

**SECOND EXAMINATION FOR COMPETENT PERSONS FOR INSPECTION AND
CERTIFICATION OF BOILERS – OCTOBER – 2012**

REGULATIONS, WELDING, HEAT TREATMENT AND SAFETY

Date : 07/10/2012

Time : 11:30 – 12:30 Hrs.

Marks : 100

- 1) The certificate issued by well known tube makers for the tubes manufactured by them is in IBR certificate format
 - a) Form III A
 - b) Form III B
 - c) Form III D
 - d) Form III E
- 2) During bevelling for fusion welding of longitudinal seams, bevelling from both sides is required for thickness more than
 - a) 10 MM
 - b) 20 MM
 - c) 25 MM
 - d) 40 MM
- 3) Exemption from P.W.H.T with additional conditions for the 1Cr $\frac{1}{2}$ Mo is provided for thickness not exceeding
 - a) 19 MM
 - b) 13 MM
 - c) 8 MM
- 4) Any person is punishable under Boilers Act for
 - a) Not reporting an accident
 - b) Tampering safety valve to render it in operative
 - c) Not engraving the register number
 - d) All of the above
- 5) In carbon steel plates the sulphur & phosphorous content shall not exceed
 - a) 0.06%
 - b) 1%
 - c) 0.05%
- 6) Hydraulic test of tubes / pipes are mandatory if the tubes are subjected to Non Destructive Testing like Ultrasonic, Eddy current / stray flux testing
 - a) Yes
 - b) No
 - c) as decided by Inspecting Authority

- 7) The minimum thickness of boiler quality plate shall be
- 3/8"
 - 1/4"
 - 5/8"
 - 1/2"
- 8) Tube holes in welded seams should be avoided as far as possible.
- True
 - False
- 9) The percentage of Chromium (Cr) & Molybdenum (Mo) in tubes / pipes to specification T91 / P91 shall be
- 0.8 to 1.25%; & 0.45 to 0.70%
 - 1.9 to 2.6%; & 0.87 to 1.13%
 - 10.0 to 12.5%; & 0.8 to 1.2%
 - 8.0 to 9.5%; & 0.85 to 1.05%
- 10) The quality factor taken in high class castings for computation of permissible working stress shall be
- 75%
 - 80%
 - 90%
- 11) If there is insufficient metal to permit preparation of retest specimens in remainder of the test Plates, test specimen may be cut from the opposite side of longitudinal seam
- True
 - False
- 12) On completion of seams, heat treatment shall not be necessary for carbon steel if thickness of part weld recess and carbon content shall not exceed
- 22mm, 0.3%
 - 20mm, 0.25%
 - 20mm, 0.3%
- 13) The temperature of water used in hydraulic testing shall be
- $20^{\circ}\text{C} > t < 50^{\circ}\text{C}$;
 - $30^{\circ}\text{C} > t < 45^{\circ}\text{C}$;
 - $25^{\circ}\text{C} > t < 50^{\circ}\text{C}$
- Where t = temperature
- 14) The working metal temperature used in design yield point (0.2%) proof stress value for super heated steam shall be
- corresponding to W.P +50°F
 - drum steam temperature +50°F
 - super heated steam temperature +50°F
- 15) The strength of the ligaments between tube holes which are subjected to longitudinal stress shall be at least one-half times of the strength of tube holes subjected to circumferential stress
- True
 - False
- 16) Boilers fitted with integral super heaters it is mandatory to fit an additional safety valve at the end of SH outlet header
- True
 - False

- 17) In testing of springs at manufacturers end, the permanent set in spring permitted shall be
 - a) 3%
 - b) 10%
 - c) 5% of the free length of spring
- 18) The outside diameter of water gauge glass shall be between
 - a) $3/8"$ & $1/2"$
 - b) $1/4"$ & $5/8"$
 - c) $1/2"$ & $3/4"$
- 19) In a boiler with wet back reversing chamber fusible plug shall be fitted
 - a) on the front tube plate
 - b) on the front & rear tube plate
 - c) on the crown of reversing chamber & tube plates
 - d) on the crown of reversing chamber & rear tube plate
- 20) The heat treatment of tubes / pipes conforming to SA 213 T11 / SA 335 P11 may be waived if
 - a) $t < 15\text{mm}$, $\text{OD} < 4"$, preheating to 150°C
 - b) $t < 13\text{mm}$, $\text{OD} < 127\text{mm}$, pre heating to 125°C
 - c) $t = 132\text{mm}$, $\text{OD} = 5"$, preheating to 200°C
- 21) The diameter of tube hole is $2.5"$, the minimum thickness of tube plate in tube are shall be
 - a) $1/2"$
 - b) $5/8"$
 - c) $9/16"$
- 22) A welder qualified in pipe welding horizontally fixed position is eligible to weld in vertically fixed position
 - a) True
 - b) False
- 23) The State Government may, by Notification in official gazette, exclude any specified area from the operation of all or any specified provision of Act.
 - a) True
 - b) False
- 24) Alignment tolerance of sections to be butt welded for thickness (t) above 51 mm on longitudinal direction in a cylindrical shell is
 - a) Lesser of $1/6 t$ or 9mm
 - b) Lesser of $1/8 t$ or 9mm
 - c) Lesser of $1/10 t$ or 9mm
 - d) Lesser of $1/8 t$ or 19 mm
- 25) Any firm seeking recognition as a repairer, for repair of boilers and steam pipes shall apply to
 - a) Secretary Central Boiler Board
 - b) Chief Inspector of Boilers of state where boiler is installed
 - c) The owner of the boiler
 - d) Chief Inspector of Boilers of state where boiler was manufactured
- 26) A candidate should obtain marks awarded in accordance with Form XII not less than
 - a) 40% in oral & 55% in practical
 - b) 50% in oral & 65% in practical
 - c) 60% in oral & 75% in practical
 - d) 70% in oral & 85% in practical

- 27) The design metal temperature should not exceed ____ degree C for seamless carbon steel pipe as per IBR
- a) 424 deg C
 - b) 434 deg C
 - c) 444 deg C
 - d) 454 deg C
- 28) For plates not for hot forming and thickness above 12mm the supplied condition is
- a) Un-normalized
 - b) As rolled
 - c) Normalized
- 29) Butt welds of tubular products required 100% R.T in case the component bore exceeds
- a) 88 mm
 - b) 102 mm
 - c) 178 mm
- 30) The minimum angle of the bend for the Grade A steel castings is
- a) 90°
 - b) 120°
 - c) 180°
- 31) In segmental bends / fabricated bends, the angle between the axis of adjoining sections does not exceed
- a) 45°c
 - b) 60°c
 - c) 30°c
- 32) The minimum hydraulic test pressure on subsequent examination shall be
- a) 1 time W.P.
 - b) 1.5 times W.P.
 - c) 1-1/4 times W.P
- 33) Heating surface means total surface of
- a) plates & tubes exposed to flame
 - b) plates & tubes on water side
 - c) plates & tubes exposed to heat on one side and in contact with water on the other side
- 34) The manufacturer shall maintain the records of boilers / economizer / steam pipes as the case may be (including the data booklet / forms) for a minimum period of
- a) 7years
 - b) 10years
 - c) 5years
- 35) Inspecting Authority's Certificate for inspection under construction of Economizers
- a) Form II
 - b) Form VIII
 - c) Form VII
- 36) The maximum permissible variation in diameter at any cross section of internal flue shall be
- a) Not more than 1/4" or half of the plate thickness whichever is greater
 - b) Not more than 1/8"
 - c) Not more than 1/2" of plate thickness

- 37) Where cross tubes are fitted in vertical boiler, the projection shall be
- a) not less than $\frac{3}{8}$ " & not more than $\frac{1}{2}$ "
 - b) not less than $\frac{1}{4}$ " & not more than $\frac{5}{8}$ "
 - c) not less than $\frac{5}{8}$ " & not more than $\frac{3}{4}$ "
- 38) The stress relieving part shall be left to cool in the furnace upto a maximum temperature
- a) 400°C
 - b) 350°C
 - c) 300°C
- 39) Two plates of thickness 25mm & 35mm are butt welded, the thickness to be considered in heat treatment for calculation soaking time shall be
- a) 25mm
 - b) 35mm
 - c) the thickness of weld joint
- 40) Compensation for openings in shell in, shell type boilers is mandatory
- a) Where the width of opening exceeds 2.5 times $t+2.75$ "
 - b) Where the width of opening exceeds 1.5times $t+2.5$ "
 - c) Where the width of opening exceeds 1.5times $t+3.0$ "
- 41) The period permitted for periodic check test of electrodes shall be every
- a) 6months
 - b) One year
 - c) at the discretion of Inspecting Authority
- 42) The thickness of the furnace or fire box whether plain or corrugated shall not exceed
- a) $\frac{1}{2}$ "
 - b) $\frac{5}{8}$ "
 - c) $\frac{7}{8}$ "
- 43) The maximum permissible variation in diameter at any cross section of furnaces of horizontal boilers shall not exceed
- a) $\frac{1}{4}$ "
 - b) $\frac{1}{2}$ "
 - c) the thickness of the plate
- 44) Plain tubes subjected to external pressure shall be fitted by
- a) expanded & bell mouthed, beaded
 - b) by welding at gas inlet end
 - c) screwed and welded
 - d) both (a) & (b)
- 45) Minimum size (i.e) Outside diameter x Thickness of stay tube subjected to external pressure shall be
- a) 25.4mm, 2.5mm
 - b) 32mm, 3mm
 - c) 38mm, 2.8mm
- 46) The percentage sensitivity required for thick section radioscopic images shall be
- a) 3%
 - b) 2%
 - c) spatial resolutions 3lines per mm

- 47) The minimum thickness of tube plate for which heat treatment may be waived when tubes are strength welded shall be
- a) 18mm
 - b) 25mm
 - c) 22mm
- 48) The minimum size of the sight / cleaning holes in boilers shall be
- a) 4" x 3"
 - b) 3.5" x 2.5"
 - c) 9" x 7"
- 49) The minimum factor of safety required in designing of shells of boilers other than fusion welded/seamless forged drum
- a) 3.5
 - b) 4
 - c) 5.13
 - d) 3.99
- 50) The maximum diameter and gauge length for all weld test specimen of butt joints of fusion welded drums
- a) $d_o = 20\text{mm}$, $L=5 d_o$
 - b) $d_o = 25\text{mm}$, $L=5 d_o$
 - c) Discretion of Inspecting Authority
- Where d_o = Out side diameter