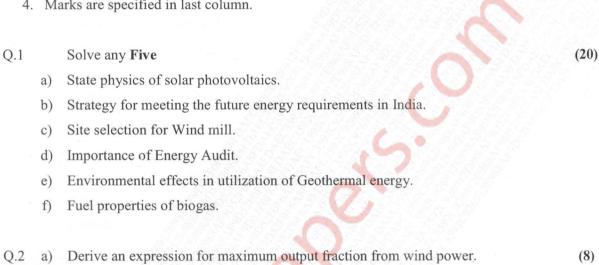
Q.P. Code: 27952

[Time: 3 hours]

[Marks: 80]

Note:

- 1. Question No.1 is compulsory.
- 2. Attempt any three questions from remaining.
- 3. Assume suitable data if required.
- 4. Marks are specified in last column.



- Describe working of solar pumping system with neat sketch. (6)b) Describe limitation and scope of tidal power plant. (6)
- Calculate the local solar time and declination at a location latitude 23°15'N, Q.3 (8)Longitude 77°30' E at 12:30 IST on June 19, 2010. Equation of time correction is given from standard table or chart is 1'01".
 - Explain with sketches applications of biogas. **(6)**
 - Write a note on prospects of geothermal energy in India. **(6)**
- 0.4 Write a note on horizontal axis type wind turbine with the help of neat sketch. (8)
 - b) Discuss the working of single basin type tidal power plant. (6)
 - Discuss the working of flat plate collectors using air as a working fluid with the (6)help of a neat sketch.

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Q.5 Calculate the following parameters of a bio-gas system: (8)The volume of biogas digester i) ii) The power available from bio-digester Given: Calorific value of methane: 28 MJ/m³, Burner Efficiency: 70 % Number of Cows: 8, Retention Period: 20 days, Temperature of Fermentation: 30 °C Dry matter (Cow Dung) collected per cow per day: 2 kg Density of dry matter in the fluid (slurry) in the digester: 50 kg/m³ Biogas Yield: 0.2 m³ per kg of dry input Methane Proportion in the biogas: 0.7 b) Explain the concept of total energy system in India. (6)Explain basic sun-earth angles in details. (6)a) Wind at 1 bar and 20° C has a velocity of 12 m/s. (10)Q.6 Calculate: i) Total power density in wind stream ii) Maximum power density iii) Reasonable obtainable power density iv)Total power produced if rotor diameter is 60 m and it runs at 50 rpm v)The torque and axial thrust produced at maximum efficiency. Discuss the analysis of aerodynamic forces acting on wind mill blades. (6)Discuss the prospects of Renewable energy sources in India. (4)