

Seat No.	
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**B.E. (Mech.) (Part - IV) (Semester - VIII) (Revised)****Examination, May - 2018****ENERGY AND POWER ENGINEERING****Sub. Code: 68509**

Day and Date : Monday, 07 - 05 - 2018

Total Marks : 100

Time : 2.30 p.m. to 5.30 p.m.

- Instructions :
- 1) All questions are compulsory.
  - 2) Figures to the right indicate full marks.
  - 3) Make suitable assumptions if required and state them clearly.

**Q1) a) Attempt any two: [10]**

- i) Define declination angle, hour angle and Zenith angle.
- ii) Write procedure to test solar collector as per BIS standard?
- iii) Draw a neat sketch of evacuated tube collector and analyse its use for different application.

**b) Solve the following: [8]**

Calculate the angle of incidence of beam radiation with normal to a flat plate collector, pointing the south location in Kolhapur ( $16^{\circ}7'N, 74^{\circ}24'E$ ) at 10.00 hours solar time on October 29. The collector is tilted at an angle of  $35^{\circ}$  with the horizontal. Also calculate day length.

**Q2) Attempt any two: [16]**

- a) With the help of block diagram explain the operation of grid connected solar system for residence.
- b) Explain the I-V characteristics of a solar cell and define fill factor. What is the significance of fill factor?
- c) Explain the principle of operation of Phosphoric Acid Fuel Cell.

**P.T.O.**

Q3) Attempt any two:

[16]

- a) How the wind mills are classified? Explain with schematic diagram of a VAWT?
- b) Discuss the working principle of open cycle OTEC plant with neat sketch. Write their advantages and disadvantages.
- c) Explain with neat sketch hybrid wind- PV power plant. State their advantages

Q4) Attempt any two:

[16]

- a) Discuss the role of NHPC in power development and present status of hydroelectric power generation in India.
- b) Explain with neat sketch the pumped storage power plant.
- c) Explain the working of power grid for smooth transmission of power from power stations to end user.

Q5) a) Solve the following:

[12]

A load duration curve of a system is a straight line, the maximum and minimum loads being 100 MW and 20 MW respectively. The load is supplied by base load and peak load plants.

The cost of both is given as :

For base load plant: Rs. 200/kW-year + Rs. 0.05/kWh

For peak load plant: Rs. 50/kW-year + Rs. 0.10/kWh

For minimum overall cost

- i) Draw the load duration curve.
- ii) Determine the load shared by peak load plant.
- iii) Annual load factors for both stations.

b) Solve any one:

[8]

- i) Explain various tariff methods.
- ii) Describe with neat sketch measurement of smoke and dust in flue gases.

Q6) Write short notes on (Any two):

[14]

- a) Supply chain in power sector.
- b) Human resource in power sector.
- c) Energy audit.

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