

CBCS SCHEME

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18ME81

Eighth Semester B.E. Degree Examination, June/July 2023 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. What is pulverised coal? What are the advantages and limitations of pulverised coal? (10 Marks)
b. Briefly explain the various steps involved in coal handling. (10 Marks)

OR

- 2 a. Explain the working principle of Benson boiler, with a neat sketch. (10 Marks)
b. Explain common methods used for controlling super heat temperature of the steam. (10 Marks)

Module-2

- 3 a. Explain the working principle of pyranometer and pyrliometer with a neat sketch. (10 Marks)
b. With the help of a neat sketch, explain the extraction of solar energy from solar ponds. (10 Marks)

OR

- 4 a. Explain the working of floating drum biogas plant with a neat sketch. (10 Marks)
b. Explain the working of updraft gasifier with a neat sketch. (10 Marks)

Module-3

- 5 a. With a neat sketch, explain the working of vapor dominated geothermal power plant. (10 Marks)
b. With a neat sketch explain the harnessing tidal energy by the arrangement of double basin tidal power plant. (10 Marks)

OR

- 6 a. What are the properties of wind and explain the problems associated with the wind power. (10 Marks)
b. With a neat sketch, explain Darrieus type wind machines and list the advantages and disadvantages. (10 Marks)

Module-4

- 7 a. With a neat sketch, explain medium and low head power plant (hydroelectric). (10 Marks)
b. The mean monthly discharge for 12 months at a particular site of river is tabulated below:

Month	Discharge in millions of Cubic meter/month	Month	Discharge in millions of Cubic meter/month
May	500	October	2000
June	200	November	1500
March	1500	December	1500
July	2500	January	1000
August	3000	February	800
September	2400	March	600

- (i) Draw hydrograph and flow duration curve for the above and find average monthly flow.
- (ii) Determine the power available at mean flow of water if available head is 80 m at the site and overall efficiency of generation is 80%. Take 30 days in a month. (10 Marks)

OR

- 8 a. With a diagram, explain Open cycle or Claude cycle OTEC system. (10 Marks)
- b. With a diagram, explain Closed or Anderson OTEC system. (10 Marks)

Module-5

- 9 a. Explain the principle of radioactive decay, half life, fusion and fission in nuclear energy. (10 Marks)
- b. Explain with neat sketch of components of nuclear reactor. (10 Marks)

OR

- 10 a. Explain the working principle of pressurized water reactor with a neat sketch. (10 Marks)
- b. Explain the working principle of homogeneous graphite reactor and gas cooled reactor (indirect circuit gas cooled reactor) with a neat sketch. (10 Marks)

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CBCS SCHEME

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18ME822

18ME822

Eighth Semester B.E. Degree Examination, June/July 2023 Tribology

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Define the term Tribology. Discuss industrial importance of Tribology. (10 Marks)
b. Briefly explain the mechanism of lubrication with the help of Stribeck curve. (10 Marks)

OR

- 2 a. Define viscosity. State and explain Newton's law of viscosity, with a neat sketch. (10 Marks)
b. With a neat sketch, explain any two types viscometer. (10 Marks)

Module-2

- 3 a. Explain Bowden and Tabor's adhesion theory of friction. (10 Marks)
b. What are the theories of friction? Explain any two theories and test measurement. (10 Marks)

OR

- 4 a. Define Wear. Briefly explain different types of Wear. (10 Marks)
b. How do you classify mechanism of wear and explain any one measurement of test method? (10 Marks)

Module-3

- 5 a. State the assumptions of Petroff's equation. Derive Petroff's equation for coefficient of bearing of friction in a lightly loaded bearing. (10 Marks)
b. A full journal bearing having the following:
Shaft diameter 45mm, bearing length 65mm, radial clearance ratio is 0.001, Speed 2000 rpm, radial load 800 N, Viscosity of the lubricant at effective temperature of oil 1.2×10^{-6} Reyn. Considering the bearing as lightly loaded, determine
i) Friction torque at the shaft ii) Coefficient of friction iii) Power loss. (10 Marks)

OR

- 6 State clearly the assumptions made in the derivation of Reynold's equation in 2D. Derive the equation. (20 Marks)

Module-4

- 7 a. A rectangular slider bearing with fixed shoe has the following specification:
Bearing length = 0.0762m; Shoe width = 0.065, Slider velocity = 2.54 m/s, load on bearing = 5383 N, Minimum of oil film thickness = 1.27×10^{-5} m, Mean viscosity of oil = 0.06803 N-s/m², find the inclination of the surface in radians, degree and coefficient of friction. (10 Marks)
b. Derive an expression for the load carrying capacity of a plane slider bearing with fixed shoe. (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.

OR

- 8 a. Derive an expression for the load carrying capacity and rate of flow of oil through a hydrostatic step bearing. (10 Marks)
- b. A hydrostatic circular thrust bearing has the following data:
Shaft diameter = 300mm, diameter of pocket = 200mm, shaft speed = 100 rpm, Pressure at the pocket = 500 kN/m², Film thickness = 0.07mm, Viscosity of lubricant = 0.5 Pas.
Determine (i) Load carrying capacity (ii) Oil flow rate (iii) Power loss due to friction. (10 Marks)

Module-5

- 9 a. Discuss any ten desirable properties of a good bearing material. (10 Marks)
- b. Briefly discuss the common bearing materials that are used in practice. (10 Marks)

OR

- 10 a. What is Surface Engineering? Explain the scope of surface engineering. (10 Marks)
- b. Briefly explain different techniques to achieve surface modifications. (10 Marks)

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