BINESWAR BRAHMA ENGINEERING COLLEGE
ONLINE CLASS TEST 2021
PROCESS UTILITIES (CHE18140E11)

Full Marks: 70 (Including 2 marks for handwriting and cleanliness)
Time: Two Hours

Q.1. Discuss the importance of water in chemical process industry. 8

Q.2. Write briefly on conservation of water. 5

Q.3. What are the functions of the following in boiler plants? 5

a. Water level indicator   b. Pressure gauge

c. Feed check valve   d. Safety valve

e. Blow-off plug

Q.4. Write down about Air preheater, Economiser and Superheaters with neat diagram including the advantages. 4x3=12

Q.5. Compare fire-tube and water-tube boilers. 5

Q.6. Mention the working principle of IC engine. How does 2-stroke diesel engine differ from 4-stroke diesel engine? 5

Q.7. Derive an expression for hypothetical mean effective pressure of a steam engine neglecting clearance. 6

Q.8. Calculate the steam consumption in kg per IHP per hour of a double acting steam engine from the following data: D = 60 cm, N = 88 rpm, L = 90 cm, P_1 = 8 kgf/cm^2, P_b = 1.8 kgf/cm^2. Cut-off takes place at 20 % of the stroke for both ends. Taking specific volume of steam entering the cylinder is 0.24 m^3/kg and diagram factor f = 0.8. Neglect clearance. 7

Q.9. What is boiler draught? What are the different types of draught? Compare between Natural and Artificial Draught. 3+4=7

Q.10. Show that for a Bell-Coleman cycle COP $= T_2/T_1 - T_2$. 5

Q.11. Why a cooling tower is used? Mention the principle of operation of cooling tower. 3

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