ductility and toughness
   c. Increase in plasticity or deformation
   d. Decrease in yield strength

8. API 570 is intended to apply to:
   a. New piping in the chemical Industry
   (b) Piping that has been placed in service
   c. New piping in the Petroleum Refinery
   d. New piping in the Paper Industry

9. If a welder is to be qualified in all positions he must pass test in which positions?
   a. 1G, 2G, 3G and 4G
   b. 5G and 4G
   (c) 6G
   d. 5G and 4G

10. ASTM A 106 Gr B pipes belong to which type?
   (a) Seamless only
   b. ERW only
   c. Seamless or ERW depending on type of Grade
   d. None of above

11. Choose correct statement.
    a. "REPAIR" of piping means change of original Design conditions
    b. "ALTERATION" of piping means change of original Design conditions
    c. Both are one and same
    d. Repair is temporary, alteration is permanent

12. ANSI/ ASME B 31.3 code is meant for:
    a. Steam piping in Power stations
    b. Piping in Refinery and process plants
    c. Cross-country piping
    d. Gas transmission piping

13. The term "NPS 10 pipe" means:
    a. A pipe with National Pressure Standard of 10 bar
    b. A pipe whose minimum thickness is 10 mm
    c. A pipe whose outside diameter is 10"
    d. A pipe whose Nominal diameter is 10"

14. Most of the fluids normally covered by B 31.3 code fall under what category?
    a. Category M
    b. Category K
    c. Category D
    d. Normal

15. The requirements of the latest edition of ASME Code Section B 31.3 and any subsequent Addenda become effective:
    a. As soon as the latest edition is issued
    b. Immediately from date of issue and all piping installed per earlier editions must be upgraded to latest edition/addenda
    (c.) After 6 months from date of issue
    d. After 1 year from date of issue

Mike Garland

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19-24 February 2005, Dammam

DAILY EXAM 1A (CLOSED)

Note: Tick only one alternative, which you think is most appropriate.

1. As per ASME 31.3, the increased quality factors by conducting additional NDT is permitted for:

   a. ERW pipes
   b. Seamless pipes
   (c) Electric fusion welded pipes
   d. All types of pipes

2. The thickness formula t=PD/2 (SE+PY) is valid only if pipe thickness as fraction of pipe outside diameter (D) is:

   a. Thickness < D/4
   b. Thickness ≤ D/6
   (c) Thickness < D/6
   d. Thickness ≤ D/4

3. For impact testing of pipe materials Code B 31.3 stipulates average value for 3 specimen, however a lower than average value (but higher than minimum stipulated) may be accepted for one specimen. This acceptance criteria is valid for:

   (a) Absorbed energy criteria only
   (b) Lateral expansion criteria only
   c. Valid for both a and b
   d. Depends on decision of piping engineer

4. Pneumatic test is to be conducted using ASME 31.3 methodology on piping having Design pr = 200 psig. Which of the following meet the methodology of ASME B 31.3 as regards test pr, inspection pr, and safety valve pressure respectively:

   a. 250 psig, 200 psig, 275 psig respectively
   (b) 220 psig, 200 psig, 240 psig respectively
   (c) 220 psig, 220 psig, 242 psig respectively
   d. None of the above

B 31.3, 345.5

DAILY EXAM 1A (CLOSED)

5. A piping is to be pneumatically tested at test pr = 80 psig. What will the pressure at which a preliminary leak check shall be performed.
   a. 40 psig
   b. 20 psig
   ⓒ 25 psig
   d. 80 psig

6. Pre-heating, whenever specified is:

   a. Applicable to strength welds and not for tack welds
   b. Strength welds and seal welds only
   ⓒ Strength welds, tack welds and seal welds
   d. Strength welds only

7. For pressure testing of piping systems, which of the following statement(s) are correct?

   a. Hazard of released energy is higher in case of hydrostatic test since Hydrostatic pressure is 50% higher than design pr while pneumatic pressure is only 10% higher.
   b. For hydrotesting water alone can be used.
   ⓒ Pneumatic test shall be conducted only if hydrostatic test is impracticable.
   d. a and c above

8. If stresses produced during hydrostatic test exceed the yield stress of material, hydrostatic test pressure shall be:

   a. 1.5 times the design pr multiplied by stress ratio
   ⓑ The pressure limited by yield strength of material
   ⓒ The lower of a and b
   d. Higher of a and b

B31.3 , 345.4.2 (c)

DAILY EXAM 1A (CLOSED)

9. Which of the following ASME Code sections will you adopt for construction of piping in chemical plants?

   a. ASME B31.1
   b. ASME B31.4
   (c.) ASME B31.3
   d. None of above

10. Code B 31.3 stipulates acceptance criteria for NDT method. In D.P. check length of "indication" for the certain discontinuity was seen as 4 mm but after the D.P. check and after cleaning by using magnifying glass, it was seen having actual length as 2.5mm only. Evaluation shall be done considering which of the following.

    (a) The size of indication 4mm B 31.3, 344.4 (Gen Knowledge)
    (b) The actual size of discontinuity 2.5 mm
    c. Higher of (a) and (b)
    d. Lower (a) and (b)

11. The Term 'S' used in formula for calculating thickness of permanent blinds as per 31.3 code, represents.

    a. Safe stress Value of pipe materials
    (b) Safe stress value of blind materials
    c. Lower of (a) and (b)
    d. Higher a. and b.

12. Code B 31.3 recommends and mandates min, required pre-heat temp, for welding of pipes. When do the recommendations become mandatory?

    a. At ambient temperature above 0 deg C
    b. At ambient temperature above 10 deg C
    c. At ambient temperature below 10 deg C
    (d) At ambient temperature below 0 deg C

DAILY EXAM 1A (CLOSED)

13. If Two pipes different pre- heat requirements say t_1 and t_2 are to be welded, the pre- heat for their joining shall be (t1 and t_2 are in °C)

    (a) Higher of t°_1 and t°_2
    b. Lower of t°_1 and t°_2
    c. Average of t°_1 and t°_2
    d. None of above

14. Code B 31.3 requires standard mill tolerance to be added to calculated pipe thickness. The standard negative mill - tolerance as percentage of nominal thickness is:

    a. 10%
    b. 15%
    (c.) 12½%
    d. None of these

15. For 8" ND Sch 40 and 8" ND Sch 80 pipes,

    (a) ID for both pipes will be same
    (b.) OD for both pipes will be same API 574, TABLE 1, PG. 4
    c. IDs and ODs for both pipes will be different
    d. Average pipe diameters for both will be same

16. Two pipes (A) and (B) of different materials and schedules are to be welded. The PWHT Required for pipe (A) is 1100° F min. for 2 hr min. for pipe (B) 1300°F min for I hr. what will be PWHT min. temp and min. time for the weld joint of (A) and (B)

    a. 1100° F and 1 hr.
    b. 1100° F and 3 hr.
    (c.) 1300° F and 1 hr.
    (d) 1300° F and 2 hr. B31.3, 331.2.3

DAILY EXAM 1A (CLOSED)

17. Which of the following types of discontinuities is not normally detected by radiography?

    a. Cracks
    b. Incomplete penetration
    (c) Laminations
    d. Slag

18. ASME B 31.3 code is meant for new piping installations in:

    a. Steam piping in Power stations
    (b) Piping in Refinery and process plants
    c. Cross-country piping
    d. Gas transmission piping

19. In a certain arc welding process, coalescence of metals is produced by an arc between a tungsten electrode and the work, and shielding is obtained from a gas or gas mixture. Filler metal may or may not be used. This process is called:

    a. FCAW
    b. GMAW
    (c) GTAW
    d. SAW

20. API 570 gives rules for:

    (a) repairs and alteration of metallic pipes only API 570, 1.1.1
    b. repairs and alteration of metallic & non-metallic pipes.
    (c) In-service inspection of metallic & non-metallic pipes.
    d. all of above.

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DAILY EXAM 1A (CLOSED)
ANSWER KEY

Q.	ANS.	REFERENCE		Q.	ANS.	REFERENCE
1	C	B 31.3, Table 302.3.4		29		
2	C	B 31.3, 304.1.2		30		
3	A	B 31.3, Table 323.3.5		31		
4	B	B 31.3, 345.5		32		
5	C	B 31.3, 345.5.5		33		
6	C	B 31.3, 330.1		34		
7	C	B 31.3, 345.1 (b)		35		
8	C	B 31.3, 345.4.2 (c)		36		
9	C	B 31.3, Introduction		37		
10	A	B 31.3, 344.4 (Gen. Knowledge)		38		
11	B	B 31.3, 304.5.3		39		
12	D	B 31.3, 330.1.1		40		
13	A	B 31.3, 330.2.3		41		
14	C	API 574, Table 3, Page 48		42		
15	B	API 574, Table 1, Page 4		43		
16	D	B 31.3, 331.2.3		44		
17	C	General Knowledge		45		
18	B	Scope of B 31.3		46		
19	C	General Knowledge		47		
20	A	API 570, 1.1.1		48		
21	--------	----------		49		
22				50		
23				51		
24				52		
25				53		
26				54		
27				55		
28				56		

DAILY EXAM 1B (OPEN)

Note: Tick only one alternative, which you think is most appropriate.

1. PWHT is required for all thicknesses of piping over ½ inch for which of the following materials?

   a. P Nos. 1 and 2
   b. P Nos. 1 and 3
   c. P Nos. 2 and 3
   (d) P Nos. 4 and 5

2. NPS 12, Sch 80 and Sch 160 pipes (M.O.C = A 106 gr B) are to be used at -10° C. Determine whether,

   a. Both pipes require impact testing
   (b.) Only Sch 160 will require impact test but Sch 80 would be exempt. Fig. 323.2.2A Curve B
   c. Both would be exempt
   d. Sch 80 would require but Sch 160 will be exempt.

3. A 6" NB Sch 40 pipe is selected for following conditions.

   Design Pr = 360 psi
   Design Temp. = 300 degrees F
   M.O.C. = A 53 gr B (ERW)
   Corrosion Allowance = 2.0 mm
   Assume standard mill tolerance

   $t = \frac{P \times D}{2(SE + PY)} = \frac{360 \times 168.28}{2(20000 \times .85 + 360 \times 0.4)} = \frac{60\,580.8}{34,288}$

   $\frac{17000}{144}$

   $2 \times 17144 =$

   Your assessment is:

   1.766
   + 3
   3176/87.5 x100 = 4297

   6"Sch40=8

   (a) Pipe design meets code requirement
   b. Pipe design does not meet code requirement
   c. Depends on opinion of Piping Inspector
   d. Depends on opinion of Piping Design Engineer

4. A piping installation was constructed out of material requiring impact testing. Following two steel materials (material A and B) were tested for impact test results. These materials are to be used for repair work on piping. The test data is as follows:

DAILY EXAM 1B (OPEN)

AVE = 14.33 (OR) OK OK

Material A:	**Material B:**
SMTS = 65000 psi (Deoxidized)	SMTS = 60,000 psi (Deoxidized)
Reading for specimen (1) = 16.0 ft lb	Reading for specimen (1) = 15.0 ft lb
Reading for specimen (2) = 17.5 ft lb	Reading for specimen (2) = 14.0 ft lb
Reading for specimen (3) = 9.5 ft lb	Reading for specimen (3) = 10.0 ft lb

OK OK OK AVE = 13

(a) Both material (A) and (B) are OK
b. (A) is OK but (B) is not OK
(c) (B) is OK but (A) is not OK
d. Both are not OK

5. An austentic stainless steel piping system operates between temperatures of – 50°F and 350°F .The temperature of installation was 100 °F. The approximate values of minimum expansion and contraction range for sliding support installed at 150 ft from the anchored end will respectively be:

a. 2.4 inch and 4.3 inch
(b) 4.3 inch and 2.4 inch
c. 1.9 inch and 4.8 inch
d. None of the above

6. A flat plate (without joints) is used as permanent blank for flanged point with gasket I.D = 200 mm Design pr. = 200 psi. and safe stress value for plate is 18,000 psi, for given temperature of 250°C, what shall be the minimum blank thickness from given options. Corrosion allowance is Nil code of construction B 31.3?

a. 8 mm
(b) 10 mm
c. 12 mm
d. 14 mm

$t_m = d_g\sqrt{\frac{3P}{16SE}} + C$ OR $t_m = 200\text{ mm}\sqrt{\frac{3\times 200}{16\times 18000\times 1}}$

$t_m = 200\sqrt{\frac{600}{288,000}}$ OR $2,0833\ \sqrt{2.083} = 1,443$

$1.44 \times 200 = 288$

7. A 106 gr B pipe after installation, required Hydrostatic leak test. Following data is presented Design pr = 300 psi, Design temp = 500°F. Considering stress at design as well as ambient temperature, determine correct hydrotest pressure if test is carried out at ambient conditions.

DAILY EXAM 1B (OPEN)

a. 450 psi
(b.) 476 psi
c. 330 psi
d. 375 psi

$P_T = 1.5\frac{PS_T}{S}$ OR $P_T = \frac{1.5 \times 300 \times 20{,}000}{18{,}900}$ OR $P_T = \frac{9{,}000{,}000}{18{,}900}$

$\frac{9{,}000{,}000}{18900} = 476.19$ OR 476

8. Calculate pneumatic test pressure for above piping considering stress correction.

a. 349 psi
b. 396 psi
c. 408 psi
(d.) 330 psi

DESIGN PRESSURE $\times 1.1 = 300 \times 1.1$ OR 330 PSI

9. Maximum Brinell hardness observed (after PWHT) on following three points was as follows:

Joint 1: MOC = PNO4, thk = 16mm, Hardness = 240 HB NOT OK
Joint 2: MOC = PNO5, thk = 16mm, Hardness = 238 HB OK
Joint 3: MOC = PNO3, thk = 20 mm, Hardness = 228 HB NOT OK

Your assessment is:

a. All joints are okay as per ASME B 31.3
b. Joint 2, and 3 are okay, joint 1 not okay
c. Only joint 1 is okay. Joint 2 and 3 are not.
(d.) None of the above are correct answers.

10. Identify incorrect statement/s:

(a.) In impact test exemption curves, curve D represents better toughness material than curve B
(b.) curve C represents more brittle material than Curve B
c. Fully de-oxidized steels are tougher than non-deoxidized materials
d. a and c

DAILY EXAM 1B (OPEN)
SOLUTION

Q.1 Ref: B 31. 3, Table 331.1.1, Page 69

Correct answer: d

Q.2 12" Sch 80 pipe, thk = 17.45 mm
12" Sch 160 pipe, thk = 33.32 mm
A 106 Gr B is "Curve B" material.

Ref. Fig. 323.2.2A,

Combination of - 10°c and 17.45 mm is above curve B
(Refer Table 323.2.2A for correct reading)

Combination of - 10°c and 33.32 is below curve B
12" Sch 80 No impact test
12" Sch 160 Require impact test

Correct answer: b

Q.3 $t_m = \frac{PD}{2(SE + Py)} + C$ s = 20000 psi, E = 0.85

D= 168.28 mm, Y=0.4

$$= \frac{360 \; x \; 168.28}{2(20000 \; x \; 0.85 + 360 \; x \; 0.4)} + 2$$

= 1.77+2
= 3.77

$t_{ord} = \frac{3.77}{0.875} = 4.30 \; mm.$

Thk of 6 " Sch 40 = 7.11 . . . safe

Correct answer: a

DAILY EXAM 1B (OPEN)
SOLUTION

Q.4 Material A

Average of 3 = $\frac{16+17.5+9.5}{3} = 14.33$ *Ok.*

Value of 1 is 9.5 ft lb < 10 ft lb —— not *Ok*.

Material B

Average of 3 = $\frac{15+14+10}{3} = 13.0$ —— *Ok*.

Value of 1 is 10 ft lb —— *Ok*.

Correct answer: c

Q.5 Nett Expansion for 350°F} = Exp. up to 350°F – exp. up to 100°F

= 3.2- 0.34 = 2.86

For 150 feet, Total Expansion = 1.5x2.86=4.29″ ≈ 4.3″

Nett expansion for -50°F = (Exp. up to – 50°F)-(Exp. up to 100°F)

= - 1.24 – 0.34

= - 1.58. Negative sign means it is actually contraction

For 150 feet, Total Contraction = 1.5x1.58 = 2.37″ ≈ 2.4″

Correct answer: b

DAILY EXAM 1B (OPEN)
SOLUTION

Q.6 $t_m = \sqrt[d_s]{\frac{3P}{16\,SE}} + C$

$= \sqrt[200]{\frac{3 \times 200}{16 \times 18{,}000 \times 1}} + 0$ $\frac{600}{288{,}000} = .00208 = 0.046$

$= 9.12$ mm say 10 mm 9.12

Correct answer: b

Q.7 $P_t = 1.5 \times P \times \frac{Stress\ at\ test\ temp}{Stress\ at\ design\ temp}$

$= 1.5 \times 300 \times \frac{20000}{18900} = 476.19\ psi$

Correct answer: b

Q.8 Pneumatic pr. $= 1.1 \times 300 \times \frac{20000}{189000} = 349.2\ psi$

Correct answer: a

Q.9

P No. 4	Hardness	required 225 HB max.
P No. 5	Hardness	required 241 HB max.
P No. 3	Hardness	required 225 HB max.

Correct answer: d

Q.10 **Correct answer: b** (incorrect answer)
Actually, B is tougher than A
C is tougher than A and B
D is tougher than A, B and C

DAILY EXAM 2A (CLOSED)

Note: Tick only one alternative which you think is most appropriate.

1. Which of the following is true of "Dead legs" in a piping system?

   a. NDT cannot be done on dead legs
   b. A portion of the piping which has fallen out of the test system
   c. The corrosion rate can very significantly from adjacent piping
   d. None of the above

2. Which of the following is a description of a "repair organization"?

   a. An owner or user of piping systems who repairs or alters his or her own equipment in accordance with API 570
   b. A contractor whose qualifications are acceptable to the owner or user of piping systems and who makes repairs or alterations according to API 570
   c. One who is authorized by, acceptable to, or otherwise not prohibited by the jurisdiction and who makes repairs or alterations according to API 570
   d. All of the above

3. What does the acronym CUI represent?

   a. Cracking Under Insulation
   b. Covered Under Insurance
   c. Corrosion Under Insulation
   d. Corrosion Under Inspection

4. Repair on piping system would

   a. Restore piping to intended design conditions
   b. Change the design conditions
   c. Require re-rating to be carried out
   d. None of the above

DAILY EXAM 2A (CLOSED)

5. Which of the following best describes auxiliary piping?

   a. Any piping which is extra to the main piping run can be considered as auxiliary piping.
   (b) Instrument and machinery piping, typically small bore secondary process piping that can be isolated from primary piping system.
   c. Any piping which is less than 1.0 inch N.B
   d. All of the above

6. Post weld heat treatment is carried out:

   a. To increase Hardness
   b. To increase Tensile strength
   (c.) To release locked-up stresses in the weld and improve ductility
   d. None of the above

7. In case of piping requiring PWHT Pressure test is conducted

   a. Before PWHT
   (b) After PWHT and before painting
   c. After PWHT and painting
   d. Anytime is okay

8. Basic construction code referred in API 570 is

   a. ASME Sec. VIII DIV 1
   b. ASME Sec. IX
   c. ASME B 31.1
   (d) ASME B 31.3

9. Which of the following defines the term hold point?

   a. A pipe hanger that utilizes springs and sliding shoes to accommodate expansion and contraction
   b. A dog welded onto piping and used to align joints prior to welding

DAILY EXAM 2A (CLOSED)

(c) A point beyond which work may not proceed until inspections have been performed and documented
d. A trunnion, gimbal, or sliding shoe used for piping support systems

10. Which of the following changes on a piping could be termed as an alteration?

a. Addition of a reinforced nozzle of size equal to an existing nozzle
b. Addition of a nozzle not requiring reinforcement
(c.) Any change that effect the pressure containing capacity of the piping beyond the scope of items described in existing data reports
d. Only "b" and "c"

11. API 570 was developed for the petroleum refining and chemical process industries.

a) It shall be used for all piping systems.
(b) It may be used, where practical, for any piping system.
c) It can be used, where necessary, for power piping.
d) It may not be used unless agreed to by all parties.

12. The preferred medium for a pressure test is _____.

a) Steam
b) Air
(c) Water
d) Hydrocarbon

13. Identify "Dead legs" from following

a. Broken or damaged pipe supports
(b) Spare pump piping
c. Both of above
d. None of above

DAILY EXAM 2A (CLOSED)

14. In API-570, the term "RBI" means:

    a. Repairing Before Inspection
    b. Report Based Inspection
    c. Repair Based Inspection
    (d.) Risk Based Inspection

    LOF & COF

15. S/A interface is taken as zone which is:

    a. 12 inches above soil
    b. 12 inches below soil
    (c.) 12 inches below and 6 inches above soil
    d. a and b above

16. Part of piping installation exhibiting similar corrosivity and similar design conditions is called:

    a. Piping system
    b. Piping Spool
    (c.) Piping Circuit
    d. None of the above

17. What is the minimum time that a leak test must be maintained as per B 31.3?

    a. 60 minutes
    b. 45 minutes
    c. 30 minutes
    (d.) 10 minutes

18. "TML" in API 570 means:

    a. Thickness monitoring line
    b. Thickness measuring location
    (c) Thickness measurement location
    d. None of the above

DAILY EXAM 2A (CLOSED)

19. Performing impact test requires testing of a set of:

    a. Three specimen
    b. At least two specimen
    c. Minimum three specimen
    d. Maximum three specimen

20. Hot tapping is best described by statement:

    a. It is technique of heating the pipe to specified temperature and gently tapping with 1lb. rounded hammer to detect thinning of pipe wall
    b. It is technique of providing a tapping connection while pipe system is in operation
    c. It is technique of fixing a water tap on hot water lines for use during winter
    d. It is an act of using the tap and die for threading the pipe when the pipe is hot

API 570 Preparatory
19 - 24 Feb 2005, Dammam

DAILY EXAM 2A (CLOSED)
ANSWER KEY

Q.	ANS.	REFERENCE		Q.	ANS.	REFERENCE
1	C	API 570, 5.3.2		29		
2	D	API 570, 3.38		30		
3	C	API 570, 3.8		31		
4	A	API 570, 3.37		32		
5	B	API 570, 3.6		33		
6	C	B 31.3, 331		34		
7	B	B 31.3, 345.1		35		
8	D	API 570, 3.3		36		
9	C	API 570, 3.13		37		
10	C	API 570, 3.1		38		
11	B	API 570, 1.1.2		39		
12	C	B 31.3, 345.4.1		40		
13	B	API 570, 3.9		41		
14	D	API 570, 5.1		42		
15	C	API 570, 3.42		43		
16	C	API 570, 3.31		44		
17	D	B 31.3, 345.22		45		
18	C	API 570, 3.47		46		
19	A	B 31.3, 323.3.3		47		
20	B	General Knowledge		48		
21	--------	----------		49		
22				50		
23				51		
24				52		
25				53		
26				54		
27				55		
28				56		

DAILY EXAM 2B (OPEN)

Note: Tick only one alternative which you think is most appropriate.

1. An ASTM A53 Grade B pipe with a maximum wall thickness of 0.75" is being considered for use in a cold service. What minimum temperature can it be used and not have an impact test?

   a. +20 degrees F
   (b) +15 degrees F. TABLE A-1 / TABLE 323.2.2 PG. 49
   c. +10 degrees F
   d. 0 degrees F

2. Which of the following fluid services or classes of piping are excluded from the specific requirements of API 570?

   a. Hazardous fluid services below threshold limits defined by jurisdictional requirements
   b. Piping or tubing with an outside diameter not exceeding that of NPS ½"
   c. Non-metallic piping and polymeric or glass-lined piping
   (d) All of the above API 570 / 1.2.2

3. For welding a 6" NB sch 160 low alloy piping (1 ¼ % cr, 1/2% Mo) to (2-¼ Cr 1 Mo) during plant erection, which of the following are applicable. Assume UTS value for both as 70000 psi

   a. Preheat at 300 °F min. and PWHT in range 1300 °F – 1375 °F
   b. No preheating but PWHT in the range 1300 - 1400 °F
   (c) Preheating at 350 °F min and PWHT in the range 1300 - 1375 °F
   d. Preheating at 350 °F and no PWHT

6" SCH160=18.2 171

? P4 1¼ % Cr ½ Mo = PH = 300F PWHT = 1300 1375) P5 2¼ Cr 1 Mo PH = 350F PWHT = 1300 1400

4. PWHT was carried out on 280 welds on pipes of P No 3 material in 2 batches of (A) 200 and (B) 80 respectively. Batch A was carried out in furnace and Batch B by local heat treatment. From batch A, 28 samples and from Batch B 40 samples were tested for Brinnel

DAILY EXAM 2B (OPEN)

hardness. And brinnel hardness values were between 208 to 222 HB for batch A while for Batch B it was between 201 to 225 HB.

Your assessment is:

a. Batch A: sample size & hardness both not acceptable
   Batch B: sample size & hardness both OK
b. Batch A: sample size & hardness both OK.
   Batch B: sample size & hardness both OK
c. Batch A: sample size inadequate but hardness OK
   Batch B: sample size adequate but hardness not acceptable
(d.) Batch A: sample size & hardness both OK
   Batch B: sample size inadequate but hardness OK

5. ASTM A 105 flange (300 lb rating) maximum system hydrostatic pressure shall not exceed:

a. 600 psi
b. 450 psi
c. 1110 psi
(d) 1125 psi

6. Suitable rating for pipe flanges (A105) for Design pr = 400 psi, design temp = 400 °F will be:

a. 600 lb min.
(b) 300 lb min ASME B31.3 . PG. 15 TABLE 2.1.1
c. 400 lb min
d. None of the above

7. A carbon steel ASTM A 53 Grade B material is being impact tested. What is the minimum energy requirement for this material (average for 3 specimens-fully deoxidized steel)?

a. 7 ft-lbs ASTM A53 GR. B = 60K
b. 10 ft-lbs
(c.) 13 ft-lbs ASME 31.3 . PG. 54 TABLE 323.3.5
d. 15 ft-lbs

DAILY EXAM 2B (OPEN)

8. Where the design temperature of the system is the same as the hydrostatic test temperature, the hydrostatic test pressure shall not be less than: (Yield stress during hydrotest is not governing factor.)

   a. that calculated according to ASME Sec. VIII Code
   b. 1.1 times the design pressure
   c. 1.25 times the operating pressure
   (d) 1.5 times the design pressure ASME B31.3 : 345.4.2 (a)

9. What is the longitudinal weld joint factor, Ej, for API 5L ERW (Electric Resistance Welded) pipe?

   a. 1.00
   b. 0.95
   (c) 0.85 ASME B31.3 TABLE 302.3.4 No. 2
   d. 0.60

10. "S" is defined as the stress value for material from Table A-1 of ASME B31.3. Pick the value of "S" when the material is ASTM A335 Grade P5 and the temperature is 950 degrees F.

    a. 11,400 psi
    b. 10,600 psi
    (c) 8,000 psi ASME B31.3 TABLE A-1 PG. 165
    d. 20,000 psi

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19 - 24 Feb 2005, Dammam

DAILY EXAM 2B (OPEN)
ANSWER KEY

Q.	ANS.	REFERENCE		Q.	ANS.	REFERENCE
1	B	B 31.3, Table A-1, Table 323.2.2.A		29		
2	D	API 570, 1.2.2		30		
3	C	API 574, Table 1, B 31.3 Table 330.1.1 and 331.1.1		31		
4	D	B 31.3, 331.1.7 (a)		32		
5	D	B 16.5, 2.5 and Table 2-1.1		33		
6	B	B 16.5, Table 2-1.1		34		
7	C	B 31.3, Table 323.3.5		35		
8	D	B 31.3, 345.4.2		36		
9	C	B 31.3, Table A-1B		37		
10	C	B 31.3, Table A-1, Page 164		38		
11	--------	----------		39		
12				40		
13				41		
14				42		
15				43		
16				44		
17				45		
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25				53		
26				54		
27				55		
28				56		

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Professional Training and Consultation

API 570 Preparatory
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DAILY EXAM 3A (CLOSED)

Note: Encircle only one alternative which you think is most appropriate.

1. Which of the following are least likely to have corrosion under insulation (CUI)?

   a. Areas subject to process spills, moisture, and/or acid vapors
   b. Areas exposed to mist from cooling towers
   (c.) Piping systems that operate above 250° F
   d. Areas exposed to steam vents

2. Which of the following is typical deterioration that can take place on the external surfaces of pipes?

   (a.) CUI
   b. Caustic embrittlement
   c. Erosion
   d. All of the above

3. Which of the following make pipe system most susceptible to CUI?

   a. Painted pipes operating at 150°F
   (b.) Insulated pipes operating at 150°F
   c. Projections and penetrations in "a"
   (d.) Projections and penetrations in "b"

4. Freeze damage can occur in case of which of the following fluids:

   a. Water only
   b. Oil only
   (c.) Water and aqueous solutions
   d. None of the above

DAILY EXAM 3A (CLOSED)

5. "Actively Engaged" as an authorized piping inspector means some minimum time as percentage of most recent 3 years shall be spent on piping inspection. This minimum period is:
   a. 25%
   b. 50%
   c. 20%
   d. 40%

6. For a typical "injection point pipe circuit" starts upstream of injection point from a distance of

   a. 3 times pipe diameter or 12 inches which ever is greater
   b. 2 times pipe diameter or 12 inches which ever is greater
   c. Fixed 12 inches irrespective of pipe diameter
   d. None of the above

7. The __________ shall be responsible to the owner-user for determining that the requirements of API 570 for inspection, examination, and testing are met.

   a) Piping Engineer
   b) Inspector
   c) Repair Organisation
   d) Operating Personnel

8. What is the best thing to do with deadlegs that are no longer REQUIRED ~~in service?~~

   a) Ultrasonically inspect often
   b) Radiograph often
   c) Inspect often
   d) Remove them

DAILY EXAM 3A (CLOSED)

9. If external or internal coatings or refractory liners on a piping circuit are in good condition, what should an inspector do?

   a) After inspection, remove the liner for UT check
   b) The entire liner should be removed for inspection
   c) Selected portions of the liner should be removed for inspection
   d) Liner need not be removed if it is found to be in sound condition

10. Where can fatigue cracking typically be first detected?

   a) At points of low-stress intensification such as reinforced nozzles
   b) At points of high-stress intensification such as branch connections
   c) At points where cyclic stresses are very low
   d) At points where there are only bending or compressive stresses

11. Who would normally report vibrating or swaying piping to engineering or inspection personnel?

   a) Operating personnel
   b) Repair personnel
   c) Jurisdictional personnel
   d) Design personnel

12. An examiner is a person who assists the inspector

   a) By conducting PMI testing
   b) By conducting pressure testing
   c) By conducting nondestructive testing
   d) By conducting destructive testing

DAILY EXAM 3A (CLOSED)

13. ASME B16.5 does not cover:

    a. Class 150 flanges
    b. Class 300 flanged fittings
    c. Butt welded pipe elbows
    d. All of the above

14. The zone for preheat shall extend (as per B31.3),

    a. At least ½" beyond each edge of the weld
    b. At least 1" beyond each edge of the weld
    c. Over only the weld itself
    d. At a minimum 2" each side of the weld

15. A pressure test for piping, in most cases is a:

    a. leak test
    b. Stress test
    c. ductility test
    d. Strength test

16. Fatigue cracking of piping systems may result from

    a) Embrittlement of the metal due to it operating below its transition temperature
    b) Erosion or corrosion / erosion that thin the piping where it cracks
    c) Excessive cyclic stresses that are often well below the static yield strength of the material
    d) Environmental cracking caused by stress corrosion due to the presence of caustic, amine, or other substance.

DAILY EXAM 3A (CLOSED)

17. What are the preferred NDE methods for detecting fatigue cracking?

    a) Eddy current testing ultrasonic A-scan testing, and / or possibly hammer testing
    b) Liquid penetrant testing, magnetic particle testing
    c) Visual testing, eddy current testing and / or possibly ultrasonic testing
    d) Acoustic emission testing, hydro-testing, and / or possibly ultrasonic testing

18. Water and aqueous solutions in piping systems may freeze and cause failure because of the

    a) Expansion of these materials;
    b) Contraction of these materials
    c) Construction of these materials
    d) Decrease of these materials

19. The _____ shall be responsible to the owner-user for the requirements for design review, analysis, and evaluation of piping system.

    a) Piping Engineer
    b) Inspector
    c) Repair Organisation
    d) Operating Personnel

20. Why should deadlegs in piping be inspected?

    a) API 570 mandates the inspection of deadlegs.
    b) Acid products and debris build up in deadlegs.
    c) The corrosion rate in deadlegs can vary significantly from adjacent active piping.
    d) Caustic products and debris build up in deadlegs.

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API 570 Preparatory
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DAILY EXAM 3A (CLOSED)
ANSWER KEY

Q. NO.	ANSWER		Q. NO.	ANSWER
1	C		27	
2	A		28	
3	D		29	
4	C		30	
5	C		31	
6	A		32	
7	B		33	
8	D		34	
9	D		35	
10	B		36	
11	A		37	
12	C		38	
13	C		39	
14	B		40	
15	A		41	
16	C		42	
17	B		43	
18	A		44	
19	A		45	
20	C		46	
21	----------		47	
22			48	
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25			51	
26			52	

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DAILY EXAM 3B (OPEN)

Note: Encircle only one alternative which you think is most appropriate.

1. The recommended downstream limit of circuit of an injection point is a minimum of:

   a) Second change in flow direction past the injection point, or 25 feet beyond the first change in flow direction whichever is less
   b) Second change in flow direction past the injection point, or 25 feet beyond the first change in flow direction whichever is greater
   c) Second change in flow direction past the injection point, or 25 inches beyond the first change in flow direction whichever is less
   d) Second change in flow direction past the injection point, or 25 inches beyond the first change in flow direction whichever is greater

2. For external inspections for potential corrosion under insulation (CUI) on Class 1 systems, the examination should include at least _____ percent of all suspect areas and _____ percent of all areas of damaged insulation:

   a) 50, 75
   b) 50, 33
   c) 75, 50
   d) 25, 10

3. For Class 2 piping, the extent of CUI inspections on a system operating at – 45°F will be (as a minimum) of:

   a) 75 % of damaged areas, 50 % of suspect areas
   b) 50 % of suspect areas, 33 % of damaged areas
   c) 33 % damaged areas, 50 % of suspect areas
   d) None of the above

DAILY EXAM 3B (OPEN)

4. In the Barlow formula for determining pipe thickness, the term 'S" stands for:

   a. Internal design gage pressure of the pipe in psi
   b. Pressure design strength for internal pressure, in inches
   c. Allowable unit stress at the design temperature, in psi
   d. Maximum strain at the average operating temperature, in psi

5. Determine the linear expansion (in/100 ft) of a carbon steel pipe between 70 degrees F and 450 degrees F.

   a. 3.04" per 100 ft
   b. 3.39" per 100 ft
   c. 2.93" per 100 ft
   d. 3.16" per 100 ft

6. A 20' long carbon steel pipe is heated uniformly to 450 degrees F. from 70 degrees F. Determine its length after heating.

   a. 20.052'
   b. 20.263'
   c. 20.210'
   d. 20.250'

7. As per API 570, in case of normal uniform corrosion, compared to other piping. The thickness measurements on valves:

   a. Must be routinely taken at same frequency while inspecting, other piping components as valve thickness is less than other piping components
   b. Must be routinely taken at twice the frequency as other piping components as valves are very critical components and essential for reliable operation.
   c. Are not routinely taken unless unusual corrosion pattern and thinning is observed during servicing and repair.

DAILY EXAM 3B (OPEN)

d. Are routinely at twice the frequency of other components because valves are more expensive items compared to rest of the piping and must be more frequently checked.

8. The UT thickness measurements for pipes at elevated temperatures, the readings generally are corrected using thickness correction tables, because the readings are normally

a. Higher than actual thickness
b. Lower than actual thickness
c. Temperature has no effect on the UT readings
d. Whether readings will be higher or lower depends on the UT examiner's skill

9. Certain areas and types of piping systems are potentially more susceptible to corrosion under insulation. Which of the items listed is not susceptible to CUI?

a) Areas exposed to mist over-spray from cooling water towers
b) Carbon steel piping systems that normally operate in-service above 250 degrees but are in intermittent service
c) Deadlegs and attachments that protrude from insulated piping
d) Carbon steel piping systems, operating between 250 degrees F and 600 degrees F

10. Environmental cracking of austenite stainless steels is caused many times by:

a) Exposing areas to high-velocity and high-turbulence streams
b) Excessive cyclic stresses that are often very low
c) Exposure to chlorides from salt water, wash-up water, etc.
d) Creep of the material by long time exposure to high temperature and stress

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DAILY EXAM 3B (OPEN)
ANSWER KEY

Q. NO.	ANSWER		Q. NO.	ANSWER
1	A		27	
2	A		28	
3	D		29	
4	C		30	
5	D		31	
6	A		32	
7	C		33	
8	A		34	
9	D		35	
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DAILY EXAM 4A (CLOSED)

Note: *Encircle the letter of one alternative which you think is most appropriate.*

1. Which document gives the methodology for RBI?

   a. API 579
   b. API 570
   c. API 580
   d. API 574

2. "Pipe to soil potential survey" for poorly coated pipes (or where cathodic protection is not reliable) should be conducted at intervals of:

   a. Five years
   b. Three years
   c. Ten years
   d. Six years

3. In pressure decay method for testing under ground pipe, the acceptance criteria is that pressure decrease over a period of:

   a. Eight hours shall not exceed 5%
   b. Four hours shall not exceed 5%
   c. Twenty four hours shall not exceed 10%
   d. Twenty four hours shall not exceed 5%

4. In pressure-decay method for testing underground pipes, minimum leak test pressure is _____% of maximum operating pressure.

   a. 150%
   b. 50%
   c. 110%
   d. 125%

5. Marker chemical (tracer) is used for testing the underground pipes for the purpose of:

   a. Checking internal smoothness of pipe
   b. Checking strength and ductility of piping material

DAILY EXAM 4A (CLOSED)

c. Checking the diameter of underground pipe
(d) Detecting and locating the leaks in the pipe line

6. Except for the class 4500 valves, the valve wall thickness is _____ times the thickness of a simple cylinder designed for a stress of _____ psi for similar pressure and temperature.

a. 1.1 times and 7000 psi
b. 1.5 times and 15000 psi
c. 1.25 times and 15000 psi
(d) 1.5 times and 7000 psi

7. The retirement thickness of valves and flanged fittings can be computed using formula for pipes by using:

a. Factor of 1.5 and the stress = 15000 psi
b. Factor of 1.25 and stress = 7000 psi
(c.) Factor of 1.5 and allowable stress as per ASME B 31.3
d. Factor of 1.5 and stress = 7000 psi

8. Temporary repairs of locally thinned sections or circumferential linear defects may be made on-stream by installing a properly designed and fabricated bolted leak clamp. What would this activity be termed as?

a. Welding repair (on-stream)
b. Permanent repair
(c) Non-welding repair (on-stream)
d. Hot tapping

9. Following inspection data is available for a piping circuit.

Minimum required thickness = 0.422 in
Actual thickness measured = 0.512 in
Long term corrosion rate = 0.018 in / year

Remaining life for this circuit will be:

(a) 5.0 years
b. 4.5 years

$RL = \frac{t_{act} - t_{min}}{CR \text{ Per } YR.}$ OR

$RL = \frac{0.512 - 0.422}{0.018}$ OR

$RL = \frac{0.09}{0.018}$ OR 5 yr.

DAILY EXAM 4A (CLOSED)

c. 6.0 years
d. Data is insufficient to calculate remaining life

10. Piping classifications (class 1, 2, 3) in API 570 will respectively mean:

a. Low, medium and high pressure pipes
b. High, medium, low pressure pipes
c. Low, medium, high level of inspection to be performed
(d) High, medium, low level of inspection to be performed

11. Inspection records contain the following information for a particular thickness measurement location (TML) in a return bend:

Thickness	Year
0.500	0
0.425	5
0.400	10

On the basis of the information above, the long-term corrosion rate for the location:

$LT = \frac{t_{INIT} - t_{ACT}}{\#\ YR\ BETWEEN}$ OR $LT = \frac{0.500 - 0.400}{10}$ OR $LT > \frac{0.100}{10} = LT = 10$ mils per yr

a. 1 ½ mils per year
b. 5 mils per year
(c) 10 mils per year
d. 100 mils per year

12. For thickness measurement of pipes NPS1 and smaller. NDT technique employed would be:

a. Ultrasonic technique
(b) Radiographic profile technique
c. Anyone is OK
d. None are OK

DAILY EXAM 4A (CLOSED)

13. If probable corrosion rates can not be determined on-stream determinations shall be made approximately

    a. 6 months of service
    (b) 3 months of service
    c. 1 month of service
    d. None of the above

14. Thickness monitoring during periodic measurements is taken at:

    (a) Same TMLS as used in previous inspection and approaching retirement thickness
    b. New TMLS only
    c. Either same or new are okay
    d. Depends on opinion of inspector

15. For calculating MAWP of Piping Circuit which is put in service the wall thickness used in computations is:

    a. Actual thickness as determined by inspection.
    b. Actual thickness minus the estimated corrosion loss before the date of next inspection
    (c) Actual thickness minus twice the estimated corrosion loss before the date of next inspection
    d. None of the above

16. Table 6-2 of API 570 standard gives extent of CUI inspection following the visual inspection, which is applicable to:

    a. Entire insulated area
    b. Areas with damaged insulation
    c. Suspect areas within susceptible temperature
    (d) b and c

17. As per API 570 for bolted flanged joints, bolts and nuts are considered as acceptably engaged if the lack of complete engagement is:

    a. Not more than two threads
    (b) Not more than one thread

DAILY EXAM 4A (CLOSED)

c. Bolts and nuts are engaged at least 50% of threads in the nuts
d. Bolts shall completely extend through nuts

18. When an RBI assessment is used to increase inspection intervals, the assessment **shall** be conducted on Class 1 systems at a maximum interval of _____ years

(a) 5
b) 10
c) 15
d) 3

19. Class 3 piping is described as being in services

a) With the highest potential of resulting in an immediate emergency if a leak occurs
(b) That is flammable but do not significantly vaporizes when they leak and are not located in high-activity areas
c) That is flammable and slowly vaporize if leak occurs
d) That is not in classes 1 and 2.

20. Thickness measurement inspection on Class 1 piping should be scheduled based on the calculation of not more than

(a) One half the remaining life determined from corrosion rates or the maximum interval of 5 years whichever is shorter.
b) One half the remaining life determined from corrosion rates or 5 years, whichever is longer
c) One fourth the remaining life determined from corrosion rates or the maximum interval of 10 years whichever is shorter.
d) One quarter the remaining life determined from corrosion rates or 5 years, whichever is longer

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Process Based Training and Orientation

API 570 Preparatory
19 - 24 Feb 2005, Dammam

DAILY EXAM 4A (CLOSED)
ANSWER KEY

Q. NO.	ANSWER		Q. NO.	ANSWER
1	C		27	
2	A		28	
3	B		29	
4	C		30	
5	D		31	
6	D		32	
7	C		33	
8	C		34	
9	A		35	
10	D		36	
11	C		37	
12	B		38	
13	B		39	
14	A		40	
15	C		41	
16	D		42	
17	B		43	
18	A		44	
19	B		45	
20	A		46	
21	----------		47	
22			48	
23			49	
24			50	
25			51	
26			52	

DAILY EXAM 4B (OPEN)

Note: Encircle the letter of the answer which you think is most appropriate.

1. An eight-inch diameter piping system is installed in December 1979.The installed thickness is measured as 0.34". The minimum thickness of the pipe is 0.20". It is inspected in Dec/83 and the thickness is found to be 0.32". An inspection Dec/87 reveals a loss of 0.01" from the 12/85 inspection was during Dec/89 the thickness was found to be 0.29". The last inspection was during Dec/95 and the thickness was found to be 0.26". What is the long-term corrosion rate of this system?

   $LT = \frac{T_{INIT} - T_{ACT}}{\#\ YR's\ BETW.}$ OR $LT = \frac{0.34 - 0.26}{16}$ OR $\frac{0.05}{16}$ OR $LT = .005"/YR$

   a) 0.005"/year
   b) 0.0075"/year
   c) 0.00375"/year
   d) 0.0025"/year

2. Using the information in question above, calculate the short-term corrosion rate.

   $ST = \frac{T_{PREV} - T_{ACT}}{\#\ YR's\ BETW.}$ OR $ST = \frac{.29 - 0.26}{6}$ OR $\frac{0.03}{6}$ OR $ST = .005$

   a) 0.005"/year
   b) 0.0075"/year
   c) 0.00375"/year
   d) 0.0025"/year

3. Using the short-term corrosion rate in questions above, determine the remaining life of the system.

   $RL = \frac{T_{ACT} - T_{MIN}}{CR\ PER\ YR}$ OR $RL = \frac{0.26 - 0.20}{.005}$ OR $RL = \frac{0.06}{.005}$ OR $RL = 12\ YR.$

   a) 18 years
   b) 15 years
   c) 12 years
   d) None of the above

DAILY EXAM 4B (OPEN)

4. Preheating to not less than_____ degrees F may be considered as an alternative to post weld heat treatment for alterations or repairs of P-1, piping initially post weld heat treated as a code requirement (may not be used if the piping was post weld heat treated due to environmental cracking prevention)

   a) 150
   b) 200
   c) 300
   d) 350

5. If an "intelligent pigging" system is used to inspect buried piping, what type of bends is usually required in the piping system?

   a) Five diameter bends
   b) 90 degree pipe ells
   c) Ten diameter bends
   d) Three diameter bends

6. How often should poorly coated pipes with inconsistent cathodic protection potentials have a pipe-to-soil potential survey made?

   a) Yearly
   b) Every 2 years
   c) Every 5 years
   d) Every 7 years

7. Buried piping inspected periodically by excavation shall be inspected in lengths of _____ feet at one or more location judged to be most susceptible to corrosion.

   a) 2 to 4
   b) 4 to 6
   c) 6 to 8
   d) 8 to 10

DAILY EXAM 4B (OPEN)

8. A buried piping system that is not cathodically protected has to have an inspection interval set. The soil resistivity is checked and found to be 3400 ohm/cm. As the inspector, what interval would you set?
   a) 2.5 years
   b) 7.5 years
   c) 5 years
   d) 10 years

9. If a piping system is made up of unknown materials and computations must be made to determine the minimum thickness of the pipe, what can the inspector or the piping engineer do to establish the minimum thickness?
   a) The lowest grade material and joint efficiency in the applicable code may be assumed for calculations.
   b) Samples must be taken from the piping and testing for maximum tensile stress and yield strength will determine the allowable stress to be used.
   c) The piping made of the unknown material must be removed from service and current piping of known material must be installed.
   d) The piping of unknown material may be subjected to a hydrostatic stress tests while having strain gages on it to determine its yield strength and thus allowable stress.

10. If a repair area is localised (for example, pitting or pin-holes) and the specified minimum yield strength (SMYS) of the pipe is not more than _____ psi, a temporary repair may be made by fillet welding a properly designed plate patch over the pitted area:

    a) 30,000 psi
    b) 55,000 psi
    c) 40,000 psi
    d) 36,000 psi

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DAILY EXAM 4B (OPEN)
ANSWER KEY

Q. NO.	ANSWER		Q. NO.	ANSWER
1	A		27	
2	A		28	
3	C		29	
4	C		30	
5	A		31	
6	C		32	
7	C		33	
8	D		34	
9	A		35	
10	C		36	
11	----------		37	
12			38	
13			39	
14			40	
15			41	
16			42	
17			43	
18			44	
19			45	
20			46	
21			47	
22			48	
23			49	
24			50	
25			51	
26			52	

DAILY EXAM 5A (CLOSED)

Note: *Encircle the letter of only one alternative which you think is most appropriate.*

1. A welder has made 25 SMAW groove welds, but the guided bend test for the welder's qualification was never performed. In order to avoid cutting out all of the production welds made by this welder, which of the following minimum steps would be taken to validate the qualification?

   a. Radiograph the welder's first production weld and accept the qualification based on acceptable weld quality by radiography.
   b. There is no alternative to qualifying a welder by the guided bend test.
   c. Have the welder prepare a test coupon and have the bend test done on that
   d. Radiograph all 25 welds, regardless of the governing specifications for sample selection

2. Which of the following represent grouping of weld-metals in ASME IX?

   a. P - Nos
   b. F - Nos
   c. S – Nos
   d. A - Nos

3. Welders carrying out repair/alteration according to API 570 shall be qualified according to

   a. API 1104 welding qualification code
   b. ASME Sec. IX code
   c. Any one of a or b above
   d. None of a or b above

4. A PQR was qualified in 5G position using a new welder. But production welding is to be done in 2G position. Which of the following are applicable as a minimum?

   a. Both procedure and welder shall be re-qualified in 2G position.
   b. The qualified procedure can be used ,only welder needs to be re-qualified

DAILY EXAM 5A (CLOSED)

c. The welder is qualified, but the procedure needs re-qualification
d. Both procedure and welder need not be re-qualified.

5. For API 5L gr B (SMTS=60000 psi) material, following results were obtained for two tensile test specimens in PQR qualification.
Specimen T1: failed in B.M. at 57,400 psi OK 60,000 x .95 = 57,000
Specimen T2: failed in weld metal, at 59,500 psi NOT OK 60,000 REQ.

Your assessment is:

a. PQR test is ok since both are within acceptance criteria
b. PQR test is rejected as both T1 and T2 are not within acceptance criteria
(c) PQR in rejected because T1 is ok but T2 has failed
d. PQR in rejected because T1 is failed though T2 is ok

6. Minimum thickness evaluation may be conducted by?

a. Use of an external micrometer only
(b) Ultrasonic testing
c. D.P. check
b. None of above

7. For procedure qualification documentation,

a. WPS gives the procedure test data and results of tensile/bend test
(b) PQR gives ranges qualified by procedure test
(c) PQR gives procedure test data and WPS gives ranges qualified
d. WPS and PQR both give test data and ranges qualified

8. If a welder is to be qualified in all positions he must pass test in which positions?

a. 1G, 2G, and 6G
b. 5G and 4G
(c) 6G
d. 6G and 4G

DAILY EXAM 5A (CLOSED)

9. According to ASME Sec. IX, Supplementary Essential Variables are to be recorded if impact testing is specified. Otherwise,

   (a) They shall be considered as non-essential.
   b. They shall be considered as essential.
   c. Depends on opinion of welding engineer
   d. Depends on opinion of API 570 inspector

10. Procedure Qualification is done by:

   a. 1 tensile and 2 bend tests
   b. 1 tensile and 1 radiography
   c. 1 bend test and 1 radiography
   (d.) 2 tensile and 4 bend tests

11. Identify correct statement from following:

   a. Tensile test for procedure qualification is passed only if base metal failure occurs at or above Specified Minimum Tensile Strength (SMTS) of base metal
   b. Tensile test for procedure qualification is passed only if base metal failure occurs above SMTS of base metal
   c. Tensile test for procedure qualification is passed even if weld metal failure occurs above 95% of SMTS of base metal
   (d) None of above

12. What type of defect should not be repaired by a full encirclement welded split sleeve?

   (a) A longitudinal crack
   b) A circumferential crack
   c) Pits that are one half through wall
   d) General corrosion

DAILY EXAM 5A (CLOSED)

13. How often should above-grade visual surveillance of a buried pipeline right-of-way be made?

a) Once a month
b) Approximately 6 month intervals
c) Once a year
d) Once every 3 months

14. Remaining life of pipe circuit is determined by:

a. Finding out total length of piping circuit
b. Finding out actual thickness, required thickness and corrosion rate
c. Finding out original thickness and corrosion rate
d. Finding out the elapsed life of the pipe

15. When using radiographs to qualify welder, the acceptance standards used are found in:

a. ASME Section V
b. ASME Section IX
c. ASME B31.3
d. API 570

16. What is the number of guided bend tests required for Performance Qualification in 6G position?

a. 2
b. 4
c. 6
d. 3

17. A welder qualified to weld in the 2G position on pipe would have to be qualified in which of the additional positions to qualify for all position groove welding on pipe?

a. 1G
b. 2G
c. 5G
d. 6G

DAILY EXAM 5A (CLOSED)

18. An RBI assessment can be used to alter the inspection strategy provided:

    a) Likelihood of failure and consequence of failure are evaluated.
    b) The RBI is fully documented.
    c) A third party conducts the RBI.
    d) Both A and B above

19. What are the methods for detecting thickness of buried piping?

    a) Eddy current testing, and / or possibly hammer testing
    b) Intelligent pigging
    c) Visual testing, eddy current testing
    d) Acoustic emission testing, hydro-testing

20. You are reviewing a WPQ for a welder. The test results indicate the following:

    a. Satisfactory side bend
    b. Face bend satisfactory
    c. Visual satisfactory

    Will these tests qualify the welder?

    a. Yes
    b. No, because bend tests are not correct type.
    c. Not enough information given
    d. No, because radiography is essential for welder qualification

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19 – 24 Feb 2005, Dammam

DAILY EXAM 5A (CLOSED)
ANSWER KEY

Q. NO.	ANSWER		Q. NO.	ANSWER
1	A		27	
2	D		28	
3	B		29	
4	B		30	
5	C		31	
6	B		32	
7	C		33	
8	C		34	
9	A		35	
10	D		36	
11	D		37	
12	A		38	
13	B		39	
14	B		40	
15	B		41	
16	A		42	
17	C		43	
18	D		44	
19	B		45	
20	B		46	
21	----------		47	
22			48	
23			49	
24			50	
25			51	
26			52	

Company Name API 570 FINAL EXAM — By John Doe

Welding Procedure Specification No. 101 — Date 1/30/96 — Supporting PQR no. (s) 10
Revision No. — Date

Welding Process(es) SMAW — Type(s) MANUAL (Automatic, Manual, Machine or Semi-Auto)

JOINTS (QW-402)	Details
Joint Design SINGLE VEE GROOVE	
Backing (Yes) X (No) X	
Backing Material (Type)	
(Refer to both backing and retainers.)	
X Metal ☐ Nonfusing Metal	
☐ Nonmetallic ☐ Other	

Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified.

T

(At the option of the Mfgr., sketches may be attached to illustrate joint design, weld layers and bead sequence. e.g. for notch toughness proce dures. for multiple process procedure, etc.)

*BASE METALS (QW-403)

P No. P1 Group No. ____ to P-No. P1 Group No. ____

OR

Specification type and grade ASTM A106 B

to Specification type and grade A106 C

OR

Chem.. Analysis and Mech. Prop. ____

to Chem. Analysis and Mech. Prop. ____

Thickness Range: 2T @ R .500 X 2 OR 1"

Base Metal: Groove (1/16" - 1") 3/16 - 1" Fillet ALL

Pipe Dia Range: Groove 2 7/8" O.D. Fillet ALL

Other ____

*FILLER METALS (QW-404)

Spec. No. (SFA) 5.1

AWS No. (Class) E 7010

F-No. 3

A-No. 1

Size of Filler Metals 3/32", 1/8"

Weld Metal th K.

Thickness Range: ____

Groove 0 - 1"

Fillet ____

Electrode-Flux (Class) N/A

Flux Trade Name N/A

8l

WPS No. 101 Rev. 0?

POSITIONS (QW-405)
Positions of Groove 6G
Welding Progression: Up X Down
Position(s) of Fillet

POSTWELD HEAT TREATMENT (QW-407)
Temperature Range NONE
Time Range

GAS (QW-408)

	Gas(es)	Percent Composition (Mixture)	Flow Rate
Shielding			
Trailing			
Backing			

PREHEAT (QW-406)
Preheat Temp. Min. 200° F 100
Interpass Temp. Max.
Preheat Maintenance
(Continuous or special heating where applicable should be recorded)

ELECTRICAL CHARACTERISTICS (QW-409)
Current AC or DC DC Polarity STRAIGHT
Amps (Range) 150-275 Volts (Range) 20-28

(Amps and volts range should be recorded for each electrode size, position, and thickness, etc. This information may be listed in a tabular form similar to that shown below.)

Tungsten Electrode Size and Type N/A (Pure Tungsten, 2% Thoriated, etc.)
Mode of Metal Transfer for GMAW N/A (Spray arc, short circuiting arc, etc.)
Electrode Wire feed speed range N/A

TECHNIQUE (QW-410)
String or Weave Bead STRING & WEAVE
Orifice or Gas Cup Size
Initial and Interpass Cleaning (Brushing, Grinding, etc.) BRUSHING. GRINDING. CHIPPING
Method of Back Gouging AIR ARC
Oscillation
Contact Tube to Work Distance
Multiple or Single Pass (per side) BOTH
Multiple or Single Electrodes SINGLE
Travel Speed (Range) 12 IPM
Peening N/A
Other

Weld Layer (s)	Process	Filler Metal Class	Filler Metal Dia.	Current Type Polar.	Current Amp. Range	Volt Range	Travel Speed Range	Other (e.g. Remarks, Comments, Hot Wi Addition, Techniqu Torch Angle, Etc.)
ROOT	SMAW	E 7018	3/32	STRAIGHT	150	18-20	N/A	
REST	SMAW	E 7018	1/8, 5/32	STRAIGHT	170-290	20-23	N/A	

QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORDS (PQR)

See QW-200.2, Section IX, ASME Boiler and Pressure Vessel Code)

Record Actual Conditions Used to Weld Test Coupon.

570

Company Name API [illegible] FINAL EXAM

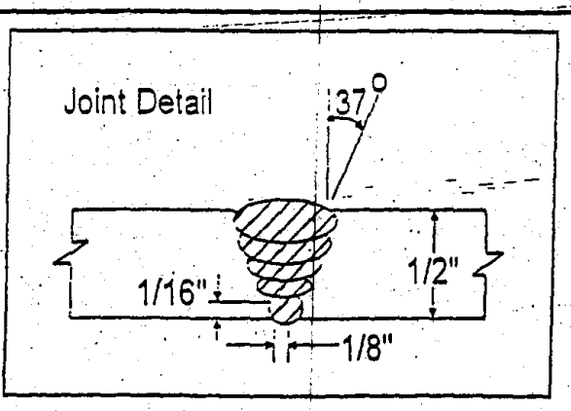
Procedure Qualification Record No. 101 Date

WPS No. 101

Welding Process(es) SMAW.

Types (Manual, Automatic, Semi-Auto.) MANUAL

JOINTS (QW-402)



Groove Design of Test Coupon

(For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal or process used

BASE METALS (QW-403)		POSTWELD HEAT TREATMENT (QW-407)
Material Spec. SA 106	70000	Temperature NONE
Type or Grade GR C		Time
P-No. P NO. 1	P-No. P. No 1	Other
Thickness of Test Coupon .500"		
Diameter of Test Coupon 10"		
Other		Gas (QW-409)
		Percent Composition
		Gas(es) (Mixture) Flow Rate
		Shielding
		Trailing
		Backing
FILLER METALS (QW-404)		
SFA Specification	5.1	
AWS Classification	E 7010	ELECTRICAL CHARACTERISTICS (QW-409)
Filler Metal F-No.	3	Current DC
Weld Metal Analysis A-No.	1 OK	Polarity STRAIGHT
Size of Filler Metal	5/32, 1/8, 3/32	Amps 150-300 Volts 20-28
Other		Tungsten Electrode Size
		Other
Weld Meal Thickness	.500	
POSITION (QW-405)		TECHNIQUE (QW-410)
Position of Groove:	1G	Travel Speed 3 IPM
Welding Progression (uphill, Downhill)		String or Weave Bead STRING & WEAVE
Other		Oscillation
		Multipass or Single pas (per side) MULTIPLE
		Single or Multiple Electrodes SINGLE
PREHEAT (QW-406)		Other
Temp. (Preheat)	200° F	
ass Temp. (interpass)	450° F	
Other		

This form (E00007) may be obtained from the Order Dept., ASME, 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300.

W-483 (Back)

PQR No. 1

Tensile Test (QW-150)

Specimen No.	Width	Thickness	Area		Ultimate Total Load LB	Ultimate Unit Stress psi	Type of Fai & Location
T1	.750	.457	.342	OK	24,624	72,000 OK	Weld Met. fo
T2	.783	.451	.353	OK	23,440	66,400 OK	Base M
							66 SOD NOTE

Guided-Bend Tests (QW-160)

Type and Figure No.	Result
SIDE	NO INDICATION FOUND OK
SIDE	LINEAR INDICATION 1/8" OK
SIDE	NO INDICATION FOUND OK
SIDE	NO INDICATION FOUND OK

Toughness Tests (QW-170)

Specimen No.	Notch Location	Specimen Size	Test Temp.	Impact Values			Drop Weight Brea (Y/N)
				Ft.Lbs	% Shear	Mils	

Comments:

Fillet-Weld Test (QW-180)

Result Satisfactory: Yes_____ No_____ Penetration into Parent Material: Yes_____ No_____

acro-Results

Other Tests

Type of Test

Deposit Analysis

Other

Welder's Name _____ Clock No. _____ Stamp No. _____

Tests conducted by: _____ Laboratory Test No. _____

We certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME Code.

Manufacturer _____

Date _____ By _____

Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code.)

-2

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19-24 February 2005, Dammam

DAILY EXAM 5B (OPEN)

Note: Refer to attached PQR / WPS documents.
Encircle the letter of only one alternative which you think is most appropriate.

1. Choose correct statement from the following:

   a. The PQR shows root spacing of 1/8" and same shall be followed in production welding.
   b. PQR shows beval angle 37°. It shall be followed in production welding without change.
   c. PQR does not show backing ring, hence production weld also can not be with backing ring
   (d) None of above is correct statement.

2. What condition below describes the results of the guided bend test?

   a. The three bend tests are acceptable and the fourth one is not acceptable
   (b) The test result overall is acceptable
   c. The test result is not acceptable due to the linear indication
   d. The bend test result is indeterminable, carry out re-test.

3. The minimum qualified preheat temperature for the WPS is:

   (a) 200° F
   (b) 100° F
   c. 75° F
   d. 5 mm (3/16")

4. What welding process is qualified by this PQR?

   a. GTAW
   (b) SMAW
   c. GMAW
   d. SAW

DAILY EXAM 5B (OPEN)

5. What is the P number and the tensile strength of SA-106-C?

   (a) P No. 1 and 70 ksi
   b. P No. 1 and 60 ksi
   c. P No. 3 and 70 ksi
   d. P No. 3 and 60 ksi

6. In accordance with the PQR, the WPS is qualified for what welding positions?

   a. Flat and horizontal
   b. Flat, vertical, overhead and horizontal
   c. Vertical and overhead
   (d) All positions

7. What is the F No. of an E 6010 electrode?

   a. F no. 4
   (b). F No. 3
   c. F No. 2
   d. F No. 1

8. The welder who welded the test plate for PQR 101 is qualified to weld in what position?

   (a) Flat
   b. Flat and horizontal
   c. Flat and vertical
   d. Flat, vertical and horizontal

9. The bend test specimen used are side bend. They are:

   a. Not accepted since 2 face bend and 2 root bend must be used
   (b.) Accepted since as alternative to (a) 4 side bend may be used

DAILY EXAM 5B (OPEN)

c. Accepted since only 2 bend tests are required where as 4 bend tests are performed
d. Not accepted since all 3 types of bend tests (face, root, side) are required.

10. As far as thickness ranges for Base Metal (B.M.) and weld metal (W.M.) as shown on WPS are concerned, your decision about the qualified range is:

(a) B.M. is okay and W.M. is not okay.
b. Both B.M. and W.M. are okay.
c. Both B.M. and W.M. are not okay.
(d.) W.M. is okay and B.M. is not okay.

11. PWHT of PQR test coupon shows "No PWHT". It means that the PWHT for _____:

a. WPS may be with PWHT
(b) WPS must be without PWHT
c. WPS must be with PWHT
d. WPS may be with or without PWHT as PWHT is non-essential variable

12. In production welds, if groove design is changed to double V groove for the qualified base metal thickness, as per ASME Sec. IX will you:

(a) Accept the change — since it is non-essential variable
b. Will not accept — since it is essential variable
c. Accept only if okay by radiography
d. Accept only if okay by both radiography and UT

13. Based on the specimen areas provided in PQR, are the ultimate stress calculations correct (as rounded up to 100 psi) for specimen T_1 and T_2:

DAILY EXAM 5B (OPEN)

a. Calculation is okay for T_1 alone.
b. Calculation is okay for T_2 alone.
(c) Calculations for both are okay.
d. Calculations for both are not okay.

14. Which condition below best describes the result of tensile tests reported on the PQR?

a. Test T1 & T2 are acceptable
b. Test T1 & T2 are unacceptable
(c) Test T1 is acceptable & T2 is unacceptable
d. Test T1 is unacceptable & T2 is acceptable

15. If electrode E7010 shown on WPS is changed to E7018, what is your decision?

a. Revise WPS to show the change and re-submit as new revision
b. No revision of WPS is necessary as both belong to same F number.
(c) A new PQR will be required to support the change.
d. No revision of WPS required but show the change in same PQR and submit it as new revision

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DAILY EXAM 5B (OPEN)
ANSWER KEY

1	D		
2	B		
3	B		
4	B		
5	A		
6	D		
7	B		
8	A		
9	B		
10	D		
11	B		
12	A		
13	C		
14	C		
15	C		
16	----------		
17			
18			
19			
20			
21			
22			
23			
24			
25			

FINAL EXAM (OPEN)

Instructions:
Choose only one alternative, which you think is most appropriate. Use attached answer sheet. You may refer to the applicable ASME/API documents.

1. The following data is presented for a class 2 pipe,

   Thickness = 0.36 inch (after inspection)
   Corrosion rate = 10 mpy
   Remaining life = 16 years
   When is the next thickness measurement inspection due?

   (a) After 8 years
   b. After 5 years
   c. After 10 years
   d. None of the above

2. Please calculate remaining corrosion allowance for piping in Question 1 above.

   $RL = \frac{t_{act} - t_{min}}{CR}$ or $RL = \frac{RCA}{CR}$

   $1 mil = 1/1000$ " $16 \times 10 = 160$ m 160

   a. 0.20 inch
   b. 0.28 inch
   c. 0.12 inch
   (d) 0.16 inch

3. When will be the next inspection schedule from now on for external inspection for pipe in Q.1?

   a. 10 years
   b. 8 years
   (c.) 5 years
   d. none of the above

4. The pipe in Q.1 above has an insulated area of 200 sq. ft., which is exposed to susceptible temperature and mist spray of cooling tower. According to API 570, how much of minimum area is recommended for NDT survey for CUI during external inspection?

   a. 100 square feet
   b. 50 square feet
   (c.) 66 square feet
   d. 150 square feet

FINAL EXAM (OPEN)

5. A PQR is to be qualified using 5/8 inch thick test coupon. It can qualify thickness:

$\frac{10}{8} = 1\frac{2}{8}$ OR $1\frac{1}{4}$

a. 1/8" to 1-1/4"
b. 1/16" to 5/8"
c. 1/16" to 1-1/4"
d. None of the above

6. The recommended minimum development time (Penetrant Testing) allowed for a material made of high temperature alloy is:

a. 5 min
b. 10 min
c. 7 min
d. 6 min

7. A radiograph was having density near the penetrameter equal to 3.0. Hence the acceptable density range of the radiograph is:

a. 1.7 to 4
b. 2.55 to 3.9
c. 2.0 to 4.0
d. None of the above

8. For piping buried in soil with resistivity of 5000-ohm cm and not cathodically protected, evaluations of pipe thickness should be performed at:

a. 10 year interval
b. 5 year interval
c. 3 year interval
d. None of the above

9. For a certain Natural gas piping system, which is in operation for 16 years, it is estimated that it has remaining life of 12 years. Considering the stipulation of API 570, which of the following will determine maximum interval for next proposed date for thickness measurement examination and visual examination?

FINAL EXAM (OPEN)

a. 6 years and 5 years respectively
b. 3 years and 10 years respectively
c. 10 years and 5 years respectively
d. 6 years and 6 years respectively

10. An Inspector finds incomplete penetration of 2mm in a radiograph of a girth weld of normal fluid service piping 12 mm thick. Can he accept as per ASME B31.3?

a. If the incomplete penetration is greater than 1 mm, reject. ≤ 1mm AND
b. If the incomplete penetration is more than 1 mm but still less than 0.2 times pipe thickness, accept. ≤ 0.2 Tw
c. Depends on opinion of inspector
d. Radiograph again and then decide on acceptance.

11. You are planning for the Hydro-test of a piping with Hydro test pressure 40Kg/cm^{2}g. The calibrated test gauges available with you are 0-50 Kg/cm^{2}g, 0-100 Kg/cm^{2}g, 1-150 Kg/cm^{2}g and 0-200 Kg/cm^{2}g. Which two gauges are acceptable for this test?

a. 0-100 Kg/cm^{2}g and 0-150 Kg/cm^{2}g 1.5 x 40 Kg = 60 KG
b. 0-50 Kg/cm^{2}g and 0-100 Kg/cm^{2}g
c. 0-100 Kg/cm^{2}g and 0-200 Kg/cm^{2}g 4 x 40 Kg = 160 KG
d. 0-50 Kg/cm^{2}g and 0-200 Kg/cm^{2}g

12. What would you expect to happen if you were taking UT readings on piping that was operated higher than 200 degrees F?

a. The thickness readings could be lower.
b. The thickness readings would not be influenced.
c. The thickness readings could be about 1% higher for each 100 degrees F rise of temperature.
d. The thickness readings may be higher or lower depending on couplant.

13. A welded part is to be radiographed and is 1" thick, with 1/8" reinforcement. What ASTM wire set IQI should be used on these radiographs if a source side technique is used?

FINAL EXAM (OPEN)

a. Set A
b. Set B
c. Set C
d. Set D

14. The document referenced in API 570 for determining "fitness for service" of piping system is:

a. API 579
b. API 574
c. ASME B 31.1
d. None of the above

15. During impact testing of A 106 grB (Deoxidised) and A53 grB pipes (non-deoxidised), following absorbed energy values in ft-lb were observed:

OK A 106 grB : 12.5, 13.5 , 12
NOT OK A 53 grB : 11, 11.5 , 9

A 106 gr. B = 60,000 12.6 AVE
A 53 gr. B = 60,000 10.5 AVE

Your assessment is:

a. Both A106 and A53 are acceptable
b. Both A106 and A 53 shall be rejected
c. Only A53 grB can be accepted
d. Only 106 grB shall be accepted

16. A PQR test was made on A 106 grade C pipe. This will qualify which of the following sets of materials:

a. A 106 gr B, A36 , A 182 F1
b. A 105, A516 gr 60, A516 gr 70
c. 515 gr 70, A 285 gr C, A 335 P 11
d. None of the above set is fully qualified by this PQR.

17. Carbon percentage cannot be detected by x-ray fluroscence method because this method cannot detect materials:

a. Lighter than sulpher
b. Heavier than sulpher
c. Black in color
d. Which are radioactive

FINAL EXAM (OPEN)

18. When a PT test cannot be conducted between 10-52 degree C (50 degrees F – 125 degrees F) what must be done, as per ASME Sec. V?

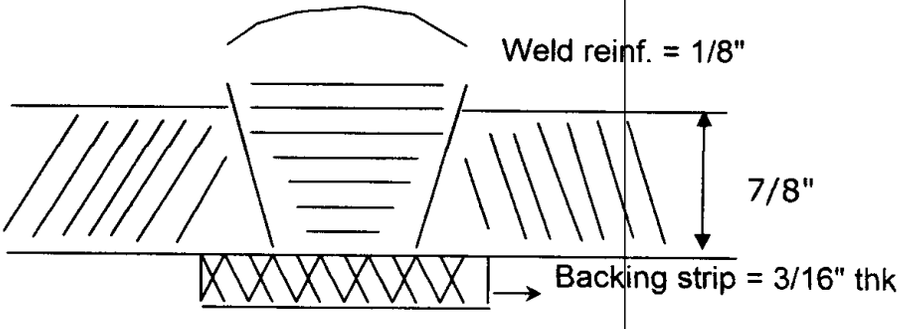
    a. A new procedure must be qualified using suitable penetrant materials.
    b. The surface must be re-cleaned.
    c. The test cannot be conducted.
    d. Use the dwell time for penetrant and developer as per Table in Article 6 of ASME Sec. V.

19. A piping system is to be pneumatically pressure tested. Its Design Pressure is 160 psig. The first stage pressuration, the test pressure and inspection pressure respectively will be:

    25 , 176 , 160

    a. 80 psi, 176 psi, 160 psi
    b. 25 psi, 200 psi, 176psi
    c. 25 psi, 176 psi, 160 psi
    d. none of above

20. Select suitable Hole type (source side) penetrameter for following weld joint:



    a. No 20
    b. No 25
    c. No 30
    d. None of the above

FINAL EXAM (OPEN)

21. If type of penetrameter in above question is changed to wire type what shall be the wire designation (wire decimeter in inch)?

    a. 0.025 (No. 10)
    b. 0.016 (No. 8)
    c. 0.032 (No. 11)
    (d) None of the above

22. For steel plates and welds to be checked by LPI, what shall be the penetration time for penetrant?

    a. 10 min for weld, 5 min for plate
    b. 5 min for both
    c. 10 min for both
    (d.) 5 min for weld, 10 min for plate

23. After applying the developer the examiner checked four welds for surface defects after following period, weld A – after 5 minute, weld B after 10 minutes, weld C was checked after 30 minutes and welds D after 65 minutes. Which of the welds were checked wrongly:

    a. Weld A and B
    b. Weld C and D
    c. Weld D only
    (d) Weld A and D

24. In a certain PQR for SMAW, the electrodes used for all passes were of AWS classification (E 7018). Corresponding WPS also showed filler materials as E 7018. Now the manufacturer proposes to change the filler material in WPS to E 7015. Will you ask manufacturer to: 7018= F4 7015 = F4 OR

    a. Qualify new PQR with E 7015 electrodes.
    (b.) Revise only WPS showing the change from E 7018 to E 7015 and submit WPS as a new revision.
    c. Revise only the PQR document showing the change and resubmit for approval.
    d. Revise both WPS and PQR showing the change and resubmit for approval.

FINAL EXAM (OPEN)

25. Actual thickness measured at a TML was 0.4 inch. The corrosion rate is 10 mpy. If next planned thickness inspection is after 6 years, what thickness will be used for MAWP calculation?

a. 0.4 inch
b. 0.34 inch
c. 0.28 inch
d. None of the above

$C_N = 60\ mil \times 2 = \frac{120\ mils}{1000}$

$MAWP = t_{act} - 2C_N$

$t_{act} = 0.4 - 0.12 = .28$

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Professional Training and Consultation

API 570 Preparatory
19-24 February 2005

FINAL EXAM (OPEN)
Answer Sheet

Name : Michael Scott Garland Date : 02/23/05

Organization : _____ Time : _____

Notes : 1. Choose only one answer for each question.
2. Mark most appropriate answer like this:

A	B	C	D
O	●	O	O

(mark by pencil only)

SN	A	B	C	D	SN	A	B	C	D	SN	A	B	C	D
1.	●	O	O	O	11.	O	O	●	O	21.	O	O	O	●
2.	O	O	O	O	12.	O	O	●	O	22.	O	O	O	●
3.	O	O	●	O	13.	O	O	O	O	23.	O	O	O	●
4.	O	O	●	O	14.	●	O	O	O	24.	O	●	O	O
5.	O	O	●	O	15.	O	O	O	●	25.	●	O	O	O
6.	O	●	O	O	16.	O	●	O	O	26.	O	O	O	O
7.	O	O	●	O	17.	●	O	O	O	27.	O	O	O	O
8.	●	O	O	O	18.	●	O	O	O	28.	O	O	O	O
9.	●	O	O	O	19.	O	O	●	O	29.	O	O	O	O
10.	●	O	O	O	20.	O	●	O	O	30.	O	O	O	O

Total Marks : _____

Examiner's Signature: _____ Date: _____

FINAL EXAM (OPEN)
Solution

Q.1 Remaining life = 16 years
Thickness measurement interval = ½ remaining life or 10 years —use lower

(Ref.: API 570:6.3 and Table 6-1)

Answer: a (Ref.: 7.1.1 of API 570)

Q.2 Remaining C.A. = Remaining life x Corrosion rate
= 16 x 10
= 160 mils say 0.16"

Answer: d (Ref: 7.1.1 of API 570)

Q.3 Answer: c (Ref.: Table 6-1)

Q.4 Answer: c (Ref.: Table 6-2)

Q.5 Answer: d (Ref.: ASME Sec. IX, Table 451.1)
Qualified thickness is 3/16" to 1 ¼"

Q.6 Table in Art. 6 of ASME Sec. V shows development time of 10 minutes for all materials.

Answer: b

Q.7 ASME Sec. V, Art. 2. Density variation in -15% to +30%

Answer: b

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Solution

Q.8 Ref.: Table 9-1 of API 570

Answer: a

Q.9 Natural gas is Class 2 fluid (Ref.: 6.2.2 of API 570)
Refer Table 6-1 of API 570

Answer: a

Q.10 Refer Table 341.3.2, pages 77 and 78 from ASME B31.3
Incomplete penetration permitted is 1mm for letter "B" for normal fluid, girth weld.

Answer: a

Q.11 Refer ASME Sec. V (Leak Testing – Art. 10). The range for pressure gauges is:

0 to 1 ½ times (minimum range)
0 to 4 times (maximum range)

for given example,

0 – 60 (minimum) and 0 – 160 maximum

Answer: a

Q.12 Refer SE-797 from Section V.
Refer paragraph no. 8.

Answer: c

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Q.13 Refer Art. 2, ASME Sec. V.
IQI is on source side.
We need wire no. 9 for thickness=1"
Wire no. 9 will be in Set B.

Answer: b

Q.14 Ref. Section 2 of API 570 Page 2-1

Answer: a

Q.15 For deoxidized steel (A106 grB, T.S = 60,000 psi)
Average required = 13 ft lb, min 10 ft lb for one.
For non-deoxidised steel (A53 grB, T.S = 60,000 psi)
Average required 10 ft/lb and min for one = 7 ft lb

Average for A106 grB = $\frac{12.5+13.5+12}{3}$ = 12.5 < 13

Average for A53 grB = $\frac{11+11.5+9}{3}$ = 10.5 > 10 ft lb

Minimum for one = 9 > 7 ft lb

Answer: c (Ref.: ASME B31.3, page 54)

Q.16 A 106 grC pipe belongs to P No. 1 material. So it will qualify only P No. 1 materials. A 105, A 516 gr60 and A516 gr70 are P No. 1 materials.
Refer Table QW-422 from ASME Sec. IX.

Answer: b

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Q.17 Refer API RP 578, paragraph 5.2.1

Answer: a

Q.18 Refer dwell time table in Art. 6, ASME Sec. V.
See the note below the table.

Answer: a

Q.19 Refer ASME B31.3, Page 86, 345.5

Answer: c

Q.20 Refer ASME Sec. V, Art. 2
Refer Table for selection of IQI
Required IQI is No. 25.

Answer: b

Q.21 Refer ASME Sec. V, Art. 2.
Required wire is no. 9.

Answer: d

Q.22 Refer dwell time in Art. 6 of ASME Sec. V.

Answer: d

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Solution

Q.23 Refer Art. 6, ASME Sec. V – Interpretation
Interpretation shall be between 7 mins to 60 mins

Answer: d

Q.24 Refer ASME Sec. IX – Table for F Nos.
E7018 and E7018 are both F No. = 4
So same PQR is OK. Only revise WPS.

Answer: b

Q.25 Refer API 570 Page 7-2 for MAWP thickness used shall be Actual Thickness minus twice the corrosion loss up to next inspection.

0.4 – 2 x 0.01 x 6 = 0.28 inch

Answer: c

FINAL EXAM (CLOSED)

Instructions:
Choose only one answer, which you think is most appropriate.
Use the attached answer sheet in answering the following questions.

1. Which of the following statement is correct?

   a. Soil resistivity is a measure of resistance offered by soil to drilling operation for oil exploration and it has no connection with corrosivity of soil.
   b. Lower soil resistivity indicates less corrosive soil.
   c. Soil resistivity has nothing to do with corrosiveness of soil because soil corrosion depends on the amount of corrosive chemicals present in the soil.
   (d) Higher soil resistivity indicates less corrosive soil.

2. The _____ shall be responsible to the owner-user for determining that the requirements of API 570 for inspection, examination, and testing are met.

   a) Piping Engineer
   (b) Inspector
   c) Repair Organisation
   d) Operating Personnel

3. Which of the following are some of the mandatory requirements for re-rating a piping system?

   a. Calculations must be performed by the piping engineer or the inspector.
   b. Current inspection records shall be reviewed to verify that the piping system is satisfactory for the proposed service conditions and that the appropriate corrosion allowance has been provided.
   c. The piping system is checked to affirm that the required pressure relieving devices are present, are set at the appropriate pressure and have the appropriate capacity at the set pressure.
   (d) All of the above

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4. After completion of alterations a pressure test is/will:

   (a) Normally required
   b. Not required at all
   c. Depend on opinion of piping inspector
   (d) Only "a" and "c" above

5. Name a part of a piping system that thickness measurements are not normally routinely taken:

   a) Elbows
   b) Expansion loops
   c) Tees
   (d) Valves

6. Pressure decay method is:

   a. A technique adopted for checking the leakage in above ground piping
   (b) A technique used for checking leakage in underground piping
   c. A technique used for calibration of pressure gauges
   d. A technique used for releasing the overpressure in piping

7. Which of the following are areas on piping systems which are susceptible to CUI during the range of 25°F to 250°F:

   a. All the area which is below insulation
   b. Insulated areas below steam vents
   c. Insulated piping exposed to cooling tower mist
   (d) "b" and "c" above

8. Listed below are several examples of piping system. Which is class I piping for flammable fluids?

   (a) Readily vaporizing on leakage
   b) Slowly vaporizing on leakage
   c) No significant vaporization
   d) All of above

9. Which of the following documents referenced in API 570 addresses hot tapping?

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(a) API 2201
b. API 574
c. ASME B 31 G
d. None of the above

10. The preferred method for inspecting piping coating is:

a. Visual inspection only
(b) Holiday detection
c. M.P. Check
d. D.P. Check

API 570 9.1.3

11. For which of the following, the approval from piping engineer is not mandatory:

(a) Changing the damaged flange to a new flange of same rating and material
b Alteration on piping changing a nozzle size from one not requiring reinforcement pad to the one requiring reinforcement pad
c. For both a and b
d. For none of the above

12. Fillet welded patches (lap patches) shall be designed by:

(a) An engineer expert in corrosion
b) The inspector
(c) The piping engineer
d) The repair organization

13. For a project involving piping welding at site by 10 welders, (with only one qualified welder) procedure and 9 welders were to be qualified. In this case, identify correct statement from the following:

a. 9 welders qualification must be performed before procedure qualification.
(b) 9 welders qualification should be performed after procedure qualification is carried out using qualified welder.

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c. Out of Welder qualification and procedure qualification, anything can be performed before.
d. Welder qualification and procedure qualification must be performed simultaneously, without waiting for the test results.

14. Guided bend test represents:

a. Ductility of weld
b. Strength of weld
c. Soundness of weld
(d). Both soundness and ductility of weld

15. All positions of groove welds are qualified by

a. Pipe positions 1G and 5G
(b). Pipe positions 2G and 5G
c. Pipe position 5G and 3G
d. None of the above

16. According to ASME Sec. IX, a welder for SMAW can be qualified by following minimum tests (for 1G pipe position):

a. 1 tensile and 2 bend tests
(b) 2 bend tests
c. 2 tensile tests and 1 bend tests
d. 1 tensile and 1 radiography

17. Identify incorrect statement from following

a. A welder performing procedure test is also qualified in that position.
b. Supplementary essential variables become essential variables when impact test is specified.
c. For procedure qualification, the test can be performed in any position as the position is not essential variable for procedure qualification.
(d) A 3G welder qualified in SMAW process can be employed for TIG welding also in that position.

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18. Procedure Qualification Record is a document which can be revised time to time.

    a. True
    b. False
    c. Depends on company policy
    d. Depends on client of the company

19. Use of Radiography is made for:

    a. Performance qualification only
    b. Procedure qualification only
    c. Both a and b
    d. Use of radiography is not permitted by ASME Sec. IX.

20. When dial-type indicating and recording pressure gauges are used to monitor leak testing, the maximum gauge range shall not exceed which multiple of the expected test pressure?

    a. 1 ½ times
    b. 2 ½ times
    c. 3 times
    d. 4 times

21. A radiographic technique in which radiation passed through two walls and both the walls are viewed on the same radiograph (double wall, double image – ellipse) the limitation for the outside diameter is:

    a. 3-1/2"
    b. 2"
    c. 4"
    d. Any diameter possible

22. Following data is available to compute remaining life of a piping circuit:

    Minimum required thickness = 0.422 in
    Actual thickness measured = 0.512 in
    Corrosion rate = 0.018 in / year

$RL = \frac{t_{act} - t_{min}}{CR}$ OR $RL = \frac{0.512 - 0.422}{0.018}$ OR $RL = \frac{0.09}{0.018}$ OR $RL = 5\,yr$

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Remaining life for this circuit will be:

(a) 5.0 years
b. 4.5 years
c. 6.0 years
d. None of above

23. Common locations which are susceptible to CUI on the insulated piping are:

a. All penetrations or breaches in the insulation jacketing such as vents, drains, piping hangers
b. Termination of insulation at flanges
c. All insulated bends and elbows
(d) a and b above

24. The accuracy of a magnetizing equipment that is equipped with an ammeter shall be verified:

(a) Each year
b. Each two years
c. When possible
d. Every 6 months

25. The WPS and the PQR are used to determine:

a. If the welder is able to deposit sound weld metal.
b. If the welder is able to operate welding equipment.
c. The welder's ability to produce welds that are radiographically free of defects.
(d) If a weldment has the required properties for the intended application (strength, ductility)

26. Which of the following penetrant system is generally considered least sensitive?

(a) Water-washable – visible dye.
b. Solvent removable – visible dye.
c. Water-washable – fluorescent dye.
d. Post-emulsification – visible dye.

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27. As soon as possible after completing an inspection, the Inspector should:

    a. Review the inspection records and schedule the next inspection
    b. Always require a hydrotest
    c. Sign all RT records
    d. Notify the Piping Engineer

28. The nondestructive examination method to be used for a particular inspection should be determined by the:

    a. Availability of certified NDE examiners.
    b. Length of time since the last inspection.
    c. Age of the component to be inspected.
    d. Type, location, and orientation of the expected flaws.

29. To verify satisfactory PWHT the test conducted is:

    a. Radiography
    b. Ultrasonic
    c. Hardness survey
    d. None of above

30. In visual testing for qualifying the procedure, a defect of which minimum width shall be used:

    a. 1/16"
    b. 1/8"
    c. 1/32"
    d. None of the above

31. Visual examiner should pass Jaeger J-1 check:

    a. Annually
    b. Six monthly
    c. Once in 3 years
    d. None of the above

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32. The pressure gauges for leak testing shall be calibrated as an ASME Sec. V requirement, at least:

    a. Every six months
    b. Every one year
    c. Every three years
    d. None of the above

33. It is decided to carryout a surface NDT for austenitic S.S. pipe welds. Choose the best combination.

    a. Penetrant testing with Halogen free developer
    b. Penetrant testing with any aqueous developer
    c. Magnetic particle testing with wet particles
    d. Magnetic particle testing with dry particles

34. In ultrasonic testing, for thickness measurement on corroded surface, use:

    a. CRT read out
    b. Digital read out
    c. Any of above
    d. None of above.

35. An example of service-specific corrosion is:

    a) Corrosion under insulation in areas exposed to steam vents
    b) Unanticipated acid or caustic carryover from processes into non-alloyed piping
    c) Corrosion in deadlegs
    d) Corrosion of underground piping at soil-to-air interface

36. When a pressure test is not necessary or practical, what shall be utilised in lieu of a pressure test?

    a) PMI Testing
    b) Non-destructive examination
    c) Vacuum visual examination
    d) Hammer Testing

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37. For which of the following can yoke technique be used?

a. Sub-surface cracks
b. Surface cracks
c. Both a and b
d. For none of a and b

38. The pipe welding test position in which the pipe is horizontal and rotated so that welding takes place at or near the top is designated as?

a. 2 G
b. 5 G
c. 3 G
d. 1 G

39. API 578 gives rules for Alloy Verification for:

a. Carbon steel piping material for old or new piping
b. Alloy steel piping materials, for old or new piping
c. Carbon steel materials used for old piping only
d. Alloy steels used for old piping only

40. For thickness measurement of pipes NPS 1 and smaller, NDT technique employed would be:

a. Ultrasonic technique
b. Radiographic profile technique
c. Anyone is okay.
d. None are okay.

41. API 578 requires at least _____ electrodes to be PMI tested from each box.

a. one
b. two
c. minimum 10%
d. all

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A

42. Which of the following make pipe system most susceptible to CUI?

    a. Painted pipes operating at 150° F
    b. Insulated pipes operating at 150° F
    c. Projections, penetrations in "a"
    d. Projections, penetrations in "b"

43. Freeze damage can occur in case of which of the following fluids:

    a. Water only
    b. Oil only
    c. Water and aqueous solutions
    d. None of the above

44. For calculating MAWP of Piping Circuit which is put in service the wall thickness used in computations is:

    a. Actual thickness as determined by inspection.
    b. Actual thickness minus the estimated corrosion loss before the date of next inspection
    c. Actual thickness minus twice the estimated corrosion loss before the date of next inspection
    d. None of the above

45. When checking Titanium materials for cracks using PT methods only liquid penetrants:

    a. with low or no nitrides should be used
    b. with low or no carbides should be used
    c. with high or medium chlorides should be used
    d. with low or no chlorides should be used

46. As per API 570 for bolted flanged joints, bolts and nuts are considered as acceptably engaged if the lack of complete engagement is:

    a. Not more than two threads
    b. Not more than one thread
    c. Bolts and nuts are engaged at least 50% of threads in the nuts
    d. Bolts shall completely extend through nuts

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47. Inspection of piping systems is carried out for purpose of:

    a. Safety
    b. Reliability of operation
    c. Regulatory requirements
    d. All of above

48. For a typical "injection point pipe circuit" starts upstream of injection point from a distance of

    a. 3 times pipe diameter or 12 inches which ever is greater
    b. 2 times pipe diameter or 12 inches which ever is greater
    c. Fixed 12 inches irrespective of pipe diameter
    d. 3 times pipe diameter or 12 inches whichever is smaller

49. For MT examination by Prod technique the spacing between prods shall be between:

    a. 4 inches to 12 inches
    b. 4 inches to 10 inches
    c. 3 inches to 10 inches
    d. 3 inches to 8 inches

50. API 578 Material Verification can be applied for:

    a. New and in-service carbon steel piping
    b. New and in-service alloy piping
    c. Only in service carbon steel piping
    d. Only for in-service alloy piping

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FINAL EXAM (CLOSED)
Answer Key

Q.	ANS.	REFERENCE	Q.	ANS.	REFERENCE
1	D	API 570, 9.1.4	29	C	ASME B 31.3, 331.1.7
2	B	API 570, 4.3.4	30	C	ASME V, T-921.3
3	D	API 570, 8.3	31	A	ASME V, T-923
4	A	API 570, 8.2.6	32	B	ASME V, T-1061 (a)
5	D	API 570, 5.9	33	A	ASME V, II-642 (p. 128.1)
6	B	API 570, 9.2.7	34	A	ASME V, SE-797, 8.8
7	D	API 570, 5.3.3.1	35	B	API 570, 5.3.5
8	A	API 570, 6.2.1	36	B	API 570, 8.2.6
9	A	API 570, Section 2	37	D b	ASME V, 755.1
10	B	API 570, 9.1.3	38	D	ASME IX, Fig. QW-461.4
11	A	API 570, 8.1.1	39	B	API 578, 1.1
12	C	API 570, 8.2.3, Para. 4	40	B	API 570, 5.6, Para. 1
13	B	ASME IX, QW-300.2	41	A	API 578, 4.2.6
14	D	ASME IX, QW-141.2	42	D	API 570, 5.3.3.1
15	B	ASME IX, QW-461.9	43	C	API 570, 5.3.12
16	B	ASME IX, QW-302.3	44	C	API 570, 7.2
17	D	ASME IX, QW-301.2	45	D	ASME V, II-642 (p. 128.1)
18	B	ASME IX, QW-200.2 (c)	46	B	API 570, 5.11 (Para. 2)
19	A	ASME IX, QW-142	47	D	API 574, 5.1
20	D	ASME V, T-1031	48	A	API 570, 5.3.1
21	A	ASME V, T-271.2 (b)	49	D	ASME V, T-752.3
22	A	API 570, 7.1.1	50	B	API 578, 1.1
23	D	API 570, 5.3.3.2	51		
24	A	ASME V, T-761.1 (b)	52		
25	D	ASME IX, Introduction	53		
26	A	Experience & Knowledge	54		
27	A	API 570, 6.3	55		
28	D	ASME V, Table A-110	56		

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Professional Training and Consultation

API 570 Preparatory
19-24 February 2005

FINAL EXAM (CLOSED)
Answer Sheet

Name : Michael Scott Garland Date : 02/23/05

Organization : _____ Time : _____

Notes : 1. Choose only one answer for each question.
2. Mark most appropriate answer like this:

A	B	C	D
O	●	O	O

(mark by pencil only)

SN	A	B	C	D	SN	A	B	C	D	SN	A	B	C	D
1.	O	O	O	●	22.	●	O	O	O	43.	O	O	●	O
2.	O	●	O	O	23.	O	O	O	●	44.	O	O	●	O
3.	O	O	O	●	24.	●	O	O	O	45.	O	O	O	●
4.	(O)	O	O	●	25.	O	O	O	●	46.	O	●	O	O
5.	O	O	O	●	26.	●	O	O	O	47.	O	O	O	●
6.	O	●	O	O	27.	(O)	O	O	●	48.	(O)	O	O	●
7.	O	O	O	●	28.	O	O	O	●	49.	●	O	O	(O)
8.	●	O	O	O	29.	O	O	●	O	50.	O	●	O	O
9.	●	O	O	O	30.	O	(O)	(X)	●	51.	O	O	O	O
10.	O	●	O	O	31.	(O)	O	●	O	52.	O	O	O	O
11.	●	O	O	O	32.	O	●	O	O	53.	O	O	O	O
12.	●	O	(O)	O	33.	●	O	O	O	54.	O	O	O	O
13.	O	●	O	O	34.	O	●	O	O	55.	O	O	O	O
14.	O	O	O	●	35.	O	(O)	●	O	56.	O	O	O	O
15.	O	●	O	O	36.	O	●	O	O	57.	O	O	O	O
16.	O	●	O	O	37.	O	●	O	(O)	58.	O	O	O	O
17.	O	O	O	●	38.	●	O	O	(O)	59.	O	O	O	O
18.	O	●	O	O	39.	O	●	O	O	60.	O	O	O	O
19.	●	O	O	O	40.	O	●	O	O	61.	O	O	O	O
20.	O	O	O	●	41.	●	O	O	O	62.	O	O	O	O
21.	●	O	O	O	42.	O	O	O	●	63.	O	O	O	O

Total Marks : _____

Examiner's Signature: _____ Date: _____

API 570 PREPARATORY
19 – 24 Feb 2005, Dammam

BENCH MARK QUIZ

Note: Tick only one alternative, which you think is most appropriate.

1. For 8" ND Sch 40 and 8" ND Sch 80 pipes,
   a. OD for both pipes will be same
   b. IDs and ODs for both pipes will be different
   c. Average pipe diameters for both will be same
   d. ID for both pipes will be same

2. Hot tapping is best described by statement:
   a. It is technique of heating the pipe to specified temperature and gently tapping with 1lb. rounded hammer to detect thinning of pipe wall
   b. It is technique of providing a tapping connection while pipe system is in operation
   c. It is technique of fixing a water tap on hot water lines for use during winter
   d. It is act of using the tap and die for threading the pipe when the pipe is hot

3. Which of the following defines the term hold point?
   a. The point at which a pipe hanger is attached to a pipe.
   b. A point at which a U-clamp is fixed on the pipe.

c. A point at pipe beyond which work may not proceed until inspections have been performed and documented

d. A trunnion, or sliding shoe used for piping support systems

4. Which of the following statements is true?
   a. Flange rating indicates flange diameter.
   b. Other factors remaining same, ERW pipes can withstand higher pressure than seamless pipes.
   c. Dead legs means pipes with broken supports.
   d. API 570 is applicable for metallic pipes only.

5. Post weld heat treatment is carried out
   a. To increase Hardness
   b. To increase Tensile strength
   c. To release locked-up stresses in the weld
   d. None of above.

6. What section of the ASME boiler and pressure vessel code is the basic document for welding procedure qualification?
   a. Section III
   b. Section VIII
   c. Section IX
   d. ASME Section II C

7. What can be caused to ferrous metals by the low operating temperatures?
   a. Increase of ductility
   b. Loss of ductility and toughness
   c. Increase in plasticity or deformation
   d. Decrease in yield strength

8. API 570 is intended to apply to:
   a. New piping in the chemical Industry
   b. Piping that has been placed in service
   c. New piping in the Petroleum Refinery
   d. New piping in the Paper Industry

9. If a welder is to be qualified in all positions he must pass test in which positions?
   a. 1G, 2G, 3G and 4G
   b. 5G and 4G
   c. 6G
   d. 5G and 4G

10. ASTM A 106 Gr B pipes belong to which type?
    a. Seamless only
    b. ERW only
    c. Seamless or ERW depending on type of Grade
    d. None of above

11. Choose correct statement.
    a. "REPAIR" of piping means change of original Design conditions
    b. "ALTERATION" of piping means change of original Design conditions
    c. Both are one and same
    d. Repair is temporary, alteration is permanent

12. ANSI/ ASME B 31.3 code is meant for:
    a. Steam piping in Power stations
    b. Piping in Refinery and process plants
    c. Cross-country piping
    d. Gas transmission piping

13. The term "NPS 10 pipe" means:
    a. A pipe with National Pressure Standard of 10 bar
    b. A pipe whose minimum thickness is 10 mm
    c. A pipe whose outside diameter is 10"
    d. A pipe whose Nominal diameter is 10"

14. Most of the fluids normally covered by B 31.3 code fall under what category?
    a. Category M
    b. Category K
    c. Category D
    d. Normal

15. The requirements of the latest edition of ASME Code Section B 31.3 and any subsequent Addenda become effective:
    a. As soon as the latest edition is issued
    b. Immediately from date of issue and all piping installed per earlier editions must be upgraded to latest edition/addenda
    c. After 6 months from date of issue
    d. After 1 year from date of issue

DAILY EXAM 1B (OPEN)

Note: Tick only one alternative, which you think is most appropriate.

1. PWHT is required for all thicknesses of piping over ½ inch for which of the following materials?

   a. P Nos. 1 and 2
   b. P Nos. 1 and 3
   c. P Nos. 2 and 3
   d. P Nos. 4 and 5

2. NPS 12, Sch 80 and Sch 160 pipes (M.O.C = A 106 gr B) are to be used at −10° C. Determine whether,

   a. *Both pipes require impact testing*
   b. Only Sch 160 will require impact test but Sch 80 would be exempt.
   c. Both would be exempt
   d. Sch 80 would require but Sch 160 will be exempt.

3. A 6" NB Sch 40 pipe is selected for following conditions.

   Design Pr = 360 psi
   Design Temp. = 300 degrees F
   M.O.C. = A 53 gr B (ERW)
   Corrosion Allowance = 2.0 mm
   Assume standard mill tolerance

   Your assessment is:

   a. Pipe design meets code requirement
   b. Pipe design does not meet code requirement
   c. Depends on opinion of Piping Inspector
   d. *Depends on opinion of Piping Design Engineer*

4. A piping installation was constructed out of material requiring impact testing. Following two steel materials (material A and B) were tested for impact test results. These materials are to be used for repair work on piping. The test data is as follows:

DAILY EXAM 1B (OPEN)

Material A:	**Material B:**
SMTS = 65000 psi (Deoxidized) Reading for specimen (1) = 16.0 ft lb Reading for specimen (2) = 17.5 ft lb Reading for specimen (3) = 9.5 ft lb	SMTS = 60,000 psi (Deoxidized) Reading for specimen (1) = 15.0 ft lb Reading for specimen (2) = 14.0 ft lb Reading for specimen (3) = 10.0 ft lb

a. Both material (A) and (B) are OK
b. (A) is OK but (B) is not OK
c. (B) is OK but (A) is not OK
d. Both are not OK

5. An austentic stainless steel piping system operates between temperatures of – 50°F and 350°F .The temperature of installation was 100 °F. The approximate values of minimum expansion and contraction range for sliding support installed at 150 ft from the anchored end will respectively be:

a. 2.4 inch and 4.3 inch
b. 4.3 inch and 2.4 inch
c. 1.9 inch and 4.8 inch
d. None of the above

6. A flat plate (without joints) is used as permanent blank for flanged point with gasket I.D = 200 mm Design pr. = 200 psi. and safe stress value for plate is 18,000 psi, for given temperature of 250°C, what shall be the minimum blank thickness from given options. Corrosion allowance is Nil code of construction B 31.3?

a. 8 mm
b. 10 mm
c. 12 mm
d. 14 mm

7. A 106 gr B pipe after installation, required Hydrostatic leak test. Following data is presented Design pr = 300 psi, Design temp = 500°F. Considering stress at design as well as ambient temperature, determine correct hydrotest pressure if test is carried out at ambient conditions.

DAILY EXAM 1B (OPEN)

a. 450 psi
b. 476 psi
c. 330 psi
d. 375 psi

8. Calculate pneumatic test pressure for above piping considering stress correction.

a. 349 psi
b. 396 psi
c. 408 psi
d. 330 psi

9. Maximum Brinell hardness observed (after PWHT) on following three points was as follows:

Joint 1: MOC = PNO4, thk = 16mm, Hardness = 240 HB
Joint 2: MOC = PNO5, thk = 16mm, Hardness = 238 HB
Joint 3: MOC = PNO3, thk = 20 mm, Hardness = 228 HB

Your assessment is:

a. All joints are okay as per ASME B 31.3
b. Joint 2, and 3 are okay, joint 1 not okay
c. Only joint 1 is okay. Joint 2 and 3 are not.
d. None of the above are correct answers.

10. Identify incorrect statement/s:

a. In impact test exemption curves, curve D represents better toughness material than curve B
b. curve C represents more brittle material than Curve B
c. Fully de-oxidized steels are tougher than non-deoxidized materials
d. a and c

DAILY EXAM 1A (CLOSED)

Note: Tick only one alternative, which you think is most appropriate.

1. As per ASME 31.3, the increased quality factors by conducting additional NDT is permitted for:

   a. ERW pipes
   b. Seamless pipes
   c. Electric fusion welded pipes
   d. All types of pipes

2. The thickness formula t=PD/2 (SE+PY) is valid only if pipe thickness as fraction of pipe outside diameter (D) is:

   a. Thickness < D/4
   b. Thickness ≤ D/6
   c. Thickness < D/6
   d. Thickness ≤ D/4

3. For impact testing of pipe materials Code B 31.3 stipulates average value for 3 specimen, however a lower than average value (but higher than minimum stipulated) may be accepted for one specimen. This acceptance criteria is valid for:

   a. Absorbed energy criteria only
   b. Lateral expansion criteria only
   c. Valid for both a and b
   d. Depends on decision of piping engineer

4. Pneumatic test is to be conducted using ASME 31.3 methodology on piping having Design pr = 200 psig. Which of the following meet the methodology of ASME B 31.3 as regards test pr, inspection pr, and safety valve pressure respectively:

   a. 250 psig, 200 psig, 275 psig respectively
   b. 220 psig, 200 psig, 240 psig respectively
   c. 220 psig, 220 psig, 242 psig respectively
   d. None of the above

DAILY EXAM 1A (CLOSED)

5. A piping is to be pneumatically tested at test pr = 80 psig. What will the pressure at which a preliminary leak check shall be performed.
   a. 40 psig
   b. 20 psig
   c. 25 psig
   d. 80 psig

6. Pre-heating, whenever specified is:

   a. Applicable to strength welds and not for tack welds
   b. Strength welds and seal welds only
   c. Strength welds, tack welds and seal welds
   d. Strength welds only

7. For pressure testing of piping systems, which of the following statement(s) are correct?

   a. Hazard of released energy is higher in case of hydrostatic test since Hydrostatic pressure is 50% higher than design pr while pneumatic pressure is only 10% higher.
   b. For hydrotesting water alone can be used.
   c. Pneumatic test shall be conducted only if hydrostatic test is impracticable.
   d. a and c above

8. If stresses produced during hydrostatic test exceed the yield stress of material, hydrostatic test pressure shall be:

   a. 1.5 times the design pr multiplied by stress ratio
   b. The pressure limited by yield strength of material
   c. The lower of a and b
   d. Higher of a and b

DAILY EXAM 1A (CLOSED)

9. Which of the following ASME Code sections will you adopt for construction of piping in chemical plants?

   a. ASME B31.1
   b. ASME B31.4
   c. ASME B31.3
   d. None of above

10. Code B 31.3 stipulates acceptance criteria for NDT method. In D.P. check length of "indication" for the certain discontinuity was seen as 4 mm but after the D.P. check and after cleaning by using magnifying glass, it was seen having actual length as 2.5mm only. Evaluation shall be done considering which of the following.

    a. The size of indication 4mm
    b. The actual size of discontinuity 2.5 mm
    c. Higher of (a) and (b)
    d. Lower (a) and (b)

11. The Term 'S' used in formula for calculating thickness of permanent blinds as per 31.3 code, represents.

    a. Safe stress Value of pipe materials
    b. Safe stress value of blind materials
    c. Lower of (a) and (b)
    d. Higher a. and b.

12. Code B 31.3 recommends and mandates min, required pre-heat temp, for welding of pipes. When do the recommendations become mandatory?

    a. At ambient temperature above 0 deg C
    b. At ambient temperature above 10 deg C
    c. At ambient temperature below 10 deg C
    d. At ambient temperature below 0 deg C

DAILY EXAM 1A (CLOSED)

13. If Two pipes different pre- heat requirements say t_1 and t_2 are to be welded, the pre- heat for their joining shall be (t1 and t_2 are in °C)

    a. Higher of t°_1 and t°_2
    b. Lower of t°_1 and t°_2
    c. Average of t°_1 and t°_2
    d. None of above

14. Code B 31.3 requires standard mill tolerance to be added to calculated pipe thickness. The standard negative mill - tolerance as percentage of nominal thickness is:

    a. 10%
    b. 15%
    c. 12½%
    d. None of these

15. For 8" ND Sch 40 and 8" ND Sch 80 pipes,

    a. ID for both pipes will be same
    b. OD for both pipes will be same
    c. IDs and ODs for both pipes will be different
    d. Average pipe diameters for both will be same

16. Two pipes (A) and (B) of different materials and schedules are to be welded. The PWHT Required for pipe (A) is 1100° F min. for 2 hr min. for pipe (B) 1300°F min for I hr. what will be PWHT min. temp and min. time for the weld joint of (A) and (B)

    a. 1100° F and 1 hr.
    b. 1100° F and 3 hr.
    c. 1300° F and 1 hr.
    d. 1300° F and 2 hr.

DAILY EXAM 1A (CLOSED)

17. Which of the following types of discontinuities is not normally detected by radiography?

    a. Cracks
    b. Incomplete penetration
    c. Laminations
    d. Slag

18. ASME B 31.3 code is meant for new piping installations in:

    a. Steam piping in Power stations
    b. Piping in Refinery and process plants
    c. Cross-country piping
    d. Gas transmission piping

19. In a certain arc welding process, coalescence of metals is produced by an arc between a tungsten electrode and the work, and shielding is obtained from a gas or gas mixture. Filler metal may or may not be used. This process is called:

    a. FCAW
    b. GMAW
    c. GTAW
    d. SAW

20. API 570 gives rules for:

    a. repairs and alteration of metallic pipes only
    b. repairs and alteration of metallic & non-metallic pipes.
    c. In-service inspection of metallic & non-metallic pipes.
    d. all of above.

DAILY EXAM 2B (OPEN)

Note: Tick only one alternative which you think is most appropriate.

1. An ASTM A53 Grade B pipe with a maximum wall thickness of 0.75" is being considered for use in a cold service. What minimum temperature can it be used and not have an impact test?

   a. +20 degrees F
   b. +15 degrees F
   c. +10 degrees F
   d. 0 degrees F

2. Which of the following fluid services or classes of piping are excluded from the specific requirements of API 570?

   a. Hazardous fluid services below threshold limits defined by jurisdictional requirements
   b. Piping or tubing with an outside diameter not exceeding that of NPS ½"
   c. Non-metallic piping and polymeric or glass-lined piping
   d. All of the above

3. For welding a 6" NB sch 160 low alloy piping (1 ¼ % cr, 1/2% Mo) to (2-¼ Cr 1 Mo) during plant erection, which of the following are applicable. Assume UTS value for both as 70000 psi

   a. Preheat at 300 °F min. and PWHT in range 1300 °F – 1375 °F
   b. No preheating but PWHT in the range 1300 - 1400 °F
   c. Preheating at 350 °F min and PWHT in the range 1300 - 1375 °F
   d. Preheating at 350 °F and no PWHT

4. PWHT was carried out on 280 welds on pipes of P No 3 material in 2 batches of (A) 200 and (B) 80 respectively. Batch A was carried out in furnace and Batch B by local heat treatment. From batch A, 28 samples and from Batch, 40 samples were tested for Brinnel

DAILY EXAM 2B (OPEN)

hardness. And brinnel hardness values were between 208 to 222 HB for batch A while for Batch B it was between 201 to 225 HB.

Your assessment is:

a. Batch A: sample size & hardness both not acceptable
   Batch B: sample size & hardness both OK
b. Batch A: sample size & hardness both OK.
   Batch B: sample size & hardness both OK
c. Batch A: sample size inadequate but hardness OK
   Batch B: sample size adequate but hardness not acceptable
d. Batch A: sample size & hardness both OK
   Batch B: sample size inadequate but hardness OK

5. ASTM A 105 flange (300 lb rating) maximum system hydrostatic pressure shall not exceed:

a. 600 psi
b. 450 psi
c. 1110 psi
d. 1125 psi

6. Suitable rating for pipe flanges (A105) for Design pr = 400 psi, design temp = 400 °F will be:

a. 600 lb min.
b. 300 lb min
c. 400 lb min
d. None of the above

7. A carbon steel ASTM A 53 Grade B material is being impact tested. What is the minimum energy requirement for this material (average for 3 specimens-fully deoxidized steel)?

a. 7 ft-lbs
b. 10 ft-lbs
c. 13 ft-lbs
d. 15 ft-lbs

DAILY EXAM 2B (OPEN)

8. Where the design temperature of the system is the same as the hydrostatic test temperature, the hydrostatic test pressure shall not be less than: (Yield stress during hydrotest is not governing factor.)

   a. that calculated according to ASME Sec. VIII Code
   b. 1.1 times the design pressure
   c. 1.25 times the operating pressure
   d. 1.5 times the design pressure

9. What is the longitudinal weld joint factor, Ej, for API 5L ERW (Electric Resistance Welded) pipe?

   a. 1.00
   b. 0.95
   c. 0.85
   d. 0.60

10. "S" is defined as the stress value for material from Table A-1 of ASME B31.3. Pick the value of "S" when the material is ASTM A335 Grade P5 and the temperature is 950 degrees F.

    a. 11,400 psi
    b. 10,600 psi
    c. 8,000 psi
    d. 20,000 psi

API 570 Preparatory
19 – 24 Feb 2005, Dammam

DAILY EXAM 2B (OPEN)
ANSWER KEY

Q.	ANS.	REFERENCE		Q.	ANS.	REFERENCE
1	B	B 31.3, Table A-1, Table 323.2.2.A		29		
2	D	API 570, 1.2.2		30		
3	C	API 574, Table 1, B 31.3 Table 330.1.1 and 331.1.1		31		
4	D	B 31.3, 331.1.7 (a)		32		
5	D	B 16.5, 2.5 and Table 2-1.1		33		
6	B	B 16.5, Table 2-1.1		34		
7	C	B 31.3, Table 323.3.5		35		
8	D	B 31.3, 345.4.2		36		
9	C	B 31.3, Table A-1B		37		
10	C	B 31.3, Table A-1, Page 164		38		
11	--------	----------		39		
12				40		
13				41		
14				42		
15				43		
16				44		
17				45		
18				46		
19				47		
20				48		
21				49		
22				50		
23				51		
24				52		
25				53		
26				54		
27				55		
28				56		

DAILY EXAM 2A (CLOSED)

Note: Tick only one alternative which you think is most appropriate.

1. Which of the following is true of "Dead legs" in a piping system?

   a. NDT cannot be done on dead legs
   b. A portion of the piping which has fallen out of the test system
   c. The corrosion rate can very significantly from adjacent piping
   d. None of the above

2. Which of the following is a description of a "repair organization"?

   a. An owner or user of piping systems who repairs or alters his or her own equipment in accordance with API 570
   b. A contractor whose qualifications are acceptable to the owner or user of piping systems and who makes repairs or alterations according to API 570
   c. One who is authorized by, acceptable to, or otherwise not prohibited by the jurisdiction and who makes repairs or alterations according to API 570
   d. All of the above

3. What does the acronym CUI represent?

   a. Cracking Under Insulation
   b. Covered Under Insurance
   c. Corrosion Under Insulation
   d. Corrosion Under Inspection

4. Repair on piping system would

   a. Restore piping to intended design conditions
   b. Change the design conditions
   c. Require re-rating to be carried out
   d. None of the above

DAILY EXAM 2A (CLOSED)

5. Which of the following best describes auxiliary piping?

   a. Any piping which is extra to the main piping run can be considered as auxiliary piping.
   b. Instrument and machinery piping, typically small bore secondary process piping that can be isolated from primary piping system.
   c. Any piping which is less than 1.0 inch N.B
   d. All of the above

6. Post weld heat treatment is carried out:

   a. To increase Hardness
   b. To increase Tensile strength
   c. To release locked-up stresses in the weld and improve ductility
   d. None of the above

7. In case of piping requiring PWHT Pressure test is conducted

   a. Before PWHT
   b. After PWHT and before painting
   c. After PWHT and painting
   d. Anytime is okay

8. Basic construction code referred in API 570 is

   a. ASME Sec. VIII DIV 1
   b. ASME Sec. IX
   c. ASME B 31.1
   d. ASME B 31.3

9. Which of the following defines the term hold point?

   a. A pipe hanger that utilizes springs and sliding shoes to accommodate expansion and contraction
   b. A dog welded onto piping and used to align joints prior to welding

DAILY EXAM 2A (CLOSED)

c. A point beyond which work may not proceed until inspections have been performed and documented
d. A trunnion, gimbal, or sliding shoe used for piping support systems

10. Which of the following changes on a piping could be termed as an alteration?

a. Addition of a reinforced nozzle of size equal to an existing nozzle
b. Addition of a nozzle not requiring reinforcement
c. Any change that effect the pressure containing capacity of the piping beyond the scope of items described in existing data reports
d. Only "b" and "c"

11. API 570 was developed for the petroleum refining and chemical process industries.

a) It shall be used for all piping systems.
b) It may be used, where practical, for any piping system.
c) It can be used, where necessary, for power piping.
d) It may not be used unless agreed to by all parties.

12. The preferred medium for a pressure test is _____.

a) Steam
b) Air
c) Water
d) Hydrocarbon

13. Identity "Dead legs" form following

a. Broken or damaged pipe supports
b. Spare pump piping
c. Both of above
d. None of above

DAILY EXAM 2A (CLOSED)

14. In API-510, the term "RBI" means:

    a. Repairing Before Inspection
    b. Report Based Inspection
    c. Repair Based Inspection
    d. Risk Based Inspection

15. S/A interface is taken as zone which is:

    a. 12 inches above soil
    b. 12 inches below soil
    c. 12 inches below and 6 inches above soil
    d. a and b above

16. Part of piping installation exhibiting similar corrosivity and similar design conditions is called:

    a. Piping system
    b. Piping Spool
    c. Piping Circuit
    d. None of the above

17. What is the minimum time that a leak test must be maintained as per B 31.3?

    a. 60 minutes
    b. 45 minutes
    c. 30 minutes
    d. 10 minutes

18. "TML" in API 570 means:

    a. Thickness monitoring line
    b. Thickness measuring location
    c. Thickness measurement location
    d. None of the above

DAILY EXAM 2A (CLOSED)

19. Performing impact test requires testing of a set of:

    a. Three specimen
    b. At least two specimen
    c. Minimum three specimen
    d. Maximum three specimen

20. Hot tapping is best described by statement:

    a. It is technique of heating the pipe to specified temperature and gently tapping with 1lb. rounded hammer to detect thinning of pipe wall
    b. It is technique of providing a tapping connection while pipe system is in operation
    c. It is technique of fixing a water tap on hot water lines for use during winter
    d. It is an act of using the tap and die for threading the pipe when the pipe is hot

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DAILY EXAM 2A (CLOSED)
ANSWER KEY

Q.	ANS.	REFERENCE		Q.	ANS.	REFERENCE
1	C	API 570, 5.3.2		29		
2	D	API 570, 3.38		30		
3	C	API 570, 3.8		31		
4	A	API 570, 3.37		32		
5	B	API 570, 3.6		33		
6	C	B 31.3, 331		34		
7	B	B 31.3, 345.1		35		
8	D	API 570, 3.3		36		
9	C	API 570, 3.13		37		
10	C	API 570, 3.1		38		
11	B	API 570, 1.1.2		39		
12	C	B 31.3, 345.4.1		40		
13	B	API 570, 3.9		41		
14	D	API 570, 5.1		42		
15	C	API 570, 3.42		43		
16	C	API 570, 3.31		44		
17	D	B 31.3, 345.22		45		
18	C	API 570, 3.47		46		
19	A	B 31.3, 323.3.3		47		
20	B	General Knowledge		48		
21	--------	----------		49		
22				50		
23				51		
24				52		
25				53		
26				54		
27				55		
28				56		

DAILY EXAM 3B (OPEN)

Note: Encircle only one alternative which you think is most appropriate.

1. The recommended downstream limit of circuit of an injection point is a minimum of:

   a) Second change in flow direction past the injection point, or 25 feet beyond the first change in flow direction whichever is less
   b) Second change in flow direction past the injection point, or 25 feet beyond the first change in flow direction whichever is greater
   c) Second change in flow direction past the injection point, or 25 inches beyond the first change in flow direction whichever is less
   d) Second change in flow direction past the injection point, or 25 inches beyond the first change in flow direction whichever is greater

2. For external inspections for potential corrosion under insulation (CUI) on Class 1 systems, the examination should include at least _____ percent of all suspect areas and _____ percent of all areas of damaged insulation:

   a) 50, 75
   b) 50, 33
   c) 75, 50
   d) 25, 10

3. For Class 2 piping, the extent of CUI inspections on a system operating at – 45°F will be (as a minimum) of:

   a) 75 % of damaged areas, 50 % of suspect areas
   b) 50 % of suspect areas, 33 % of damaged areas
   c) 33 % damaged areas, 50 % of suspect areas
   d) None of the above

DAILY EXAM 3B (OPEN)

4. In the Barlow formula for determining pipe thickness, the term 'S" stands for:

   a. Internal design gage pressure of the pipe in psi
   b. Pressure design strength for internal pressure, in inches
   c. Allowable unit stress at the design temperature, in psi
   d. Maximum strain at the average operating temperature, in psi

5. Determine the linear expansion (in/100 ft) of a carbon steel pipe between 70 degrees F and 450 degrees F.

   a. 3.04" per 100 ft
   b. 3.39" per 100 ft
   c. 2.93" per 100 ft
   d. 3.16" per 100 ft

6. A 20' long carbon steel pipe is heated uniformly to 450 degrees F. from 70 degrees F. Determine its length after heating.

   a. 20.052'
   b. 20.263'
   c. 20.210'
   d. 20.250'

7. As per API 570, in case of normal uniform corrosion, compared to other piping. The thickness measurements on valves:

   a. Must be routinely taken at same frequency while inspecting, other piping components as valve thickness is less than other piping components
   b. Must be routinely taken at twice the frequency as other piping components as valves are very critical components and essential for reliable operation.
   c. Are not routinely taken unless unusual corrosion pattern and thinning is observed during servicing and repair.

DAILY EXAM 3B (OPEN)

d. Are routinely at twice the frequency of other components because valves are more expensive items compared to rest of the piping and must be more frequently checked.

8. The UT thickness measurements for pipes at elevated temperatures, the readings generally are corrected using thickness correction tables, because the readings are normally

a. Higher than actual thickness
b. Lower than actual thickness
c. Temperature has no effect on the UT readings
d. Whether readings will be higher or lower depends on the UT examiner's skill

9. Certain areas and types of piping systems are potentially more susceptible to corrosion under insulation. Which of the items listed is not susceptible to CUI?

a) Areas exposed to mist over-spray from cooling water towers
b) Carbon steel piping systems that normally operate in-service above 250 degrees but are in intermittent service
c) Deadlegs and attachments that protrude from insulated piping
d) Carbon steel piping systems, operating between 250 degrees F and 600 degrees F

10. Environmental cracking of austenite stainless steels is caused many times by:

a) Exposing areas to high-velocity and high-turbulence streams
b) Excessive cyclic stresses that are often very low
c) Exposure to chlorides from salt water, wash-up water, etc.
d) Creep of the material by long time exposure to high temperature and stress

DAILY EXAM 3A (CLOSED)

Note: Encircle only one alternative which you think is most appropriate.

1. Which of the following are least likely to have corrosion under insulation (CUI)?

   a. Areas subject to process spills, moisture, and/or acid vapors
   b. Areas exposed to mist from cooling towers
   c. Piping systems that operate above 250°F
   d. Areas exposed to steam vents

2. Which of the following is typical deterioration that can take place on the external surfaces of pipes?

   a. CUI
   b. Caustic embrittlement
   c. Erosion
   d. All of the above

3. Which of the following make pipe system most susceptible to CUI?

   a. Painted pipes operating at 150°F
   b. Insulated pipes operating at 150°F
   c. Projections and penetrations in "a"
   d. Projections and penetrations in "b"

4. Freeze damage can occur in case of which of the following fluids:

   a. Water only
   b. Oil only
   c. Water and aqueous solutions
   d. None of the above

DAILY EXAM 3A (CLOSED)

5. "Actively Engaged" as an authorized piping inspector means some minimum time as percentage of most recent 3 years shall be spent on piping inspection. This minimum period is:
   a. 25%
   b. 50%
   c. 20%
   d. 40%

6. For a typical "injection point pipe circuit" starts upstream of injection point from a distance of

   a. 3 times pipe diameter or 12 inches which ever is greater
   b. 2 times pipe diameter or 12 inches which ever is greater
   c. Fixed 12 inches irrespective of pipe diameter
   d. None of the above

7. The _____ shall be responsible to the owner-user for determining that the requirements of API 570 for inspection, examination, and testing are met.

   a) Piping Engineer
   b) Inspector
   c) Repair Organisation
   d) Operating Personnel

8. What is the best thing to do with deadlegs that are no longer in service?

   a) Ultrasonically inspect often
   b) Radiograph often
   c) Inspect often
   d) Remove them

DAILY EXAM 3A (CLOSED)

9. If external or internal coatings or refractory liners on a piping circuit are in good condition, what should an inspector do?

   a) After inspection, remove the liner for UT check
   b) The entire liner should be removed for inspection
   c) Selected portions of the liner should be removed for inspection
   d) Liner need not be removed if it is found to be in sound condition

10. Where can fatigue cracking typically be first detected?

   a) At points of low-stress intensification such as reinforced nozzles
   b) At points of high-stress intensification such as branch connections
   c) At points where cyclic stresses are very low
   d) At points where there are only bending or compressive stresses

11. Who would normally report vibrating or swaying piping to engineering or inspection personnel?

   a) Operating personnel
   b) Repair personnel
   c) Jurisdictional personnel
   d) Design personnel

12. An examiner is a person who assists the inspector

   a) By conducting PMI testing
   b) By conducting pressure testing
   c) By conducting nondestructive testing
   d) By conducting destructive testing

DAILY EXAM 3A (CLOSED)

13. ASME B16.5 does not cover:

    a. Class 150 flanges
    b. Class 300 flanged fittings
    c. Butt welded pipe elbows
    d. All of the above

14. The zone for preheat shall extend (as per B31.3),

    a. At least ½" beyond each edge of the weld
    b. At least 1" beyond each edge of the weld
    c. Over only the weld itself
    d. At a minimum 2" each side of the weld

15. A pressure test for piping, in most cases is a:

    a. leak test
    b. Stress test
    c. ductility test
    d. Strength test

16. Fatigue cracking of piping systems may result from

    a) Embrittlement of the metal due to it operating below its transition temperature
    b) Erosion or corrosion / erosion that thin the piping where it cracks
    c) Excessive cyclic stresses that are often well below the static yield strength of the material
    d) Environmental cracking caused by stress corrosion due to the presence of caustic, amine, or other substance.

DAILY EXAM 3A (CLOSED)

17. What are the preferred NDE methods for detecting fatigue cracking?

    a) Eddy current testing ultrasonic A-scan testing, and / or possibly hammer testing
    b) Liquid penetrant testing, magnetic particle testing
    c) Visual testing, eddy current testing and / or possibly ultrasonic testing
    d) Acoustic emission testing, hydro-testing, and / or possibly ultrasonic testing

18. Water and aqueous solutions in piping systems may freeze and cause failure because of the

    a) Expansion of these materials;
    b) Contraction of these materials
    c) Construction of these materials
    d) Decrease of these materials

19. The _____ shall be responsible to the owner-user for the requirements for design review, analysis, and evaluation of piping system.

    a) Piping Engineer
    b) Inspector
    c) Repair Organisation
    d) Operating Personnel

20. Why should deadlegs in piping be inspected?

    a) API 570 mandates the inspection of deadlegs.
    b) Acid products and debris build up in deadlegs.
    c) The corrosion rate in deadlegs can vary significantly from adjacent active piping.
    d) Caustic products and debris build up in deadlegs.

DAILY EXAM 4B (OPEN)

Note: Encircle the letter of the answer which you think is most appropriate.

1. An eight-inch diameter piping system is installed in December 1979.The installed thickness is measured as 0.34". The minimum thickness of the pipe is 0.20". It is inspected in Dec/83 and the thickness is found to be 0.32". An inspection Dec/87 reveals a loss of 0.01" from the 12/85 inspection was during Dec/89 the thickness was found to be 0.29". The last inspection was during Dec/95 and the thickness was found to be 0.26". What is the long-term corrosion rate of this system?

   a) 0.005"/year
   b) 0.0075"/year
   c) 0.00375"/year
   d) 0.0025"/year

2. Using the information in question above, calculate the short-term corrosion rate.

   a) 0.005"/year
   b) 0.0075"/year
   c) 0.00375"/year
   d) 0.0025"/year

3. Using the short-term corrosion rate in questions above, determine the remaining life of the system.

   a) 18 years
   b) 15 years
   c) 12 years
   d) None of the above

DAILY EXAM 4B (OPEN)

4. Preheating to not less than_____ degrees F may be considered as an alternative to post weld heat treatment for alterations or repairs of P-1, piping initially post weld heat treated as a code requirement (may not be used if the piping was post weld heat treated due to environmental cracking prevention)

   a) 150
   b) 200
   c) 300
   d) 350

5. If an "intelligent pigging" system is used to inspect buried piping, what type of bends is usually required in the piping system?

   a) Five diameter bends
   b) 90 degree pipe ells
   c) Ten diameter bends
   d) Three diameter bends

6. How often should poorly coated pipes with inconsistent cathodic protection potentials have a pipe-to-soil potential survey made?

   a) Yearly
   b) Every 2 years
   c) Every 5 years
   d) Every 7 years

7. Buried piping inspected periodically by excavation shall be inspected in lengths of _____ feet at one or more location judged to be most susceptible to corrosion.
   a) 2 to 4
   b) 4 to 6
   c) 6 to 8
   d) 8 to 10

DAILY EXAM 4B (OPEN)

8. A buried piping system that is not cathodically protected has to have an inspection interval set. The soil resistivity is checked and found to be 3400 ohm/cm. As the inspector, what interval would you set?
   a) 2.5 years
   b) 7.5 years
   c) 5 years
   d) 10 years

9. If a piping system is made up of unknown materials and computations must be made to determine the minimum thickness of the pipe, what can the inspector or the piping engineer do to establish the minimum thickness?
   a) The lowest grade material and joint efficiency in the applicable code may be assumed for calculations.
   b) Samples must be taken from the piping and testing for maximum tensile stress and yield strength will determine the allowable stress to be used.
   c) The piping made of the unknown material must be removed from service and current piping of known material must be installed.
   d) The piping of unknown material may be subjected to a hydrostatic stress tests while having strain gages on it to determine its yield strength and thus allowable stress.

10. If a repair area is localised (for example, pitting or pin-holes) and the specified minimum yield strength (SMYS) of the pipe is not more than _____ psi, a temporary repair may be made by fillet welding a properly designed plate patch over the pitted area:

    a) 30,000 psi
    b) 55,000 psi
    c) 40,000 psi
    d) 36,000 psi

DAILY EXAM 4A (CLOSED)

Note: *Encircle the letter of one alternative which you think is most appropriate.*

1. Which document gives the methodology for RBI?

   a. API 579
   b. API 570
   c. API 580
   d. API 574

2. "Pipe to soil potential survey" for poorly coated pipes (or where cathodic protection is not reliable) should be conducted at intervals of:

   a. Five years
   b. Three years
   c. Ten years
   d. Six years

3. In pressure decay method for testing under ground pipe, the acceptance criteria is that pressure decrease over a period of:

   a. Eight hours shall not exceed 5%
   b. Four hours shall not exceed 5%
   c. Twenty four hours shall not exceed 10%
   d. Twenty four hours shall not exceed 5%

4. In pressure-decay method for testing underground pipes, minimum leak test pressure is _____% of maximum operating pressure.

   a. 150%
   b. 50%
   c. 110%
   d. 125%

5. Marker chemical (tracer) is used for testing the underground pipes for the purpose of:

   a. Checking internal smoothness of pipe
   b. Checking strength and ductility of piping material

DAILY EXAM 4A (CLOSED)

c. Checking the diameter of underground pipe
d. Detecting and locating the leaks in the pipe line

6. Except for the class 4500 valves, the valve wall thickness is _____ times the thickness of a simple cylinder designed for a stress of _____ psi for similar pressure and temperature.

a. 1.1 times and 7000 psi
b. 1.5 times and 15000 psi
c. 1.25 times and 15000 psi
d. 1.5 times and 7000 psi

7. The retirement thickness of valves and flanged fittings can be computed using formula for pipes by using:

a. Factor of 1.5 and the stress = 15000 psi
b. Factor of 1.25 and stress = 7000 psi
c. Factor of 1.5 and allowable stress as per ASME B 31.3
d. Factor of 1.5 and stress = 7000 psi

8. Temporary repairs of locally thinned sections or circumferential linear defects may be made on-stream by installing a properly designed and fabricated bolted leak clamp. What would this activity be termed as?

a. Welding repair (on-stream)
b. Permanent repair
c. Non-welding repair (on-stream)
d. Hot tapping

9. Following inspection data is available for a piping circuit.

Minimum required thickness = 0.422 in
Actual thickness measured = 0.512 in
Long term corrosion rate = 0.018 in / year

Remaining life for this circuit will be:

a. 5.0 years
b. 4.5 years

DAILY EXAM 4A (CLOSED)

c. 6.0 years
d. Data is insufficient to calculate remaining life

10. Piping classifications (class 1, 2, 3) in API 570 will respectively mean:

a. Low, medium and high pressure pipes
b. High, medium, low pressure pipes
c. Low, medium, high level of inspection to be performed
d. High, medium, low level of inspection to be performed

11. Inspection records contain the following information for a particular thickness measurement location (TML) in a return bend:

Thickness	*Year*
0.500	0
0.425	5
0.400	10

On the basis of the information above, the long-term corrosion rate for the location is:

a. 1 ½ mils per year
b. 5 mils per year
c. 10 mils per year
d. 100 mils per year

12. For thickness measurement of pipes NPS1 and smaller. NDT technique employed would be:

a. Ultrasonic technique
b. Radiographic profile technique
c. Anyone is OK
d. None are OK

DAILY EXAM 4A (CLOSED)

13. If probable corrosion rates can not be determined on-stream determinations shall be made approximately

    a. 6 months of service
    b. 3 months of service
    c. 1 month of service
    d. None of the above

14. Thickness monitoring during periodic measurements is taken at:

    a. Same TMLS as used in previous inspection and approaching retirement thickness
    b. New TMLS only
    c. Either same or new are okay
    d. Depends on opinion of inspector

15. For calculating MAWP of Piping Circuit which is put in service the wall thickness used in computations is:

    a. Actual thickness as determined by inspection.
    b. Actual thickness minus the estimated corrosion loss before the date of next inspection
    c. Actual thickness minus twice the estimated corrosion loss before the date of next inspection
    d. None of the above

16. Table 6-2 of API 570 standard gives extent of CUI inspection following the visual inspection, which is applicable to:

    a. Entire insulated area
    b. Areas with damaged insulation
    c. Suspect areas within susceptible temperature
    d. b and c

17. As per API 570 for bolted flanged joints, bolts and nuts are considered as acceptably engaged if the lack of complete engagement is:

    a. Not more than two threads
    b. Not more than one thread

DAILY EXAM 4A (CLOSED)

c. Bolts and nuts are engaged at least 50% of threads in the nuts
d. Bolts shall completely extend through nuts

18. When an RBI assessment is used to increase inspection intervals, the assessment **shall** be conducted on Class 1 systems at a maximum interval of _____ years

a) 5
b) 10
c) 15
d) 3

19. Class 3 piping is described as being in services

a) With the highest potential of resulting in an immediate emergency if a leak occurs
b) That is flammable but do not significantly vaporizes when they leak and are not located in high-activity areas
c) That is flammable and slowly vaporize if leak occurs
d) That is not in classes 1 and 2.

20. Thickness measurement inspection on Class 1 piping should be scheduled based on the calculation of not more than

a) One half the remaining life determined from corrosion rates or the maximum interval of 5 years whichever is shorter.
b) One half the remaining life determined from corrosion rates or 5 years, whichever is longer
c) One fourth the remaining life determined from corrosion rates or the maximum interval of 10 years whichever is shorter.
d) One quarter the remaining life determined from corrosion rates or 5 years, whichever is longer

DAILY EXAM 5B (OPEN)

Note: Refer to attached PQR / WPS documents.
Encircle the letter of only one alternative which you think is most appropriate.

1. Choose correct statement from the following:

   a. The PQR shows root spacing of 1/8" and same shall be followed in production welding.
   b. PQR shows beval angle 37°. It shall be followed in production welding without change.
   c. PQR does not show backing ring, hence production weld also can not be with backing ring
   d. None of above is correct statement.

2. What condition below describes the results of the guided bend test?

   a. The three bend tests are acceptable and the fourth one is not acceptable
   b. The test result overall is acceptable
   c. The test result is not acceptable due to the linear indication
   d. The bend test result is indeterminable, carry out re-test.

3. The minimum qualified preheat temperature for the WPS is:

   a. 200° F
   b. 100° F
   c. 75° F
   d. 5 mm (3/16")

4. What welding process is qualified by this PQR?

   a. GTAW
   b. SMAW
   c. GMAW
   d. SAW

DAILY EXAM 5B (OPEN)

5. What is the P number and the tensile strength of SA-106-C?

   a. P No. 1 and 70 ksi
   b. P No. 1 and 60 ksi
   c. P No. 3 and 70 ksi
   d. P No. 3 and 60 ksi

6. In accordance with the PQR, the WPS is qualified for what welding positions?

   a. Flat and horizontal
   b. Flat, vertical, overhead and horizontal
   c. Vertical and overhead
   d. All positions

7. What is the F No. of an E 6010 electrode?

   a. F no. 4
   b. F No. 3
   c. F No. 2
   d. F No. 1

8. The welder who welded the test plate for PQR 101 is qualified to weld in what position?

   a. Flat
   b. Flat and horizontal
   c. Flat and vertical
   d. Flat, vertical and horizontal

9. The bend test specimen used are side bend. They are:

   a. Not accepted since 2 face bend and 2 root bend must be used
   b. Accepted since as alternative to (a) 4 side bend may be used

DAILY EXAM 5B (OPEN)

c. Accepted since only 2 bend tests are required where as 4 bend tests are performed
d. Not accepted since all 3 types of bend tests (face, root, side) are required.

10. As far as thickness ranges for Base Metal (B.M.) and weld metal (W.M.) as shown on WPS are concerned, your decision about the qualified range is:

a. B.M. is okay and W.M. is not okay.
b. Both B.M. and W.M. are okay.
c. Both B.M. and W.M. are not okay.
d. W.M. is okay and B.M. is not okay.

11. PWHT of PQR test coupon shows "No PWHT". It means that the PWHT for _____:

a. WPS may be with PWHT
b. WPS must be without PWHT
c. WPS must be with PWHT
d. WPS may be with or without PWHT as PWHT is non-essential variable

12. In production welds, if groove design is changed to double V groove for the qualified base metal thickness, as per ASME Sec. IX will you:

a. Accept the change — since it is non-essential variable
b. Will not accept — since it is essential variable
c. Accept only if okay by radiography
d. Accept only if okay by both radiography and UT

13. Based on the specimen areas provided in PQR, are the ultimate stress calculations correct (as rounded up to 100 psi) for specimen T_1 and T_2:

DAILY EXAM 5B (OPEN)

a. Calculation is okay for T_1 alone.
b. Calculation is okay for T_2 alone.
c. Calculations for both are okay.
d. Calculations for both are not okay.

14. Which condition below best describes the result of tensile tests reported on the PQR?

a. Test T1 & T2 are acceptable
b. Test T1 & T2 are unacceptable
c. Test T1 is acceptable & T2 is unacceptable
d. Test T1 is unacceptable & T2 is acceptable

15. If electrode E7010 shown on WPS is changed to E7018, what is your decision?

a. Revise WPS to show the change and re-submit as new revision
b. No revision of WPS is necessary as both belong to same F number.
c. A new PQR will be required to support the change.
d. No revision of WPS required but show the change in same PQR and submit it as new revision

Company Name API 570 FINAL EXAM By John Doe

Welding Procedure Specification No. 101 Date 1/30/96 Supporting PQR no. (s) 10
Revision No. Date
Welding Processes) SMAW Type(s) MANUAL
(Automatic, Manual, Machine or Semi-Auto)

JOINTS (QW-402)	Details
Joint Design SINGLE VEE GROOVE	
Backing (Yes) X (No) X	
Backing Material (Type)	
(Refer to both backing and retainers.)	
X Metal ☐ Nonfusing Metal	
☐ Nonmetallic ☐ Other	

Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified.

(At the option of the Mfgr., sketches may be attached to illustrate joint design, weld layers and bead sequence. e.g. for notch toughness proce dures. for multiple process procedure, etc.)

*BASE METALS (QW-403)

No. _____ Group No. _____ to P-No. _____ Group No. _____
OR
Specification type and grade _____
to Specification type and grade _____
OR
Chem.. Analysis and Mech. Prop. _____
to Chem. Analysis and Mech. Prop. _____
Thickness Range:
Base Metal: Groove 1/16" - 1" Fillet ALL
Pipe Dia Range: Groove 2 7/8" O.D. Fillet ALL
Other _____

*FILLER METALS (QW-404)

Spec. No. (SFA) 5.1
AWS No. (Class) E 7010
F-No.
A-No. 1
Size of Filler Metals 3/32", 1/8"
Weld Metal
Thickness Range:
Groove 0 - 1"
Fillet
Electrode-Flux (Class) N/A
Flux Trade Name N/A

WPS No. 101 Rev.

POSITIONS (QW-405)
Positions of Groove 6G
Welding Progression: Up X Down
Position(s) of Fillet

POSTWELD HEAT TREATMENT (QW-407)
Temperature Range NONE
Time Range

PREHEAT (QW-406)
Preheat Temp. Min.
Interpass Temp. Max.,
Preheat Maintenance
(Continuous or special heating where applicable should be recorded)

GAS (QW-408)

	Gas(es)	Percent Composition (Mixture)	Flow Rate
Shielding			
Trailing			
Backing			

ELECTRICAL CHARACTERISTICS (QW-409)
Current AC or DC DC Polarity STRAIGHT
Amps (Range) 150-275 Volts (Range) 20-28

(Amps and volts range should be recorded for each electrode size, position, and thickness, etc. This information may be listed in a tabular form similar to that shown below.)

Tungsten Electrode Size and Type N/A (Pure Tungsten, 2% Thoriated, etc.)
Mode of Metal Transfer for GMAW N/A (Spray arc, short circuiting arc, etc.)
Electrode Wire feed speed range N/A

TECHNIQUE (QW-410)
String or Weave Bead STRING & WEAVE
Orifice or Gas Cup Size
Initial and Interpass Cleaning (Brushing, Grinding, etc.) BRUSHING, GRINDING, CHIPPING
Method of Back Gouging AIR ARC
Oscillation
Contact Tube to Work Distance
Multiple or Single Pass (per side) BOTH
Multiple or Single Electrodes SINGLE
Travel Speed (Range) 12 IPM
Peening N/A
Other

Weld Layer (s)	Process	Filler Metal Class	Filler Metal Dia.	Current Type Polar.	Current Amp. Range	Volt Range	Travel Speed Range	Other (e.g. Remarks, Comments, Hot Wi Addition, Techniqu Torch Angle, Etc.)
ROOT	SMAW	E 7018	3/32	STRAIGHT	150	18-20	N/A	
REST	SMAW	E 7018	1/8, 5/32	STRAIGHT	170-290	20-23	N/A	

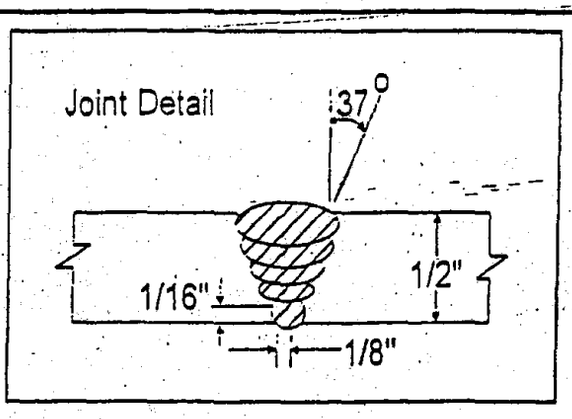
QW-483 SUGGESTED FORMAT FOR PROCEDURE QUALIFICATION RECORDS (PQR)

See QW-200.2, Section IX, ASME Boiler and Pressure Vessel Code)
Record Actual Conditions Used to Weld Test Coupon.

570

Company Name API [redacted] FINAL EXAM
Procedure Qualification Record No. 101 Date
WPS No. 101
Welding Process(es) SMAW
Types (Manual, Automatic, Semi-Auto.) MANUAL

JOINTS (QW-402)



Groove Design of Test Coupon

(For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal or process used

BASE METALS (QW-403)	POSTWELD HEAT TREATMENT (QW-407)
Material Spec. SA 106	Temperature NONE
Type or Grade GR C	Time
P-No. P-No.	Other
Thickness of Test Coupon .500"	
Diameter of Test Coupon 10"	
Other	Gas (QW-409)
	Percent Composition
	Gas(es) (Mixture) Flow Rate
	Shielding
	Trailing
	Backing
FILLER METALS (QW-404)	
SFA Specification 5.1	ELECTRICAL CHARACTERISTICS (QW-409)
AWS Classification E 7010	Current DC
Filler Metal F-No.	Polarity STRAIGHT
Weld Metal Analysis A-No. 1	Amps 150-300 Volts 20-28
Size of Filler Metal 5/32, 1/8, 3/32	Tungsten Electrode Size
Other	Other
Weld Meal Thickness	
POSITION (QW-405)	TECHNIQUE (QW-410)
Position of Groove: 1G	Travel Speed 3 IPM
Welding Progression (uphill, Downhill)	String or Weave Bead STRING & WEAVE
Other	Oscillation
	Multipass or Single pas (per side) MULTIPLE
	Single or Multiple Electrodes SINGLE
PREHEAT (QW-406)	Other
Temp. (Preheat) 200° F	
ass Temp. (interpass) 450° F	
Other	

This form (E00007) may be obtained from the Order Dept., ASME, 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300.

W-483 (Back)

PQR No. 1

Tensile Test (QW-150)

Specimen No.	Width	Thickness	Area	Ultimate Total Load LB	Ultimate Unit Stress psi	Type of Fai & Location
T1	.750	.457	.342	24,624	72,000	Weld Met
T2	.783	.451	.353	23,440	66,400	Base M

Guided-Bend Tests (QW-160)

Type and Figure No.	Result
SIDE	NO INDICATION FOUND
SIDE	LINEAR INDICATION 1/8"
SIDE	NO INDICATION FOUND
SIDE	NO INDICATION FOUND

Toughness Tests (QW-170)

Specimen No.	Notch Location	Specimen Size	Test Temp.	Impact Values			Drop Weight Brea (Y/N)
				Ft.Lbs	% Shear	Mils	

Comments: _____

Fillet-Weld Test (QW-180)

Result Satisfactory: Yes_____ No_____ Penetration into Parent Material: Yes_____ No_____

acro-Results _____

Other Tests

Type of Test _____

Deposit Analysis _____

Other _____

Welder's Name _____ Clock No. _____ Stamp No. _____

Tests conducted by: _____ Laboratory Test No. _____

We certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Section IX of the ASME Code.

Manufacturer _____

Date: _____ By _____

Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code.)

egratedTraining

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DAILY EXAM 5A (CLOSED)

Note: *Encircle the letter of only one alternative which you think is most appropriate.*

1. A welder has made 25 SMAW groove welds, but the guided bend test for the welder's qualification was never performed. In order to avoid cutting out all of the production welds made by this welder, which of the following minimum steps would be taken to validate the qualification?

   a. Radiograph the welder's first production weld and accept the qualification based on acceptable weld quality by radiography.
   b. There is no alternative to qualifying a welder by the guided bend test.
   c. Have the welder prepare a test coupon and have the bend test done on that
   d. Radiograph all 25 welds, regardless of the governing specifications for sample selection

2. Which of the following represent grouping of weld-metals in ASME IX?

   a. P - Nos
   b. F - Nos
   c. S – Nos
   d. A - Nos

3. Welders carrying out repair/alteration according to API 570 shall be qualified according to

   a. API 1104 welding qualification code
   b. ASME Sec. IX code
   c. Any one of a or b above
   d. None of a or b above

4. A PQR was qualified in 5G position using a new welder. But production welding is to be done in 2G position. Which of the following are applicable as a minimum?

   a. Both procedure and welder shall be re-qualified in 2G position.
   b. The qualified procedure can be used ,only welder needs to be re-qualified

DAILY EXAM 5A (CLOSED)

c. The welder is qualified, but the procedure needs re-qualification
d. Both procedure and welder need not be re-qualified.

5. For API 5L gr B (SMTS=60000 psi) material, following results were obtained for two tensile test specimens in PQR qualification.
Specimen T1: failed in B.M. at 57,400 psi
Specimen T2: failed in weld metal, at 59,500 psi

Your assessment is:

a. PQR test is ok since both are within acceptance criteria
b. PQR test is rejected as both T1 and T2 are not within acceptance criteria
c. PQR in rejected because T1 is ok but T2 has failed
d. PQR in rejected because T1 is failed though T2 is ok

6. Minimum thickness evaluation may be conducted by?

a. Use of an external micrometer only
b. Ultrasonic testing
c. D.P. check
b. None of above

7. For procedure qualification documentation,

a. WPS gives the procedure test data and results of tensile/bend test
b. PQR gives ranges qualified by procedure test
c. PQR gives procedure test data and WPS gives ranges qualified
d. WPS and PQR both give test data and ranges qualified

8. If a welder is to be qualified in all positions he must pass test in which positions?

a. 1G, 2G, and 6G
b. 5G and 4G
c. 6G
d. 6G and 4G

DAILY EXAM 5A (CLOSED)

9. According to ASME Sec. IX, Supplementary Essential Variables are to be recorded if impact testing is specified. Otherwise,

   a. They shall be considered as non-essential.
   b. They shall be considered as essential.
   c. Depends on opinion of welding engineer
   d. Depends on opinion of API 570 inspector

10. Procedure Qualification is done by:

   a. 1 tensile and 2 bend tests
   b. 1 tensile and 1 radiography
   c. 1 bend test and 1 radiography
   d. 2 tensile and 4 bend tests

11. Identify correct statement from following:

   a. Tensile test for procedure qualification is passed only if base metal failure occurs at or above Specified Minimum Tensile Strength (SMTS) of base metal
   b. Tensile test for procedure qualification is passed only if base metal failure occurs above SMTS of base metal
   c. Tensile test for procedure qualification is passed even if weld metal failure occurs above 95% of SMTS of base metal
   d. None of above

12. What type of defect should not be repaired by a full encirclement welded split sleeve?

   a) A longitudinal crack
   b) A circumferential crack
   c) Pits that are one half through wall
   d) General corrosion

DAILY EXAM 5A (CLOSED)

13. How often should above-grade visual surveillance of a buried pipeline right-of-way be made?

    a) Once a month
    b) Approximately 6 month intervals
    c) Once a year
    d) Once every 3 months

14. Remaining life of pipe circuit is determined by:

    a. Finding out total length of piping circuit
    b. Finding out actual thickness, required thickness and corrosion rate
    c. Finding out original thickness and corrosion rate
    d. Finding out the elapsed life of the pipe

15. When using radiographs to qualify welder, the acceptance standards used are found in:

    a. ASME Section V
    b. ASME Section IX
    c. ASME B31.3
    d. API 570

16. What is the number of guided bend tests required for Performance Qualification in 6G position?

    a. 2
    b. 4
    c. 6
    d. 3

17. A welder qualified to weld in the 2G position on pipe would have to be qualified in which of the additional positions to qualify for all position groove welding on pipe?

    a. 1G
    b. 2G
    c. 5G
    d. 6G

DAILY EXAM 5A (CLOSED)

18. An RBI assessment can be used to alter the inspection strategy provided:

    a) Likelihood of failure and consequence of failure are evaluated.
    b) The RBI is fully documented.
    c) A third party conducts the RBI.
    d) Both A and B above

19. What are the methods for detecting thickness of buried piping?

    a) Eddy current testing, and / or possibly hammer testing
    b) Intelligent pigging
    c) Visual testing, eddy current testing
    d) Acoustic emission testing, hydro-testing

20. You are reviewing a WPQ for a welder. The test results indicate the following:

    a. Satisfactory side bend
    b. Face bend satisfactory
    c. Visual satisfactory

    Will these tests qualify the welder?

    a. Yes
    b. No, because bend tests are not correct type.
    c. Not enough information given
    d. No, because radiography is essential for welder qualification

FINAL EXAM (OPEN)

Instructions:
Choose only one alternative, which you think is most appropriate. Use attached answer sheet. You may refer to the applicable ASME/API documents.

1. The following data is presented for a class 2 pipe,

   Thickness = 0.36 inch (after inspection)
   Corrosion rate = 10 mpy
   Remaining life = 16 years
   When is the next thickness measurement inspection due?

   a. After 8 years
   b. After 5 years
   c. After 10 years
   d. None of the above

2. Please calculate remaining corrosion allowance for piping in Question 1 above.

   a. 0.20 inch
   b. 0.28 inch
   c. 0.12 inch
   d. 0.16 inch

3. When will be the next inspection schedule from now on for external inspection for pipe in Q.1?

   a. 10 years
   b. 8 years
   c. 5 years
   d. none of the above

4. The pipe in Q.1 above has an insulated area of 200 sq. ft., which is exposed to susceptible temperature and mist spray of cooling tower. According to API 570, how much of minimum area is recommended for NDT survey for CUI during external inspection?

   a. 100 square feet
   b. 50 square feet
   c. 66 square feet
   d. 150 square feet

FINAL EXAM (OPEN)

5. A PQR is to be qualified using 5/8 inch thick test coupon. It can qualify thickness:

   a. 1/8" to 1-1/4"
   b. 1/16" to 5/8"
   c. 1/16" to 1-1/4"
   d. None of the above

6. The recommended minimum development time (Penetrant Testing) allowed for a material made of high temperature alloy is:

   a. 5 min
   b. 10 min
   c. 7 min
   d. 6 min

7. A radiograph was having density near the penetrameter equal to 3.0. Hence the acceptable density range of the radiograph is:

   a. 1.7 to 4
   b. 2.55 to 3.9
   c. 2.0 to 4.0
   d. None of the above

8. For piping buried in soil with resistivity of 5000-ohm cm and not cathodically protected, evaluations of pipe thickness should be performed at:

   a. 10 year interval
   b. 5 year interval
   c. 3 year interval
   d. None of the above

9. For a certain Natural gas piping system, which is in operation for 16 years, it is estimated that it has remaining life of 12 years. Considering the stipulation of API 570, which of the following will determine maximum interval for next proposed date for thickness measurement examination and visual examination?

FINAL EXAM (OPEN)

a. 6 years and 5 years respectively
b. 3 years and 10 years respectively
c. 10 years and 5 years respectively
d. 6 years and 6 years respectively

10. An Inspector finds incomplete penetration of 2mm in a radiograph of a girth weld of normal fluid service piping 12 mm thick. Can he accept as per ASME B31.3?

a. If the incomplete penetration is greater than 1 mm, reject.
b. If the incomplete penetration is more than 1 mm but still less than 0.2 times pipe thickness, accept.
c. Depends on opinion of inspector
d. Radiograph again and then decide on acceptance.

11. You are planning for the Hydro-test of a piping with Hydro test pressure 40Kg/cm^{2}g. The calibrated test gauges available with you are 0-50 Kg/cm^{2}g, 0-100 Kg/cm^{2}g, 1-150 Kg/cm^{2}g and 0-200 Kg/cm^{2}g. Which two gauges are acceptable for this test?

a. 0-100 Kg/cm^{2}g and 0-150 Kg/cm^{2}g
b. 0-50 Kg/cm^{2}g and 0-100 Kg/cm^{2}g
c. 0-100 Kg/cm^{2}g and 0-200 Kg/cm^{2}g
d. 0-50 Kg/cm^{2}g and 0-200 Kg/cm^{2}g

12. What would you expect to happen if you were taking UT readings on piping that was operated higher than 200 degrees F?

a. The thickness readings could be lower.
b. The thickness readings would not be influenced.
c. The thickness readings could be about 1% higher for each 100 degrees F rise of temperature.
d. The thickness readings may be higher or lower depending on couplant.

13. A welded part is to be radiographed and is 1" thick, with 1/8" reinforcement. What ASTM wire set IQI should be used on these radiographs if a source side technique is used?

FINAL EXAM (OPEN)

a. Set A
b. Set B
c. Set C
d. Set D

14. The document referenced in API 570 for determining "fitness for service" of piping system is:

    a. API 579
    b. API 574
    c. ASME B 31.1
    d. None of the above

15. During impact testing of A 106 grB (Deoxidised) and A53 grB pipes (non-deoxidised), following absorbed energy values in ft-lb were observed:
    A 106 grB : 12.5, 13.5 , 12
    A 53 grB : 11, 11.5 , 9

    Your assessment is:

    a. Both A106 and A53 are acceptable
    b. Both A106 and A 53 shall be rejected
    c. Only A53 grB can be accepted
    d. Only 106 grB shall be accepted

16. A PQR test was made on A 106 grade C pipe. This will qualify which of the following sets of materials:

    a. A 106 gr B, A36 , A 182 F1
    b. A 105, A516 gr 60, A516 gr 70
    c. 515 gr 70, A 285 gr C, A 335 P 11
    d. None of the above set is fully qualified by this PQR.

17. Carbon percentage cannot be detected by x-ray fluroscence method because this method cannot detect materials:

    a. Lighter than sulpher
    b. Heavier than sulpher
    c. Black in color
    d. Which are radioactive

FINAL EXAM (OPEN)

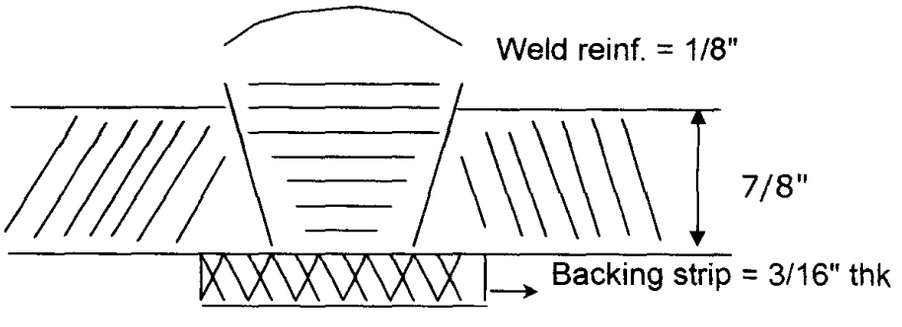
18. When a PT test cannot be conducted between 10-52 degree C (50 degrees F – 125 degrees F) what must be done, as per ASME Sec. V?

    a. A new procedure must be qualified using suitable penetrant materials.
    b. The surface must be re-cleaned.
    c. The test cannot be conducted.
    d. Use the dwell time for penetrant and developer as per Table in Article 6 of ASME Sec. V.

19. A piping system is to be pneumatically pressure tested. Its Design Pressure is 160 psig. The first stage pressuration, the test pressure and inspection pressure respectively will be:

    a. 80 psi, 176 psi, 160 psi
    b. 25 psi, 200 psi, 176psi
    c. 25 psi, 176 psi, 160 psi
    d. none of above

20. Select suitable Hole type (source side) penetrameter for following weld joint:



    a. No 20
    b. No 25
    c. No 30
    d. None of the above

FINAL EXAM (OPEN)

21. If type of penetrameter in above question is changed to wire type what shall be the wire designation (wire decimeter in inch)?

    a. 0.025 (No. 10)
    b. 0.016 (No. 8)
    c. 0.032 (No. 11)
    d. None of the above

22. For steel plates and welds to be checked by LPI, what shall be the penetration time for penetrant?

    a. 10 min for weld, 5 min for plate
    b. 5 min for both
    c. 10 min for both
    d. 5 min for weld, 10 min for plate

23. After applying the developer the examiner checked four welds for surface defects after following period, weld A – after 5 minute, weld B after 10 minutes, weld C was checked after 30 minutes and welds D after 65 minutes. Which of the welds were checked wrongly:

    a. Weld A and B
    b. Weld C and D
    c. Weld D only
    d. Weld A and D

24. In a certain PQR for SMAW, the electrodes used for all passes were of AWS classification (E 7018). Corresponding WPS also showed filler materials as E 7018. Now the manufacturer proposes to change the filler material in WPS to E 7015. Will you ask manufacturer to:

    a. Qualify new PQR with E 7015 electrodes.
    b. Revise only WPS showing the change from E 7018 to E 7015 and submit WPS as a new revision.
    c. Revise only the PQR document showing the change and resubmit for approval.
    d. Revise both WPS and PQR showing the change and resubmit for approval.

FINAL EXAM (OPEN)

25. Actual thickness measured at a TML was 0.4 inch. The corrosion rate is 10 mpy. If next planned thickness inspection is after 6 years, what thickness will be used for MAWP calculation?
    a. 0.4 inch
    b. 0.34 inch
    c. 0.28 inch
    d. None of the above

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Professional Training and Consultation

API 570 Preparatory
19-24 February 2005

FINAL EXAM (OPEN)
Answer Sheet

Name : _____ Date : _____

Organization : _____ Time : _____

Notes : 1. Choose only one answer for each question.
2. Mark most appropriate answer like this:

A	B	C	D	
O	●	O	O	(mark by pencil only)

SN	A	B	C	D	SN	A	B	C	D	SN	A	B	C	D
1.	O	O	O	O	11.	O	O	O	O	21.	O	O	O	O
2.	O	O	O	O	12.	O	O	O	O	22.	O	O	O	O
3.	O	O	O	O	13.	O	O	O	O	23.	O	O	O	O
4.	O	O	O	O	14.	O	O	O	O	24.	O	O	O	O
5.	O	O	O	O	15.	O	O	O	O	25.	O	O	O	O
6.	O	O	O	O	16.	O	O	O	O	26.	O	O	O	O
7.	O	O	O	O	17.	O	O	O	O	27.	O	O	O	O
8.	O	O	O	O	18.	O	O	O	O	28.	O	O	O	O
9.	O	O	O	O	19.	O	O	O	O	29.	O	O	O	O
10.	O	O	O	O	20.	O	O	O	O	30.	O	O	O	O

Total Marks : _____

Examiner's Signature: _____ Date: _____

FINAL EXAM (CLOSED)

Instructions:
Choose only one answer, which you think is most appropriate.
Use the attached answer sheet in answering the following questions.

1. Which of the following statement is correct?

   a. Soil resistivity is a measure of resistance offered by soil to drilling operation for oil exploration and it has no connection with corrosivity of soil.
   b. Lower soil resistivity indicates less corrosive soil.
   c. Soil resistivity has nothing to do with corrosiveness of soil because soil corrosion depends on the amount of corrosive chemicals present in the soil.
   d. Higher soil resistivity indicates less corrosive soil.

2. The _____ shall be responsible to the owner-user for determining that the requirements of API 570 for inspection, examination, and testing are met.

   a) Piping Engineer
   b) Inspector
   c) Repair Organisation
   d) Operating Personnel

3. Which of the following are some of the mandatory requirements for re-rating a piping system?

   a. Calculations must be performed by the piping engineer or the inspector.
   b. Current inspection records shall be reviewed to verify that the piping system is satisfactory for the proposed service conditions and that the appropriate corrosion allowance has been provided.
   c. The piping system is checked to affirm that the required pressure relieving devices are present, are set at the appropriate pressure and have the appropriate capacity at the set pressure.
   d. All of the above

FINAL EXAM (CLOSED)

4. After completion of alterations a pressure test is/will:

   a. Normally required
   b. Not required at all
   c. Depend on opinion of piping inspector
   d. Only "a" and "c" above

5. Name a part of a piping system that thickness measurements are not normally routinely taken:

   a) Elbows
   b) Expansion loops
   c) Tees
   d) Valves

6. Pressure decay method is:

   a. A technique adopted for checking the leakage in above ground piping
   b. A technique used for checking leakage in underground piping
   c. A technique used for calibration of pressure gauges
   d. A technique used for releasing the overpressure in piping

7. Which of the following are areas on piping systems which are susceptible to CUI during the range of 25°F to 250°F:

   a. All the area which is below insulation
   b. Insulated areas below steam vents
   c. Insulated piping exposed to cooling tower mist
   d. "b" and "c" above

8. Listed below are several examples of piping system. Which is class I piping for flammable fluids?

   a) Readily vaporizing on leakage
   b) Slowly vaporizing on leakage
   c) No significant vaporization
   d) All of above

9. Which of the following documents referenced in API 570 addresses hot tapping?

FINAL EXAM (CLOSED)

a. API 2201
b. API 574
c. ASME B 31 G
d. None of the above

10. The preferred method for inspecting piping coating is:

a. Visual inspection only
b. Holiday detection
c. M.P. Check
d. D.P. Check

11. For which of the following, the approval from piping engineer is not mandatory:

a. Changing the damaged flange to a new flange of same rating and material
b Alteration on piping changing a nozzle size from one not requiring reinforcement pad to the one requiring reinforcement pad
c. For both a and b
d. For none of the above

12. Fillet welded patches (lap patches) shall be designed by:

a) An engineer expert in corrosion
b) The inspector
c) The piping engineer
d) The repair organization

13. For a project involving piping welding at site by 10 welders, (with only one qualified welder) procedure and 9 welders were to be qualified. In this case, identify correct statement from the following:

a. 9 welders qualification must be performed before procedure qualification.
b. 9 welders qualification should be performed after procedure qualification is carried out using qualified welder.

FINAL EXAM (CLOSED)

c. Out of Welder qualification and procedure qualification, anything can be performed before.
d. Welder qualification and procedure qualification must be performed simultaneously, without waiting for the test results.

14. Guided bend test represents:

a. Ductility of weld
b. Strength of weld
c. Soundness of weld
d. Both soundness and ductility of weld

15. All positions of groove welds are qualified by

a. Pipe positions 1G and 5G
b. Pipe positions 2G and 5G
c. Pipe position 5G and 3G
d. None of the above

16. According to ASME Sec. IX, a welder for SMAW can be qualified by following minimum tests (for 1G pipe position):

a. 1 tensile and 2 bend tests
b. 2 bend tests
c. 2 tensile tests and 1 bend tests
d. 1 tensile and 1 radiography

17. Identify incorrect statement from following

a. A welder performing procedure test is also qualified in that position.
b. Supplementary essential variables become essential variables when impact test is specified.
c. For procedure qualification, the test can be performed in any position as the position is not essential variable for procedure qualification.
d. A 3G welder qualified in SMAW process can be employed for TIG welding also in that position.

FINAL EXAM (CLOSED)

18. Procedure Qualification Record is a document which can be revised time to time.

    a. True
    b. False
    c. Depends on company policy
    d. Depends on client of the company

19. Use of Radiography is made for:

    a. Performance qualification only
    b. Procedure qualification only
    c. Both a and b
    d. Use of radiography is not permitted by ASME Sec. IX.

20. When dial-type indicating and recording pressure gauges are used to monitor leak testing, the maximum gauge range shall not exceed which multiple of the expected test pressure?

    a. 1 ½ times
    b. 2 ½ times
    c. 3 times
    d. 4 times

21. A radiographic technique in which radiation passed through two walls and both the walls are viewed on the same radiograph (double wall, double image – ellipse) the limitation for the outside diameter is:

    a. 3-1/2″
    b. 2″
    c. 4″
    d. Any diameter possible

22. Following data is available to compute remaining life of a piping circuit:

    Minimum required thickness = 0.422 in
    Actual thickness measured = 0.512 in
    Corrosion rate = 0.018 in / year

FINAL EXAM (CLOSED)

Remaining life for this circuit will be:

a. 5.0 years
b. 4.5 years
c. 6.0 years
d. None of above

23. Common locations which are susceptible to CUI on the insulated piping are:

a. All penetrations or breaches in the insulation jacketing such as vents, drains, piping hangers
b. Termination of insulation at flanges
c. All insulated bends and elbows
d. a and b above

24. The accuracy of a magnetizing equipment that is equipped with an ammeter shall be verified:

a. Each year
b. Each two years
c. When possible
d. Every 6 months

25. The WPS and the PQR are used to determine:

a. If the welder is able to deposit sound weld metal.
b. If the welder is able to operate welding equipment.
c. The welder's ability to produce welds that are radiographically free of defects.
d. If a weldment has the required properties for the intended application (strength, ductility)

26. Which of the following penetrant system is generally considered least sensitive?

a. Water-washable – visible dye.
b. Solvent removable – visible dye.
c. Water-washable – fluorescent dye.
d. Post-emulsification – visible dye.

FINAL EXAM (CLOSED)

27. As soon as possible after completing an inspection, the Inspector should:

    a. Review the inspection records and schedule the next inspection
    b. Always require a hydrotest
    c. Sign all RT records
    d. Notify the Piping Engineer

28. The nondestructive examination method to be used for a particular inspection should be determined by the:

    a. Availability of certified NDE examiners.
    b. Length of time since the last inspection.
    c. Age of the component to be inspected.
    d. Type, location, and orientation of the expected flaws.

29. To verify satisfactory PWHT the test conducted is:

    a. Radiography
    b. Ultrasonic
    c. Hardness survey
    d. None of above

30. In visual testing for qualifying the procedure, a defect of which minimum width shall be used:

    a. 1/16"
    b. 1/8"
    c. 1/32"
    d. None of the above

31. Visual examiner should pass Jaeger J-1 check:

    a. Annually
    b. Six monthly
    c. Once in 3 years
    d. None of the above

FINAL EXAM (CLOSED)

32. The pressure gauges for leak testing shall be calibrated as an ASME Sec. V requirement, at least:

    a. Every six months
    b. Every one year
    c. Every three years
    d. None of the above

33. It is decided to carryout a surface NDT for austenitic S.S. pipe welds. Choose the best combination.

    a. Penetrant testing with Halogen free developer
    b. Penetrant testing with any aqueous developer
    c. Magnetic particle testing with wet particles
    d. Magnetic particle testing with dry particles

34. In ultrasonic testing, for thickness measurement on corroded surface, use:

    a. CRT read out
    b. Digital read out
    c. Any of above
    d. None of above.

35. An example of service-specific corrosion is:

    a) Corrosion under insulation in areas exposed to steam vents
    b) Unanticipated acid or caustic carryover from processes into non-alloyed piping
    c) Corrosion in deadlegs
    d) Corrosion of underground piping at soil-to-air interface

36. When a pressure test is not necessary or practical, what shall be utilised in lieu of a pressure test?

    a) PMI Testing
    b) Non-destructive examination
    c) Vacuum visual examination
    d) Hammer Testing

FINAL EXAM (CLOSED)

37. For which of the following can yoke technique be used?

    a. Sub-surface cracks
    b. Surface cracks
    c. Both a and b
    d. For none of a and b

38. The pipe welding test position in which the pipe is horizontal and rotated so that welding takes place at or near the top is designated as?

    a. 2 G
    b. 5 G
    c. 3 G
    d. 1 G

39. API 578 gives rules for Alloy Verification for:

    a. Carbon steel piping material for old or new piping
    b. Alloy steel piping materials, for old or new piping
    c. Carbon steel materials used for old piping only
    d. Alloy steels used for old piping only

40. For thickness measurement of pipes NPS 1 and smaller, NDT technique employed would be:

    a. Ultrasonic technique
    b. Radiographic profile technique
    c. Anyone is okay.
    d. None are okay.

41. API 578 requires at least _____ electrodes to be PMI tested from each box.

    a. one
    b. two
    c. minimum 10%
    d. all

FINAL EXAM (CLOSED)

42. Which of the following make pipe system most susceptible to CUI?

    a. Painted pipes operating at 150° F
    b. Insulated pipes operating at 150° F
    c. Projections, penetrations in "a"
    d. Projections, penetrations in "b"

43. Freeze damage can occur in case of which of the following fluids:

    a. Water only
    b. Oil only
    c. Water and aqueous solutions
    d. None of the above

44. For calculating MAWP of Piping Circuit which is put in service the wall thickness used in computations is:

    a. Actual thickness as determined by inspection.
    b. Actual thickness minus the estimated corrosion loss before the date of next inspection
    c. Actual thickness minus twice the estimated corrosion loss before the date of next inspection
    d. None of the above

45. When checking Titanium materials for cracks using PT methods only liquid penetrants:

    a. with low or no nitrides should be used
    b. with low or no carbides should be used
    c. with high or medium chlorides should be used
    d. with low or no chlorides should be used

46. As per API 570 for bolted flanged joints, bolts and nuts are considered as acceptably engaged if the lack of complete engagement is:

    a. Not more than two threads
    b. Not more than one thread
    c. Bolts and nuts are engaged at least 50% of threads in the nuts
    d. Bolts shall completely extend through nuts

FINAL EXAM (CLOSED)

47. Inspection of piping systems is carried out for purpose of:

    a. Safety
    b. Reliability of operation
    c. Regulatory requirements
    d. All of above

48. For a typical "injection point pipe circuit" starts upstream of injection point from a distance of

    a. 3 times pipe diameter or 12 inches which ever is greater
    b. 2 times pipe diameter or 12 inches which ever is greater
    c. Fixed 12 inches irrespective of pipe diameter
    d. 3 times pipe diameter or 12 inches whichever is smaller

49. For MT examination by Prod technique the spacing between prods shall be between:

    a. 4 inches to 12 inches
    b. 4 inches to 10 inches
    c. 3 inches to 10 inches
    d. 3 inches to 8 inches

50. API 578 Material Verification can be applied for:

    a. New and in-service carbon steel piping
    b. New and in-service alloy piping
    c. Only in service carbon steel piping
    d. Only for in-service alloy piping

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API 570 Preparatory
19-24 February 2005

FINAL EXAM (CLOSED)
Answer Sheet

Name : _____ Date : _____

Organization : _____ Time : _____

Notes : 1. Choose only one answer for each question.
2. Mark most appropriate answer like this:

A	B	C	D	
O	●	O	O	(mark by pencil only)

SN	A	B	C	D	SN	A	B	C	D	SN	A	B	C	D
1.	O	O	O	O	22.	O	O	O	O	43.	O	O	O	O
2.	O	O	O	O	23.	O	O	O	O	44.	O	O	O	O
3.	O	O	O	O	24.	O	O	O	O	45.	O	O	O	O
4.	O	O	O	O	25.	O	O	O	O	46.	O	O	O	O
5.	O	O	O	O	26.	O	O	O	O	47.	O	O	O	O
6.	O	O	O	O	27.	O	O	O	O	48.	O	O	O	O
7.	O	O	O	O	28.	O	O	O	O	49.	O	O	O	O
8.	O	O	O	O	29.	O	O	O	O	50.	O	O	O	O
9.	O	O	O	O	30.	O	O	O	O	51.	O	O	O	O
10.	O	O	O	O	31.	O	O	O	O	52.	O	O	O	O
11.	O	O	O	O	32.	O	O	O	O	53.	O	O	O	O
12.	O	O	O	O	33.	O	O	O	O	54.	O	O	O	O
13.	O	O	O	O	34.	O	O	O	O	55.	O	O	O	O
14.	O	O	O	O	35.	O	O	O	O	56.	O	O	O	O
15.	O	O	O	O	36.	O	O	O	O	57.	O	O	O	O
16.	O	O	O	O	37.	O	O	O	O	58.	O	O	O	O
17.	O	O	O	O	38.	O	O	O	O	59.	O	O	O	O
18.	O	O	O	O	39.	O	O	O	O	60.	O	O	O	O
19.	O	O	O	O	40.	O	O	O	O	61.	O	O	O	O
20.	O	O	O	O	41.	O	O	O	O	62.	O	O	O	O
21.	O	O	O	O	42.	O	O	O	O	63.	O	O	O	O

Total Marks : _____

Examiner's Signature: _____ Date: _____

API 570

DAILY POINTS TO RECALL

DAILY POINTS TO RECALL (DAY 6)

1. ASME Sec. V is NDT procedure/methods code and is applicable only if it is referenced by the relevant construction code. The extent of NDT and acceptance standards are stipulated in relevant construction code.

2. **For RT:**

   a. Backscatter:
   Light image of B on dark background - Unacceptable

   b. Density Limitations:
   Min 1.8 for X Ray / 2.0 for G-Ray
   Max 4.0 for X / G Ray
   Density Variation = -15 % to + 30%

   c. Double wall viewing (DWDI)- up to 3.5" diameter

   d. Penetrameter Selection : Table T-276. Thickness includes weld reinforcement. But not backing.

3. **For PT :**

   a. Control of Contaminants: sulphur or (chlorine+ fluorine) content shall not exceed 1 %

   b. Temp. shall be between 10°C to 52°C, for standard procedures.

   c. Penetrants are colour (visible) type and fluorescent type. Each of these have:
   - water washable
   - post emulsifying
   - solvent removable

   Thus, total 6 categories of penetrant are available.

DAILY POINTS TO RECALL (DAY 6)

d. Emulsifier is applied after applying penetrant and required dwell time is completed. Lipopholic emulsifier is applied without pre-rinsing. Hydropholic emulsifier is applied after pre-rinsing.

e. For dwell time for penetrant and developer refer Table T-672.

f. After applying developer, interpretation shall be done within 10 to 60 minutes.

g. All penetrant materials should be from same manufacturer.

4. **For MT:**

a. Prod Technique:
- Use direct (rectified) current for magnetization
- Prod spacing 3" to 8"
- Useful for surface and sub-surface defects.

b. Yoke Technique:
- Use D.C. or A.C. or permanent magnet
- Suitable for surface defects only.

c. Calibration:
Equipment Ammeter to be calibrated once a year comparing with standard Ammeter, take 3 readings. Deviation shall not exceed ±10% of full scale.

d. Lifting Power of Yokes
- AC shall have lifting power of at least 4.5 kg
- DC shall have lifting power of at least 18.1 kg
- Weight too shall be checked prior to first use

DAILY POINTS TO RECALL (DAY 6)

e. Minimum two examinations on each area, the second is perpendicular to first

5. **For VT:**

a. There shall be a written procedure for VT indicating the essential and non-essential variables.
b. The procedure used to be re-qualified if the essential variable is changed.
c. The acceptance of procedure is the criteria to detect a defect of width not more than 1/32" (0.8 mm) made on similar surface.
d. The examiner shall be annually tested for Jaeger J-1.
e. For direct Visual testing, the eye of examiner shall be at an angle of min.30 deg. to the surface, and within 24 inches from surface

6. **For Leak Testing (Bubble Test):**

a. The testing medium maybe air or any other inert gas.
b. The test temperature shall be between 4°C to 52° C.
c. The pressure gauge range shall be twice the test pressure preferably, however, the gauge range shall not be lower than 1.5 times and higher than 4 times the test pressure. Pressure gauges shall be calibrated at least annually
d. Prior to inspection, the test pressure shall be held min. 15 minutes.
e. The presence and growth of bubble at leak location would constitute a defect.
f. After repair the leak test shall be repeated.

DAILY POINTS TO RECALL (DAY 6)

7. SE-797 UT Measurement :

a. Pulse-echo method can be adopted up to 200°F

b. Apparatus: 3 types
- CRT read out
- CRT + direct read out
- Direct thickness read out

c. Search Units: 3 types
- Straight beam contact type
- Delay line type (delay block to minimize dead zone)
- Dual element type. There are two crystals set at a small range. Low roof angle used for higher range and higher angle for low range.

d. High thickness measurement:

Use of multiple echoes are made. (i.e., For thickness between 50 mm and 60mm, use 10mm calibration block then 5th back echo will be 50mm and 6th will be 60mm. Set the 5th echo to zero and 6th at the screen range. The screen is calibrated to 50-60mm.

e. While taking measurement for high temperature condition a positive error of 1% per 55°C (100°F) results. Hence temperature correction is necessary.

f. CRT read out is recommended on corroded and rough surface.

DAILY POINTS TO RECALL (DAY 6)

API RP 578

8. API RP 578 can be used for new and existing piping system. Carbon steel components are not covered in RP 578.

9. One inspection lot means items taken from one heat only.

10. Mill test report is not substitute to PMI test.

11. PMI testing of at least one electrode should be carried out from each lot or package.

12. PMI Test Methods:

    a. *X-ray Fluorescent:* It cannot detect elements lighter than sulpher. Carbon cannot be detected. The equipment uses gamma rays to analyze material.

    b. *Optical Emission Spectrometer:* Uses electric arc to analyze light spectrum. May be used to detect carbon.

    c. *Chemical analysis* by removing small sample.

13. When PMI testing is conducted on new or existing piping, records of results shall be kept as long as the piping exists in original location.

DAILY POINTS TO RECALL (DAY 5)

1. PQR gives data used in PQR test and test results, and cannot be revised.

2. WPS gives parameters to be used in production job, and must be within ranges qualified by the PQR test.

3. Essential variables (EV), if changed require new procedure qualification. Non essential variables (NEV) may be changed in WPS without new PQR.

4. Bend test crack shall not exceed 1/8" in any direction. Radiography criteria are stricter than radiography for job.

5. Supplementary essential variables (SEV) are considered as (EV) only if there is impact strength requirement. Otherwise, they are "non-essential" variables.

6. Tensile test for procedure qualification is passed if failure is in:

   a. Weld metal at strength >= Base metal SMTS, or
   b. Base metal at strength >= 95% of base metal SMTS

7. P-numbers represent parent metal groupings of similar composition and properties, i.e., similar strength and ductility.
   F-numbers give similar usability aspects of filler material.
   A — numbers give similar chemical composition of weld metal.
   In "As welded" condition.

8. For performance, 1G is flat, 2G is horizontal, 3G is vertical and 4G is overhead position. Pipe 5G qualifies 1G, 3G and 4G, but pipe 6G qualifies all positions.

9. For acceptance criteria of production welds refer to Table 341.2.3 of B31.3 for:

   - Weld reinforcement

DAILY POINTS TO RECALL (DAY 5)

- For radiographic results
- General acceptance of welds

10. Reasons for inspection are to ensure safety, reliability and to meet regulatory requirements.

11. On-stream inspections can reduce down-time by

    - Extending process run if pipes are okay.
    - If replacement of piping is required, fabrication of replacement piping can be done in advance.
    - Reducing work-load during shutdown

12. UT thickness measurement at high temperature requires correction of about 1% for each 100°F.

13. Radiography has advantages like:

    - Pipe insulation need not be removed for pipe wall thickness measurement.
    - Small diameter piping, nipples, threaded connections can be inspected
    - Permanent record is available

14. Flanged fittings and valves are made thicker than pipes. The thickness is given by:

    t = 1.5 X Cylindrical thk + 0.1" for 150 lb to 2500 lb rating
    S = 7,000 psi for new condition

15. For 4,500 lb rating a factor of 1.35 is used instead of 1.5 in above formula.

16. For retirement thickness of valves and flanged fittings the value of "S" is selected from stress tables of ASME B31.3.

DAILY POINTS TO RECALL (DAY 5)

17. For flanges as per B16.5, the raised face thickness of 1/16" (0.06") is included in flange thickness for class 150 and 300 flanges. For flanges of higher rating raised face is ¼" (0.25") and is additional to flange thickness.

18. Flanged joints and fittings are hydrostatically tested. Minimum Test pressure shall be 1.5 times the 100°F rating rounded to next higher 25 psi. This is also the maximum System-test pressure .

19. To locate the correct pressure temperature ratings for any flange, first refer to Table 1A of B16.5, which gives which table to refer for which material.

DAILY POINTS TO RECALL (DAY 4)

1. a. Remaining life = $\frac{t\ actual - t\ required}{corrosion\ rate}$

   b. L. T. Corrosion rate = $\frac{t\ initial - t\ actual}{years\ between\ t\ initial\ \&\ t\ actual}$

   c. S. T. Corrosion rate = $\frac{t\ previous - t\ actual}{years\ between\ t\ previous\ and\ t\ actual}$

2. If corrosion rate is not available for new service, it shall be determined within 3 months of service and shall be confirmed by subsequent measurements.

3. MAWP of piping system is worked out on basis of:

   MAWP = $\frac{2SEt}{D}$. t = *t actual – (2 x corrosion loss) up to next insp.*

   For unknown C.S. material, assume Lowest grade and lowest joint efficiency permitted by the Construction Code.

4. Authorization for repair may be given by Inspector, however authorization for alteration shall be given only after consultation with and approval by piping engineer. After completion, all repairs and alteration work shall be checked and approved by Inspector.

5. A temporary repair may be made by fillet welding a plate patch if SMYS of pipe does not exceed 40,000 psi.

6. Insert patches may be used for repairs if:
   a. Full penetration groove welds are provided
   b. For class 1 and 2 piping the welds are 100% radiographed or UT checked and
   c. Patches have rounded corners 1" min. radius

DAILY POINTS TO RECALL (DAY 4)

7. Any welding done on-stream shall be done in accordance with hot tapping procedure API 2201.

8. Pre-heating (and maintaining) to minimum 300°F can be substituted as alternative to PWHT for P-1 and some P-3 steels. The weld shall be covered with insulation to slow cooling rate.

9. For other steels, PWHT has to be performed as per construction code.

10. Pressure tests are normally required after alterations and major repairs. However, NDE maybe utilized if Pressure Test is not practical, if accepted by piping Engineer.

11. The above grade survey of buried piping shall be conducted at interval not exceeding 6 months.

12. For piping buried in lengths greater that 100 feet and not cathodically protected (CP), the soil resistivity shall be checked at 5 year interval.

13. Thickness measurement of buried pipes without CP shall be done at interval of 5, 10, and 15 years if soil resistivity is less than 2000, 2000 to 10,000 and more than 10,000 ohm-cm respectively. Thickness measurement is performed by "intelligent pigging" or by excavation and UT check.

14. Leak testing at minimum pressure = 1.1 x M.O.P. shall be done at half the above intervals for non-C.P. pipes and same intervals for C.P. pipes. Pressure shall not drop more than 5% in 4 hours period (Pressure-Decay Test).

15. For poorly coated pipes or pipes with improper cathodic protection, close-interval potential survey shall be made every 5 years.

16. Repairs using clamps for buried pipes, the location and date of clamp shall be shown on the marker (flag) and also on the inspection report. Clamp shall be replaced by permanent repair at first available opportunity.

DAILY POINTS TO RECALL (DAY 3)

1. CUI is more likely on insulated pipings exposed to water/mist/moisture and in the range of 25° to 250°F.

2. Erosion is caused due to impacts of solid particles in liquids/gases or liquid particles in gases. It is more serious if corrosion is also present.

3. Fatigue failure is caused due to cyclic stress or stress reversals (vibrations, thermal changes).

4. Creep failure is dependent on time, temperature and stress.

5. The two important inspections carried out periodically on piping are:

   a. Thickness measurement inspection, and
   b. External visual inspection

6. Thickness measurements are usually carried out by:

   a. Ultrasonic thickness measurements for pipes larger than NPS 1
   b. Profile radiography for pipes NPS 1 and smaller

7. External visual shall include checklist form Appendix D which involves checking for leaks, misalignments, vibrations, pipe support conditions, external corrosion, condition of insulation/coating/painting.

8. TMLS shall be selected representing suspect areas and shall include elbows, tees, injection points and S/A interface.

9. In API 570, pipes are classified as follows:

DAILY POINTS TO RECALL (DAY 3)

Class 1: Services with highest potential of resulting in emergency if the leak occurs. i.e The inflammable fluids which readily vaporise on leakage.

Class 2: Those pipes which are not included in Classes 1 and 3

Class 3: Services that do not significantly vaporize and not located in high activity area.

10. Inspection Intervals:

    a. Thickness measurements: Lower of half the remaining life or
        i. 5 years for Class 1
        ii. 10 years for Classes 2 and 3
        iii. 3 years for injection points

    b. External visual:
        i. 5 years for Classes 1 and 2
        ii. 10 years for Class 3
        iii. Injection points and S/A interface — by class

11. CUI inspection shall be done by NDE or insulation removal on the following areas:

Class	Areas with Damaged Insulation	Suspect Areas Within Susceptible Temperature
1	75 %	50 %
2	50 %	33 %
3	25 %	10 %

DAILY POINTS TO RECALL (DAY 3)

12. Pipes systems having remaining life more than 10 years and are adequately protected, need not be included for inspection of suspect area as above.

13. Inspection of SBP:

    a. SBP in Process Piping
       — As per other process piping

    b. SBP in Secondary Piping

       1. For Class 1: Same as other Class 1
       2. For Classes 2 and 3: Inspection is optional, however deadlegs shall be inspected.

DAILY POINTS TO RECALL (DAY 2)

1. Thermal expansion and contraction for different temperatures is given in Table C-1. To determine total expansion net effect shall be considered.

2. Working pressure for flanges and flanged fittings can be read from pressure-temperature ratings of flange. The hydrostatic test pressure is taken as 1.5 times the pressure rating at 100° F, rounded to the next 25 psi.

3. "Repair" *on piping system means* work *necessary* to restore a piping system to the design conditions.

4. "Alteration" means any change in piping components that affects the design conditions.

5. API 570 shall not be used for new construction. It shall not violate jurisdiction requirements.

6. Authorized inspection agency means any of the following:

   a. Inspection organization of jurisdiction
   b. Inspection organization authorized by jurisdiction
   c. Inspection organization of owner user
   d. Inspection organization or contracted by owner user
   e. Inspection organization of insurance company that undertakes insurance of piping system

7. Repair Organization means any of the following:

   a. Owner user who repairs or alters his own piping
   b. A contractor authorized by owner user and who carries out work as per API 570

DAILY POINTS TO RECALL (DAY 2)

c. Organization authorized/accepted or not prohibited by jurisdiction and who carries out work in accordance with API 570

8. **Ultimate responsibility for executing the work as per API 570 rests with owner/user.**

9. **Soil-to-Air interface is subjected to combined action from atmosphere as well as soil, and is taken up to 6" above and 12" below the soil.**

10. **Deadlegs means piping components where there is no significant flow (almost stagnant fluid).**

11. **Piping Circuit is part of piping system which is subjected to similar corrosivity.**

12. **Piping system is the piping subjected to same design conditions.**

13. **Examiner is NDT person who assists the API 570 inspector but does not decide acceptance / rejection of NDT results.**

14. **Risk Based Inspection (RBI) means: Assessment of likelihood of failure and consequences of failure and evolving inspection scheme keeping in view both.**

15. **Injection points may cause accelerated or localized corrosion. During scheduled inspections, extensive inspection should be applied beginning 12 inches upstream.**

16. **Deadlegs: Stagnant liquids in deadlegs can cause more corrosion than the active piping in the process.**

POINTS TO RECALL (DAY 1)

1. API 570 Code is applicable for inspection, repairs, alteration and re-rating of **in-service ,** metallic piping.

2. ASME B 31.3 piping is used for construction of **new piping** installation.

3. Revised edition and addenda of API and ASME Codes may be used from beginning with date of issue. But they become mandatory from 6 months after issue date.

4. Table A-1B of B 31.3 Code gives weld joint quality factor for manufactured pipes. The factor can be increased for Electric Fusion welded pipes by conducting additional radiography (spot or full) as per Table 302.3.4.

5. Minimum required thickness (t_m) for a pipe of outside diameter (D), made from material having safe stress (S) and subjected to internal pressure (P) is given by:

$$t_m = \frac{PD}{2(SE + PY)} + C$$

where E = weld joint factor
Y = material co-efficient (Table 304.1.1)
C = corrosion and other allowances

6. Maximum allowable internal pressure for a pipe for given metal thickness is worked out by substituting nett thickness in Barlow formula and calculating the required internal Pressure (P).

(Nett thickness = Available Thickness – Corrosion Allowance)

POINTS TO RECALL (DAY 1)

7. Thickness of a permanent blank for the pipe is given by:

$$t_m = dg\sqrt{\frac{3P}{16\,SE}} + C$$

Where, dg = the inside diameter of gasket

8. Hydrostatic Test pr = 1.5 × Design pr x stress ratio

Stress ratio is ratio of material stress at test temp to the stress at design temp. Stress ratio is always greater than or equal to 1.

9. Pneumatic test pr = 1.1 x Design pr

During pneumatic test a pressure relief valve (with set pr ≤ 1.1 x Test pr.) shall be installed. Pressurization should be in steps. Initially, pressure shall be slowly increased to 25 psi or 50% of test pressure (whichever is lower). Check for leakage, if any, and correct them.

Thereafter, the pressure shall be increased in steps up to the full pressure. Inspection ~~may~~ shall be carried out at Design Pressure.

10. Hydrostatic test is preferred over Pneumatic test. The butt joints where Hydro or Pneumatic test can not be performed, 100% RT or UT may be done on butt welds, and PT or MT may be done on other welds (branch welds, fillet welds, etc.) as alternative to Leak testing.

11. If temperature – thickness combination falls on or above the material curve (Fig. 323.22), impact testing is NOT required. (If below the curve – impact testing is required)

POINTS TO RECALL (DAY 1)

12. For impact testing 3 specimen are required. If the average of 3 specimen > = Required Average and Value of only one specimen is less than average but more than minimum for one specimen — Accept

13. If average of 3 specimen > = Minimum for one specimen and

    a. Value of one specimen is less than average and also less than minimum for one specimen — Retest
    b. Value of two specimen is less than average — Retest

    After retest, all specimen must have value > = Average Value

14. Table 330.1.1 gives required and recommended pre-heat temperature. Recommendation becomes requirement if ambient temp is < 0 ° C.

15. In dissimilar pipe joints higher temperature of the two is to be used for pre-heating.

16. PWHT Table (331.1.1) gives temperature range, minimum time and maximum hardness values. Hardness survey shall be done for 10% samples for furnace PWHT, and 100% for local PWHT.

API 570

FINAL MOCK EXAMS