

Regn.No. \_\_\_\_\_

Name: \_\_\_\_\_

(To be written by the candidate)

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

**OPERATION & MAINTENANCE (O & M), COMMISSIONING,  
NDT, MATERIALS AND ERECTION**

Date : 20/08/2017

Time : 14:00 – 17:00 Hrs.

Marks: 150

**Question I**

(20 marks)

Briefly explain the cold startup procedure of boiler *till* mills are cut in.

**Question II**

(25 marks)

With a neat sketch, show the pressure part general arrangement of a high pressure boiler showing waterwall, drum, downcomer, risers, economizer, superheaters, desuperheaters and reheater. With the help of a block diagram showing water and steam circuit through different boiler components starting from feed regulating station till boiler main steam stop valves.

**Question III**

- a) Explain different type of fuels and their firing techniques in water tube boilers and also explain the advantages of the same. (15 marks)
- b) What is meant by stoichiometric air and excess air in the fuel firing? (5 marks)

**Question IV**

- a) What is the function of a safety valve? (5 marks)
- b) What is safety valve set pressure and how you set a safety valve? (5 marks)

- c) What is the minimum number of safety valves required in a boiler and their location as per IBR? **(5 marks)**

**Question V**

- a) List out the major types of tube failures and their causes. **(10 marks)**
- b) Explain short term overheating and its causes and corrective actions. **(5 marks)**
- c) Explain long term overheating and its causes and corrective actions. **(5 marks)**

**Question VI**

**(20 marks)**

Explain the principles of Liquid penetrant inspection, Magnetic particle inspection and Ultrasonic testing in detail and how the testing is carried out. What kind of defects can be identified through the above methods?

**Question VII**

**(3 x 5 = 15 marks)**

Explain the following along with advantages and limitations.

- i. Flux Cored Arc Welding (FCAW)
- ii. Gas Metal Arc Welding (GMAW)
- iii. Gas Tungsten Arc Welding (GTAW)

**Question VIII**

- a) Why maintaining water chemistry is important in boiler operations? **(5 marks)**
- b) Indicate the critical parameters and methods to maintain water chemistry during the operation of boilers. **(10 marks)**

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