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Eighth Semester B.E. Degree Examination, July/August 2022 Energy Engineering

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Briefly explain the various step involved in coal handling. (10 Marks)
b. With a neat sketch, explain the working principle of Benson boiler. (10 Marks)

OR

- 2 a. With a neat sketch, explain the functions of super heater and air pre heater in thermal power plant. (10 Marks)
b. With a neat sketch, explain the working of Induced draught cooling tower. (10 Marks)

Module-2

- 3 a. Name solar radiation measuring instruments and explain pyranometer with a neat sketch to measure beam and diffused radiation. (10 Marks)
b. With the help of a neat sketch, explain the construction and working principle of solar pond. (10 Marks)

OR

- 4 a. Explain the working of Down draft gasifier with a neat sketch. (10 Marks)
b. With a neat sketch, explain the working principle of Janta biogas digester. (10 Marks)

Module-3

- 5 a. With a neat sketch, explain the working of Hot dry rock geothermal plant. (10 Marks)
b. With a neat sketch, explain the arrangement of single basin and double basin for tidal power plant. (10 Marks)

OR

- 6 a. With a block diagram, explain the basic components of wind energy conversion system. (10 Marks)
b. With a neat sketch, explain horizontal axis and vertical axis wind machines. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-4

- 7 a. With a neat sketch, explain pumped storage hydroelectric power plant. (10 Marks)
- b. The runoff data of a river at a particular site is tabulated below:

Month	Mean discharge per month (millions of m ³)	Month	Mean discharge per month (millions of m ³)
January	40	July	75
February	25	August	100
March	20	September	110
April	10	October	60
May	0	November	50
June	50	December	40

- (i) Draw a hydrograph and find the mean flow.
- (ii) Also draw the flow duration curve.
- (iii) Find the power in MW available at mean flow if the head available is 80 m and overall efficiency of generation is 85%. Take each month of 30 days. (10 Marks)

OR

- 8 a. With a diagram, explain closed Rankine cycle OTEC system. (10 Marks)
- b. List the problems associated with Ocean Thermal Energy Conversion (OTEC). (04 Marks)
- c. Explain the following terms related to hydroelectric power plant: (06 Marks)
- (i) Surge tank. (ii) Penstock

Module-5

- 9 a. Explain the principle of release of nuclear energy by fusion and fission reaction. (10 Marks)
- b. Write a short note on Nuclear fuels used in the reactors. (05 Marks)
- c. Explain : (i) Thermal utilization factor. (ii) Multiplication factor. (05 Marks)

OR

- 10 a. Explain the following: (10 Marks)
- (i) Reactor shielding.
- (ii) Radioactive waste disposal. (10 Marks)
- b. With a neat sketch, explain the working of Pressurized Water Reactor (PWR). (10 Marks)

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Eighth Semester B.E. Degree Examination, July/August 2022 Tribology

Time: 3 hrs.

Max. Marks: 100

*Note:1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Use of Data hand book is permitted.*

Module-1

- 1 a. Define Tribology. Briefly explain the practical applications of Tribology. (10 Marks)
b. Define Viscosity. State and explain Newton's law of viscosity, with neat sketch. (10 Marks)

OR

- 2 a. Define lubrication. Briefly explain the properties of lubricant oils. (10 Marks)
b. Explain the effect of temperature and pressure on viscosity. (10 Marks)

Module-2

- 3 a. Define friction. List the different types of friction. (05 Marks)
b. Briefly explain any one friction measuring technique. (05 Marks)
c. With neat sketch, explain Bowden and Tabor's theory of friction. (10 Marks)

OR

- 4 a. Define wear. List the different types of wear. Briefly explain any two. (10 Marks)
b. List various wear testing methods. With neat sketch, explain Abrasive wear testing method. (10 Marks)

Module-3

- 5 a. Derive Petroff's equation for lightly loaded journal bearing. Also state the assumptions. (10 Marks)
b. A full journal bearing has following specifications:
Journal diameter = 45 mm, Length = 65 mm, Speed = 2800 rpm,
Radial clearance ratio = 0.0015, Radial load = 800 N,
Average viscosity of oil = 8.274×10^{-3} Pa.Sec.
Calculate : (i) Frictional torque at the shaft.
(ii) Co-efficient of friction.
(iii) Power loss in bearing. (10 Marks)

OR

- 6 State the assumption and derive Reynold's equation in 2D with usual notations. (20 Marks)

Module-4

- 7 Derive an expression for pressure and load carrying capacity in a plane slider bearing with a fixed shoe. Also state the assumptions. (20 Marks)

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OR

- 8 a. Derive an expression for rate of oil flow in an Hydrostatic step bearing. (10 Marks)
- b. A hydrostatic circular thrust bearing has the following data: Shaft dia = 300 mm, dia of pocket = 200 mm, Shaft speed = 100 rpm, Pressure at the pocket = 500 kN/m², Film thickness = 0.07 mm, Viscosity of lubricant = 0.05 Pa.sec.
- Determine :
- (i) Load carrying capacity
 - (ii) Oil flow rate
 - (iii) Powerloss due to friction. (10 Marks)

Module-5

- 9 a. List commonly used bearing materials. (05 Marks)
- b. Briefly explain the properties of bearing materials. (05 Marks)
- c. What are the advantages and disadvantages of bearing materials? (10 Marks)

OR

- 10 a. List different surface coating techniques. Explain any two. (10 Marks)
- b. Write a short note on :
- (i) Scope of surface engineering.
 - (ii) Surface hardening. (10 Marks)
