

SL - 1058

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B.E. (Mech.) (Part-IV) (Semester -VIII) (Revised)

Examination, April - 2017

ENERGY AND POWER ENGINEERING

Sub. Code : 68509

Day and Date : Thursday, 27 - 04 - 2017

Total Marks : 100

Time : 02.00 p.m. to 05.00 p.m.

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

Q1) a) Attempt any two: [10]

- i) Compare flat plate and evacuated tube solar collector on the basis of .
 - a) Construction
 - b) Efficiency
 - c) Heat output per day
 - d) Expected life
 - e) Cost
- ii) Outline the need of thermal energy storage and list the types.
- iii) Draw a neat sketch of cylindrical parabolic concentrating collector and analyse its use for different application.

b) Solve the following. [8]

Calculate the angle of incidence of beam radiation on a plane surface, tilted by 45° from the horizontal plane and pointing 30° west of south located at Mumbai at 1:30 PM (IST) on 15th November. The longitude and latitude of Mumbai are $72^\circ 49'E$ and $18^\circ 54'N$ respectively. The standard latitude for IST is $81^\circ 44'E$.

P.T.O.

Q2) Attempt any two from the following:

[16]

- a) Analyse solar PV cell on the basis of type of active material
 - i) Single crystal Silicon Solar Cell
 - ii) Multicrystalline Silicon Solar Cell
 - iii) Amorphous Silicon Solar Cell
 - iv) Organic Solar cell
- b) What is the importance of Maximum Power Point Tracking (MPPT) in a PV system? outline various strategies used for operation of an MPPT.
- c) Describe the classification of fuel cells. Comment on relative performance of various types of fuel cells.

Q3) Attempt any two:

[16]

- a) Illustrate wind energy conversion systems (WECS)
- b) Discuss the working principle of closed cycle OTEC plant with neat sketch. Write their advantages and disadvantages.
- c) Explain the concept of hybrid wind-PV power plant. State their advantages

Q4) Attempt any two:

[16]

- a) Discuss the role of NTPC in power development and present status of thermal power generation in India.
- b) Explain the working of a compressed air storage power plant.
- c) Explain in brief power grid, railway grid and international grid.

Q5) a) Attempt any two:

[12]

- i) Explain the measurement of CO₂ by thermal conductivity method.
- ii) Explain magnetic wind method for measurement of oxygen in flue gases.
- iii) Explain the measurement of smoke and dust by reflected dust monitor.

b) Solve the following.

[8]

A power station has to supply load as follows.

Time (Hrs)	0-6	6-10	10-18	18-21	21-22	22-24
Load (MW)	20	40	60	80	60	20

- i) Draw load curve.
- ii) Draw load duration curve.
- iii) Choose suitable generating units to supply the load.
- iv) Calculate load factor.
- v) Plant capacity factor.

Q6) Answer any two:

[14]

- a) Enlist the private companies in power sector and explain any one in detail.
- b) Explain the procedure for detailed energy audit.
- c) Explain the supply chain in energy sector in India.

