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18ME81

Eighth Semester B.E. Degree Examination, Dec.2024/Jan.2025
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. With a relevant flow chart, explain the various steps involved in coal handling. **(10 Marks)**

b. With a neat sketch, explain the working principle of Benson Boiler. **(10 Marks)**

OR

2 a. Explain the functions of following Boiler accessories with a neat sketch :
i) Air preheater ii) Super heater iii) Economizer iv) Reheater. **(10 Marks)**

b. With a neat sketch, discuss the construction and working of :
i) Natural drought cooling tower ii) Induced drought cooling tower. **(10 Marks)**

Module-2

3 a. With a neat sketch, explain the working principle of pyranometer as a solar radiation measuring instrument. **(10 Marks)**

b. Briefly explain the working of solar pond with neat sketch. Also list the application of Solar energy. **(10 Marks)**

OR

4 a. With a neat sketch, explain the construction and working of KVIC Bio gas plant. **(10 Marks)**

b. Briefly explain the following :
i) Photosynthesis ii) Factors affecting biogas generation. **(10 Marks)**

Module-3

5 a. Explain the working of single and double basin tidal power plant with neat sketch. **(10 Marks)**

b. List the advantages and disadvantages of geothermal energy. Briefly explain the problems associated with geothermal energy. **(10 Marks)**

OR

6 a. With a neat sketch, explain the basic components involved in wind energy convention system. **(10 Marks)**

b. Classify the various geothermal energy sources. With a neat sketch, interpret the working of vapour dominated geothermal power plant. **(10 Marks)**

Module-4

7 a. Elaborate the working of closed cycle OTEC plant [Rankine / Anderson cycle] with a neat sketch. **(10 Marks)**

b. Mean weekly discharge for 12 weeks of a river is given below :

Week	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th
Discharge (m^3/sec)	100	200	300	1200	600	900	800	600	1000	600	400	200

i) Draw Hydrograph and Flow duration curve.

ii) If the available head is 100 m and overall efficiency is 85%. Find the power available at mean flow of water. **(10 Marks)**

OR

8 a. With a neat sketch, explain the working of pumped storage hydro – electric power plant. Also state any 3 advantages and disadvantages of hydroelectric power. **(10 Marks)**

b. Write a short note on the following :
i) Surge tank ii) Draft tube iii) Water hammer iv) Spill way. **(10 Marks)**

Module-5

9 a. With a neat sketch, explain the general components of a nuclear reactor. **(10 Marks)**

b. Write a short note on :
i) Nuclear fusion and Fission ii) Nuclear fuels iii) Thermal utilization factor
iv) Multiplication factor. **(10 Marks)**

OR

10 a. With a neat sketch, explain the working of Pressurized Water Reactor (PWR). **(10 Marks)**

b. List any five advantages and disadvantages of nuclear power plant. Also write a short note on nuclear waste and its disposal. **(10 Marks)**

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18ME822

Eighth Semester B.E. Degree Examination, Dec.2024/Jan.2025
Tribology

Time: 3 hrs. Max. Marks: 100

Note : 1. ***Answer any FIVE full questions, choosing ONE full question from each module.***
2. ***Reference of design data handbook is permitted.***

Module-1

1 a. Briefly explain importance and practical applications of Tribology. **(06 Marks)**
b. Discuss the effect of pressure and temperature on viscosity of oils. **(08 Marks)**
c. List and explain the properties of lubricating oils. **(06 Marks)**

OR

2 a. Define Tribology and explain history of Tribology. **(08 Marks)**
b. With neat sketches, explain saybolt and Red wood viscometers. **(12 Marks)**

Module-2

3 a. Define friction and explain any two theories of friction with neat sketches. **(12 Marks)**
b. What is wear debris analysis? Elaborate in detail. **(08 Marks)**

OR

4 a. Classify wear mechanisms and explain any two wear mechanisms with neat sketches. **(12 Marks)**
b. Write short notes on friction of metals and non - metals. **(08 Marks)**

Module-3

5 Explain the mechanism of pressure developed in an oil film and hence derive the Reynold's equation in two dimensions. **(20 Marks)**

OR

6 a. With a neat sketch, explain partial journal bearing and effect of end leakage. **(08 Marks)**
b. A lightly loaded journal bearing has the following specifications :
Shaft diameter = 50 mm , Bearing length = 80 mm , Diameter clearance ratio = 0.002 , Radial load = 750 N , Viscosity of lubricant = 10×10^{-3} Pa-S , Speed = 4000 rpm.
Determine i) Frictional torque ii) Co-efficient of friction iii) Power loss. **(12 Marks)**

Module-4

7 a. Derive an equation for coefficient of friction of an idealized plane slider bearing with fixed shoe. **(10 Marks)**
b. A hydrostatic step bearing has the following specifications : Shaft diameter = 147 mm , Diameter of pocket = 106 mm , Vertical thrust on bearing = 25 kN , External pressure = 0, Viscosity of lubricant = 25 cP , Oil film thickness = 0.12 mm. Determine
i) Rate of flow through the bearing.
ii) Power loss due to viscous friction. **(10 Marks)**

OR

8 a. Derive an equation for load carrying capacity of hydrostatic bearing. **(10 Marks)**

b. A slider bearing having rectangular shoe has the following specifications :
Length of shoe in the direction of motion = 100mm , Width of shoe = 120 mm , Velocity of moving member = 2 m/s , Expected temperature of oil film = 70°C , Permissible film thickness = 0.02 mm , lubricating oil is automobile oil SAE 40, take q = 1.4. Determine
i) Load carrying capacity ii) Co-efficient of friction. **(10 Marks)**

Module-5

9 a. Discuss the properties of typical bearing materials. **(10 Marks)**

b. Explain in detail about the major aspects to be considered for selection of coating for wear and corrosion resistance. **(10 Marks)**

OR

10 a. What are the advantages and disadvantages of bearing materials? **(04 Marks)**

b. Discuss the concept and scope of surface engineering. **(06 Marks)**

c. Briefly explain different techniques to achieve surface modifications. **(10 Marks)**

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18ME824

Eighth Semester B.E. Degree Examination, Dec.2024/Jan.2025
Automobile Engineering

Time: 3 hrs. Max. Marks: 100

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

Module-1

1	a.	Explain with a neat sketch the dry liners and wet liners.	**(08 Marks)**
	b.	Explain over head valve actuating mechanism with a neat sketch.	**(08 Marks)**
	c.	What are the necessities of cooling system?	**(04 Marks)**

OR

2	a.	Explain thermosyphon cooling system with neat sketch.	**(06 Marks)**
	b.	Explain Hybrid Engine and Electric Car with suitable sketch.	**(10 Marks)**
	c.	State the significance of lubrication system.	**(04 Marks)**

Module-2

3	a.	What are the functions of clutch?	**(04 Marks)**
	b.	Explain with neat sketch the working of single plate clutch.	**(08 Marks)**
	c.	With a neat sketch explain the working of hydraulic brake system.	**(08 Marks)**

OR

4	a.	With a neat sketch explain working principle of overdrive.	**(06 Marks)**
	b.	Explain sliding mesh gear box with a neat sketch.	**(07 Marks)**
	c.	Explain the working principle of a torque converter with a neat sketch.	**(07 Marks)**

Module-3

5	a.	Discuss in detail the Ackerman steering mechanism.	**(10 Marks)**
	b.	Explain the principle of air suspension system with layout.	**(10 Marks)**

OR

6	a.	With a neat sketch explain Battary ignition system	**(08 Marks)**
	b.	Explain the following with suitable diagram : i) Camber ii) Castor.	**(12 Marks)**

Module-4

7	a.	What are the advantages and disadvantages of super charging?	**(08 Marks)**
	b.	With a neat sketch explain exhaust turbo charging of a single cylinder engine.	**(12 Marks)**

OR

8 a. Explain working principle of carburetor with diagram. **(10 Marks)**

b. Explain the following with a diagram :

i) Mechanical fuel pump

ii) Electrical fuel pump. **(10 Marks)**

Module-5

9 a. With a neat sketch explain exhaust gas recirculation system. **(10 Marks)**

b. Explain positive crank case ventilation system. **(10 Marks)**

OR

10 Write short notes on following :

a. Catalytic converter

b. Motor vehicle Act

c. Emission Norms in India

d. Controlling combustion process. **(20 Marks)**

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