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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)

**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 <sup>3</sup> )	Month	Mean discharge per month (millions of m <sup>3</sup> )
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:
- (i) Surge tank. (ii) Penstock (06 Marks)

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