

CBCS SCHEME



15ME71

Seventh Semester B.E. Degree Examination, June/July 2019 Energy Engineering

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. With a neat sketch, explain the travelling gate stokers. (08 Marks)
b. Mention the various types of draught system, used at chimneys and explain them with a neat sketch (any one). (08 Marks)

OR

- 2 a. What are the function of super heaters and economizers? (04 Marks)
b. List the different types of fuels used in steam generation. (04 Marks)
c. Estimate the height of the chimney required to produce a static draught of 16 mm of water if the mean temperature of the flue gas in the chimney is 255°C and the temperature of outside air is 25°C. The densities of atmospheric air and flue gas at N.T.P are 1.293 and 1.34 kg/m³ respectively. (08 Marks)

Module-2

- 3 a. Explain different methods of starting a diesel engine. (06 Marks)
b. Draw a line diagram to show the layout of diesel power plant and describe in brief. (10 Marks)

OR

- 4 a. With a neat sketch explain the pumped storage plant. (06 Marks)
b. The discharge through monsoon stream as tabulated below:

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Discharge(m ³ /s)	2.0	1.5	1.0	0.6	0.0	0.0	8.0	10.0	12.0	6.0	4.0	3.0

- i) Draw the hydrograph and calculate the average flow.
ii) Determine the capacity of reservoir for the obtained average flow if a dam is constructed across the stream.
iii) If the mean level of water on the upstream side is 100 m above the tail races find the power in kW that could be generated assuming 80% generator efficiency. (10 Marks)

Module-3

- 5 a. Sketch and explain the solar flat plate collector. (08 Marks)
b. Name solar radiation measuring instruments, and explain any one with neat sketch. (08 Marks)

OR

- 6 a. Give the classification of solar cells, and explain the working principle of solar cell. (08 Marks)
b. Calculate the angle made by the beam radiation with normal to a flat plate collector December 21 at 0900h (LAT). The collector is located at in New Delhi (28°35'N, 77°12'E) and is fitted at an angle of 36° with the horizontal and is pointing due south. (08 Marks)

Module-4

- 7 a. Give a brief note on horizontal and vertical axis wind mill system. (08 Marks)
b. Wind blows with a velocity of 16 m/s at 15°C. The turbine diameter is 115 m with rotating speed of 40 rpm at maximum efficiency. Assume one standard atmospheric pressure and propeller wind turbine. Calculate the following:
i) Total power density in the wind stream
ii) Maximum obtainable power density
iii) Reasonably obtainable power density
iv) Total power (08 Marks)

OR

- 8 a. Draw a neat sketch and explain the working of double basin tidal power plant. (08 Marks)
b. What are the advantages and disadvantages of tidal power plant? (08 Marks)

Module-5

- 9 a. What are the stages in anaerobic digestion process? Explain. (08 Marks)
b. With a neat sketch, explain the updraft gasifier. Mention the temperature ranges. (08 Marks)

OR

- 10 a. Write short notes on the following:
i) Fuel cell thermodynamics principles (08 Marks)
ii) Nuclear energy applications (08 Marks)
b. With a neat sketch, explain the closed cycle OTEC system (Anderson cycle). (08 Marks)
