



**Energy Engineering
(New) (1315)**

P. Pages : 2

Time : Three Hours

Max. Marks : 100

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Solve **any two** bits from a, b, c.
5. Assume suitable data if necessary.
6. Use of non-programmable calculator is allowed.

UNIT - I

1. a) Explain Indian energy scenario. **10**
- b) What is energy conservation act 2001 and its features. **10**
- c) What is an energy audit ? Explain briefly the difference between preliminary and detailed energy audits ? **10**

UNIT - II

2. a) Define the following terms : **10**
 - i) Surface azimuth angle (γ)
 - ii) Declination angle (δ)
 - iii) The hour angle (ω)
 - iv) Latitude (ϕ)
 - v) Incident angle (α)
- b) Give the energy diagram of typical flat plate collector. Give collector efficiency. **10**
- c) Explain the cylindrical parabolic collector with the related terms. **10**

UNIT - III

3. a) Explain the solar air heater with its constructional diagram with its types. **10**
- b) Explain low temperature power generation cycle using flat-plate collectors. **10**
- c) Explain schematic view of a typical solar cell with its working principle. **10**

UNIT - IV

4. a) Compare horizontal axis wind turbine (HAWT) and vertical axis wind turbine (VAWT). **10**
- b) Prove that in case of horizontal axis wind turbine, maximum power can be obtained when exit velocity = $\frac{1}{3}$ rd of wind velocity and $P_{\max} = \frac{8}{27} \rho AV^3$. **10**
- c) Classification of Gasifier and explain any one with neat sketch with application. **10**

UNIT - V

5. a) Give the advantages and disadvantages of geothermal resource. **10**
- b) Explain open cycle OTEC plant. **10**
- c) Explain hydrothermal resources. **10**
