

Regn.No. _____

Name: _____

(To be written by the candidate)

**FOURTH EXAMINATION FOR RECOGNITION OF COMPETENT
PERSONS FOR INSPECTION & CERTIFICATION OF
BOILERS – AUGUST 2017**

REGULATIONS, WELDING, HEAT TREATMENT AND SAFETY

Date : 20/08/2017

Time : 11:30 – 12:30 Hrs.

Maximum Marks: 100

Each Question Carry 2 Marks

1. According to Boilers Act 1923, an accident means
 - (a) Any unsafe working condition of boiler
 - (b) Explosion of any component in the plant, liable to cause death or injury to any person or damage to any property
 - (c) Explosion of boiler component, liable to cause damage to any property and injury to any person
 - (d) Any person fall down from boiler construction site and lost his life

2. In which of the following conditions post weld heat treatment is required for 1 Cr ½ Mo tubes butt joints, welded by shielded metal arc welding?
 - (a) OD 63.5 MM, Thk 9 mm, not preheated
 - (b) OD 63.5 MM, Thk 9 mm, preheated to 100 °C
 - (c) OD 63.5 MM, Thk 14 mm, preheated to 150 °C
 - (d) All of the above

3. A circumferential seam weld of 2500 mm diameter shell type boiler has slag in a continuous length of 500 mm. How much length is required to be repaired?
 - (a) 500 mm
 - (b) 700 mm
 - (c) 600 mm
 - (d) Entire circumferential seam length to be cut out

4. Which initial test is required to be carried out for normal penetration electrodes?
- All Weld metal tensile test, Transverse tensile test, Transverse Bend test, All weld metal impact test, Fillet weld hot cracking test, Cruciform fillet weld tensile test
 - All Weld metal tensile test, Transverse tensile test, Transverse Bend test, All weld metal impact test, Fillet weld hot cracking test
 - All Weld metal tensile test, Transverse Bend test, All weld metal impact test, Fillet weld hot cracking test, Cruciform fillet weld tensile test
 - All Weld metal tensile test, Transverse tensile test, Transverse Bend test, Fillet weld hot cracking test
5. A certificate authorising the use of a boiler shall not be invalid in which of the following cases?
- Any minor accident occurs to the boiler
 - Order issued by inspector to owner for prohibiting its use due to boiler component is in dangerous condition
 - Any structural alteration, addition or removal made in the boiler
 - Change of boiler operational engineer who is the main person taking care of the boiler
6. Which of the following Forms is required for Certificate of Inspection for site assembled boilers
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|-----------------|-----------------|
| (a) Form II | (b) Form II-A |
| (c) Form II (I) | (d) Form II (2) |
7. What is the extent of RT required for 50.8 mm OD Class-I pipe line not subjected to hydraulic test after completion?
- 10% weld per welder with minimum 2 joints per welder
 - RT not required, as pipeline is going to be hydraulic tested after completion
 - 2% weld per welder with minimum one weld per welder
 - 5% weld per welder with minimum two welds per welder
8. Boiler quality plate not intended for hot forming can be supplied without normalising or as rolled condition, if thickness of plate is,
- ≤ 12 mm
 - > 12 mm
 - Any thickness
 - Carbon $< 0.3\%$, Thickness < 25 mm

9. What is the minimum thickness required for a 63.5 mm OD stay tube?
- (a) 2.81mm (b) 3.38 mm
(c) 4.26mm (d) 3.12 mm
10. In which of the following conditions Post Bend Heat Treatment is required for carbon steel tube bends?
- (a) Thinning is more than 25%
(b) OD 63.5 mm and bending radius 75 mm
(c) OD 168.3 mm and bending radius 400 mm
(d) All of the above
11. Nursing homes can operate a boiler with 50 litres capacity used for sterilizer disinfectant without fulfilling the Boilers Act.
- (a) True (b) False
12. How many Flaring test specimens are required to be tested for 359 Nos. of ERW carbon steel tubes?
- (a) None (b) Two
(c) Four (d) Five
13. In case of material not available for test plate after cutting main shell plate, test plate can be taken from the other plate of same cast.
- (a) True (b) False
14. How many transverse tensile test specimens are required for 120 mm thickness drum shell test plate?
- (a) One
(b) Two
(c) Four
(d) Any number of specimens covering full thickness of weld joint
15. Remnant Life Assessment shall be carried out on water tube boilers operating at main steam outlet temperature of 520°C after
- (a) 100000 Hrs of operation (b) 25 years
(c) 10000 Hrs of operation (d) None of the above

16. What will be the hydraulic test pressure at site of a supercritical boiler after erection with the following parameters?
- (i) Maximum working pressure of individual component is 319 Kg/cm^2
(ii) Maximum working pressure of superheater outlet is 268 Kg/cm^2
- (a) 478.5 Kg/cm^2 (b) 402 Kg/cm^2
(c) 398.75 Kg/cm^2 (d) 335 Kg/cm^2
17. What care shall be taken while using electric light inside a boiler shell or drum?
- (a) Light voltage ≤ 24 Volts
(b) Hand lamp with lamp guard
(c) Keyless socket, insulated handle
(d) All of the above
18. The manufacturer of boiler shall maintain the records pertaining to boiler components including certificates and drawings for a period of
- (a) Entire life of the boiler (b) 3 years
(c) Upto registration (d) 5 years
19. What is the pH value required for the boiler water for a boiler operating at a pressure 5 MN/m^2 ?
- (a) 8.5 to 9.5 (b) 11 to 12
(c) 10.5 to 11 (d) Any of the above
20. Any equipment which is partly or wholly exposed to flue gases for the purpose of raising temperature of steam beyond saturation temperature at that pressure is called
- (a) Economiser (b) Feed heater
(c) Superheater (d) Desuperheater
21. The persons engaged for welding boiler or boiler components shall hold welders certificate issued by a
- (a) Competent Person (b) Inspecting Authority
(c) Competent Authority (d) Registering Authority

22. If the owner of a boiler fails to cause the registry number allotted to the boiler under the Boilers Act to be marked on the boiler as required by sub-section (6) of section 7, shall be punishable with
- (a) Penalty of Rupees One Thousand
 - (b) Penalty of Rupees One Lakh
 - (c) Imprisonment of five years
 - (d) Imprisonment which may extend to two years or with a fine which may extend to one lakh rupees, or with both
23. Competent Person or Inspecting Authority may charge fee for the inspection subject to the condition that the fee
- (a) Shall be equal to fee specified by the Central Boilers Board
 - (b) Shall be more than fee specified by the Central Boilers Board
 - (c) Shall not be less than the fee specified by the concerned State Government
 - (d) Shall be equal to the fee specified by the Competent Person
24. Form VI shall be countersigned by the Chief Inspector at
- (a) The time of registration of boiler only
 - (b) The time of inspection of boiler for renewal of certificate only
 - (c) The time of alternation, modification in the boiler only
 - (d) The time of transfer of ownership only
25. Time limit for Assigning of Registry No. for boilers is
- (a) 15 days (b) 45 days (c) 30 days (d) 7 days
26. Requirement for recognition as Remnant Life Assessment Organization for undertaking Remnant Life Assessment (RLA) of boilers operating up-to 120 Kg/cm² pressure is
- (a) Knowledge on boiler design, manufacturing and field knowledge on operation and maintenance of boilers, materials, codes and standards
 - (b) Expertise in failure analysis, stress analysis to evaluate pressure part component life
 - (c) Expertise on metallurgy, Non Destructive Testing (NDT) and other RLA assessment techniques
 - (d) All of the above
27. Required minimum diameter of safety valve for a Small Industrial Boiler is
- (a) 13 mm (b) 19 mm (c) 25.4 mm (d) 12 mm

28. In a sub-critical boiler operation the maximum pressure is observed in the
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| (a) Drum | (b) Main Steam header |
| (c) Superheater | (d) Economiser |
29. The speed with which a penetrant penetrates a surface flaw is influenced to the greatest extent by which of the following properties:
- Density
 - Surface tension and wettability
 - Viscosity
 - Capillary action
30. A Certified Boiler Operation Engineer is authorized to be in-charge of boilers of any type or size, provided all the boilers are situated
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|----------------------------------|----------------------------------|
| (a) Within a radius of 35 meters | (b) Within a radius of 70 meters |
| (c) Within a radius of 50 meters | (d) Within any radius |
31. Welding electrodes after initial check tests shall be subjected to periodic check tests after
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|---------------------|---------------------|
| (a) Every 6 months | (b) Every 3 months |
| (c) Every 12 months | (d) Every 24 months |
32. Design pressure in relation to a natural or assisted circulation boiler means
- The maximum allowable working pressure in the superheater of the boiler
 - The maximum allowable working pressure in the re-heater of the boiler
 - The maximum allowable working pressure in the steam drum of the boiler
 - The maximum allowable working pressure in the evaporator of the boiler
33. For approval of boiler repairs to be carried out in-house or by the repairers, every user shall engage a
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| (a) Competent person | (b) Competent authority |
| (c) Inspecting authority | (d) All of the above |
34. Who is the "Appellate Authority" under Section 20 of the Boilers Act
- | | |
|----------------------|----------------------------|
| (a) Chief Inspector | (b) Deputy Chief Inspector |
| (c) Competent Person | (d) Technical Adviser |

35. Boiler shall have automatic water level alarms and firing controls where the evaporating capacity of the boiler is greater than
- (a) 3700 kg/hr (b) 1000 kg/hr
(c) 500 kg/hr (d) 2100 kg/hr
36. The Circulation ratio for once through steam boilers is
- (a) Greater than one
(b) Less than one
(c) Unity
(d) Can take any value depending on type of circulation employed
37. The blow down for safety valve is given by
- (a) (Set pressure) / (Set pressure - reseating pressure)
(b) (Reseating pressure) / (Set pressure)
(c) (Set pressure - reseating pressure) / (set pressure)
(d) (Reseating pressure) / (Reseating pressure - set pressure)
38. Boiler registry number shall be engraved on boiler
- (a) Within a period of one month from boiler registration
(b) Within a period of six month from boiler registration
(c) Within a period of one month from date of receipt of boiler registry number
(d) Within a period of six month from date of receipt of boiler registry number
39. In reference to radiography testing, an IQI is used to determine the
- (a) Size of a discontinuity in the part
(b) Density of the film
(c) Radiographic contrast
(d) Quality of the radiographic image
40. A longitudinal surface crack in a circularly magnetized part will cause
- (a) The magnetic field to die out (b) A decrease in permeability
(c) A magnetic leakage field (d) A current to flow
41. The maximum validity for a welder certificate issued by a Competent Authority
- (a) 2 years (b) 3 years (c) 1 year (d) 6 months
42. When any accident occurs to a Boiler, the owner or person in-charge shall report the same in writing to the Inspector within
- (a) 12 hours (b) 24 hours (c) 48 hours (d) 36 hours

43. Longitudinal welds of internal furnaces shall be placed at the lower part of furnace and shall break joint in successive sections at least by
(a) 100 mm (b) 110 mm (c) 125 mm (d) 150 mm
44. What is the minimum permitted thickness of a corrugated furnace?
(a) 12 mm (b) 10 mm (c) 8 mm (d) 1/4"
45. Minor axis of a boiler opening shall be _____ to the axis of the boiler
(a) Perpendicular (b) Any Angle
(c) Parallel (d) None of the above
46. For Boilers having a wet back reversing chamber, the minimum number of fusible plugs shall be fitted are
(a) 2 (b) 1 (c) 3 (d) None
47. During Hydraulic Test, what is the minimum holding time at test pressure?
(a) 30 mins (b) 60 mins (c) 15 mins (d) 45 mins
48. In Furnaces, if the bowling hoops are provided then the minimum pitch of bowling hoop centres shall not be less than
(a) 300 mm (b) 400 mm (c) 500 mm (d) 600 mm
49. In which of the following cases, Post weld heat treatment is required in arc welded butt joints of pipes?
(a) Carbon Steel Pipe Thickness < 20 mm and carbon \leq 0.25%
(b) Carbon Steel Pipe Thickness < 9 mm and carbon \leq 0.30%
(c) P11 Pipe Thickness < 13 mm, OD < 127 mm, not preheated
(d) All of the above
50. In which of the following cases the Chief Inspector may at any time withdraw or revoke any certificate or provisional order
(a) Boiler sustained injury
(b) Boiler is being transferred
(c) Boiler is under the in-charge of persons holding the certificates required by rules
(d) None of the above

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