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10ME53

Fifth Semester B.E. Degree Examination, Aug./Sept.2020
Energy Engineering

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.

PART - A

1. a. With a simple sketch, explain the working of Spreader stoker. (06 Marks)
 b. What are the advantages of pulverized fuel burning? Sketch and explain bowl type pulverizing mill. (08 Marks)
 c. Sketch and explain the following coal handling systems :
 i) Screw conveyor ii) Bucket elevator. (06 Marks)
2. a. Explain the following with simple sketches :
 i) Forced draught ii) Balanced draught. (08 Marks)
 b. With sketches, describe the following boiler accessories :
 i) Economiser ii) Air pre heater. (08 Marks)
 c. Determine the height of the chimney to get a net draught of 2mm of mercury, when the temperature of the flue gas is 300°C and the ambient temperature is 30°C. Take the air fuel ratio as 20 : 1. (04 Marks)
3. a. Write short note on the following Diesel engine cooling systems with the help of simple sketches : i) Thermo – siphon system ii) Pump – circulation system. (08 Marks)
 b. What do you mean by dry – sump lubrication? Describe with simple sketch. (06 Marks)
 c. Explain the following fuel supply systems to diesel engine using line diagram :
 i) Common rail type ii) Distributor type. (06 Marks)
4. a. Briefly explain the following with respect to hydel power plant, giving one examples :
 i) Masonry dam ii) Spill way iii) Surge tank. (09 Marks)
 b. With the help of neat diagram of high head power plant, list the components involved. (04 Marks)
 c. The following is the monthly average discharge of a river in millions of m³ for a period of 12 months.

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Flow	100	200	220	150	80	350	650	900	700	600	400	250

- i) Draw hydrograph and mass curve.
- ii) For the average flow, estimate the reservoir capacity.
- iii) If the available head is 95m and the overall efficiency of generation is 85%, calculate the power developed. Take as each month has 30 days. (07 Marks)

PART - B

5. a. Explain the following with respect to nuclear power plant :
 i) Moderator ii) Control rod iii) Uranium enrichment iv) Thermal utilization factor v) Mass defect vi) Multiplication factor and vii) Binding energy. (07 Marks)
 b. Draw a neat diagram and explain any ONE of the following :
 i) Self Controlled Reactor ii) Sodium – Graphite Reactor. (08 Marks)
 c. Write a note on Nuclear radioactive waste disposal. (05 Marks)



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- 6 a. With the help of simple sketches, explain the following related to solar energy :
i) Sun – Shine recorder ii) Pyrheliometer iii) Photo voltaic cell. (12 Marks)
- b. Sketch a horizontal axis wind mill and label its parts. (04 Marks)
- c. What are the advantages and disadvantages of wind energy? (04 Marks)
- 7 a. Explain a typical Geothermal power station with simple line diagram. (08 Marks)
- b. Explain briefly how tides are formed over a month due change in mutual orientation of sun, moon and earth. (04 Marks)
- c. What are the merits and demerits of tidal energy? (04 Marks)
- d. What are the problems associated with OTEC? (04 Marks)
- 8 a. List the factors affecting the generation of Bio - gas. (04 Marks)
- b. Write short notes on :
i) Anaerobic fermentation ii) Photo synthesis. (08 Marks)
- c. Write a neat sketch of floating drum type of digester and explain how bio gas is produced. (08 Marks)
