

# CBCS SCHEME

USN

15ME71

## Seventh Semester B.E. Degree Examination, July/August 2022 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 working of spreader stokes. State the advantages and disadvantages. (08 Marks)
- b. Explain the pneumatic ash handling system, with a neat sketch. (08 Marks)

OR

- 2 a. With a neat sketch, explain the Benson boiler. (08 Marks)
- b. What is draught? Mention types of draught and explain any one type with neat sketch. (08 Marks)

### Module-2

- 3 a. Draw a line diagram to show the layout of diesel power plant. Describe it in brief. (08 Marks)
- b. Name the various starting methods used for diesel engine and explain them. (08 Marks)

OR

- 4 a. Differentiate between :
  - (i) Pondage and storage type of hydel power plant
  - (ii) Fore bay and surge tank (08 Marks)
- b. The run off data of a river at a particular site is tabulated below:

Month	Mean discharge per month (million of Cum)
January	40
February	25
March	20
April	10
May	0
June	50
July	75
August	100
September	110
October	60
November	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%. (08 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-3**

- 5 a. Define the following terms:  
 (i) Solar constant (ii) Beam radiation  
 (iii) Diffuse radiation (iv) Zenith angle (08 Marks)
- b. Determine the local solar time and delination at a location latitude  $23^{\circ}15'N$ , longitude  $77^{\circ}30'E$  at 12.30 IST on June 19. Equation of time correction is given from standard table  $- (1'01'')$  and standard time longitude is  $82^{\circ}30'$ . (08 Marks)

**OR**

- 6 a. Draw a neat sketch, explain flat plate collector. (08 Marks)
- b. With a neat sketch, explain the working of solar cell. (08 Marks)

**Module-4**

- 7 a. With a neat sketch, explain a horizontal axis wind mill and vertical axis wind mill. (08 Marks)
- b. Wind blows with velocity of 15 m/s and at  $15^{\circ}C$ . Assume 1 standard atmospheric pressure if the turbine diameter is 120 m and operating at 40 rpm at maximum efficiency. Calculate torque and axial thrust at maximum efficiency. Assume propeller type wind turbine. Assume gas constant for air  $R = 0.287 \text{ kJ/kgK}$ . (08 Marks)

**OR**

- 8 a. Draw a neat sketch and explain the working of Double basin tidal power plant. (08 Marks)
- b. Discuss the advantages and limitations of tidal power generation. (08 Marks)

**Module-5**

- 9 a. With a neat sketch, explain the construction and working of KVIC digester. (08 Marks)
- b. With a neat sketch, explain the working of down draft gasifier. (08 Marks)

**OR**

- 10 a. Describe the classification of fuel cells. (08 Marks)
- b. Write short notes on:  
 (i) Nuclear energy  
 (ii) Geothermal energy (08 Marks)

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