



Indian BOE Coaching Service

BOE Examination Test Papers-2016

Paper-1 (Boiler Engineering-1)

Date : 08.05.2016

Time : 01.30hrs.

Max. Marks : 100

Note : Attempt any 5 question whether question No. 1 is compulsory. Each question has equal marks.

Q.1 : (a) In a boiler test the following quantities were obtained. [10]

Mean temperature of feed water 59°C

Mean boiler pressure 12bar

Mean steam dryness fraction 0.95

Mass of coal burnt per hour 250kg

Calorific value of coal 32400Kj/Kg

Mass of water supplied to the boiler in 7hour and 14minutes 16500kg

Mass at the end of the test was less than that at the commencement by 1000kg

Calculate the thermal efficiency of the boiler and actual equivalent evaporation from and at 100°C per kg of coal.

b) The percentage composition of a sample of coal on mass basis is as follows Carbon 85%,Hydrogen 12%, Oxygen 3%

(i) Determine the minimum air required for complete combustion of 1kg of coal.

(ii) If Air supplied is 1.5times the minimum air required, calculate the mass of dry product of combustion per kg of coal burned.

(iii) The heat carried away by the dry product of combustion leaving the boiler per kg of fuel burned.

Given average specific heat of dry flue gas is 1.005 Kj/kg*K and temperature of flue gas is 375°C and boiler house temperature is 25°C. [10]

Or

b) A boiler is equipped with a chimney 25 meter high. The temperature of outside air is 25°C and average temperature of flue gasses in the chimney is 320°C. If the boiler is supplied 20kg of air per kg of fuel burnt. Calculate (a) The theoretical draft created in cm of water and

(b) The velocity of flue gases in the chimney if 60% of the draught is lost in friction at the grate and passage. [10]

Q.2 : Write short notes on any 4 of the followings. [4x5=20]

a. Advantages & disadvantages of surface condenser over jet condenser.

b. Advantages of supercritical boiler over subcritical boiler.

c. Priming, foaming & carryover.

d. Boiling mechanism.

e. Post weld treatment

f. Advantages and disadvantages of welded joint over Riveted joint.

Q.3 : Define the following definitions as per IBR Act-2007. [5x4=20]

a. Boiler. b. Economizer. c. Steam Pipes.

d. Super-heater. e. Boiler components.

Q.4: a) Explain function of Boiler mounting and boiler accessories. Name 6 Nos. of each? [12]

b) A circular beam of 105mm diameter is subjected to shear force of 500kg. Calculate the value of maximum shear stress and sketch the variation of shear stress along the depth of the beam. [8]

Q.5 : (a) What is meant by good, perfect & complete combustion. What is the role of excess air. [8]

b) Discuss briefly about principle on which ESP works & List out different parts name of ESP. [12]

Q.6 : a) A hollow shaft is to transmit 300 kw at 80 rpm. If the shear stress is not to exceed 60 N/mm² and internal diameter is 0.6 of the external diameter. Find the external and internal diameter assuming the max torque is 1.4 times the mean torque? [10]

b) What method are there for preservation of boiler during shutdown? Explain any one of them. [10]

Q.7 : a) Single element and three elements drum level control. [10]

b) Describe about any one of the following external water treatment process (i) Softener, (ii) DM Plant, (iii) R O Plant. [10]

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