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Question Paper Code: 59710

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2018

Elective

Mechanical Engineering

15UME910 - POWER PLANT TECHNOLOGY

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

PART A - (10 x 1 = 10 Marks)

1. An ideal working fluid for a Rankine cycle should have CO1- R
 - (a) lower latent heat at low pressure
 - (b) higher latent heat at high pressure
 - (c) lower latent heat at high pressure
 - (d) higher latent heat at low pressure

2. Which power plant requires more space CO1- R
 - (a) Nuclear power plant
 - (b) Hydro-electric power plant
 - (c) Thermal power plant
 - (d) Diesel power plant

3. Which conveyor is suitable for large quantities of coal over large distances? CO2- R
 - (a) Belt conveyor
 - (b) Screw conveyor
 - (c) Bucket elevator
 - (d) Flight conveyor

4. The percentage of volume occupied by the tubes in the surface condenser shell is CO2- R
 - (a) 5%
 - (b) 10%
 - (c) 15%
 - (d) 20%

5. Natural uranium contains CO3 -R
- (a) more than 99% U^{235} (b) more than 99% U^{238}
- (c) about 50% U^{235} and 50% U^{238} (d) about 10% U^{235} and 90% U^{238}
6. In which of the reactors is the steam generated in the reactor itself? CO3 -R
- (a) Pressurized water reactor (b) Boiling water reactor
- (c) Liquid metal fuelled reactor (d) All the above
7. Diesel power plant can be used as central station where the capacity required is CO4- R
- (a) 1 to 2 MW (b) 2 to 5 MW (c) 5 to 10 MW (d) 10 to 15 MW
8. In a gas turbine power plant, the maximum pressure ratio is limited to CO4 -R
- (a) 5 (b) 10 (c) 15 (d) 20
9. What is the maximum collection efficiency of solar flat plate collectors? CO5 -R
- (a) 30% (b) 40% (c) 50% (d) 60%
10. As the load factor of generating plant increases, the generation cost per unit energy generated CO5-R
- (a) decreases (b) increases
- (c) may increase or decrease (d) remains the same

PART – B (5 x 2= 10Marks)

11. List the advantages of load duration curve. CO1- R
12. What are the factors affecting the performance of electrostatic precipitators? CO2 -U
13. Define: Chain reaction. CO3 -R
14. Mention few advantages of two stroke engine when used in diesel power plant. CO4 -R
15. What are the causes and effect of acid rain? CO5- R

PART – C (5 x 16= 80Marks)

16. (a) (i) Sketch a typical hydroelectric power plant indicating all the components of power plant and list the factors to be considered for the selection of hydro-electric power plant. CO1 -App (10)
- (ii) Compare hydro-electric power plant with steam power plant in the aspect of applications, advantages and disadvantages. CO1 -App (6)
- Or
- (b) (i) Sketch the layout of gas and steam combined power plants with and without reheat system. CO1- App (8)
- (ii) Demonstrate the open cycle MHD power plant describing briefly the components of the system. CO1- App (8)
17. (a) (i) Explain the ball and race mill system used for pulverization of coal with neat diagram. CO2 -App (16)
- (ii) List the advantages of stoker system over pulverized system of coal firing. CO2 -App (6)
- Or
- (b) (i) Explain the forced and induced draught systems with simple sketches. CO2 -U (16)
- (ii) Explain briefly the hyperbolic cooling tower used in steam power plant with simple diagram. CO2 -Ana (6)
18. (a) Sketch the layout of a Nuclear power plant describing the components of the power plant. CO3 -Ana (16)
- Or
- (b) Explain the construction and working of boiling water reactor with neat diagram along with its advantages and disadvantages. CO3 -U (16)
19. (a) Explain the various systems of diesel electric power plant. CO4- U (16)
- Or
- (b) (i) Explain open and closed cycle gas turbine power plants. CO4 -U (10)
- (ii) List the (a) materials used for gas turbine components and (b) fuels used in gas turbine plants. CO4-U (6)

20. (a) (i) Explain how ocean thermal energy is converted into electrical energy with relevant diagram. CO5 -U (10)
- (ii) Describe with simple diagram the double basin type tidal power plant. CO5 -U (6)

Or

- (b) Describe the construction and working principle of Geo thermal power plant with neat sketch and state their advantages and disadvantages. CO5- U (16)