Total No. of Questions : 4]

SEAT No. : [ ]

PA-1681

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[5931]-1004

F.Y. Engineering

SYSTEMS IN MECHANICAL ENGINEERING

(2019 Pattern) (Semester - I) (102003)

Time : 1 Hour] ***[Max. Marks : 30***

Instructions to the candidates :

1) ***Answer Q1 or Q2, Q3 or Q4.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary.***

Q1) a) Write difference between renewable and non-renewable sources of energy. **[4]**

b) Explain construction and working of Hydrogen Fuel Cell with neat sketch. State its advantages and disadvantages. **[6]**

c) A small generating plant of 100 kW capacity uses gas of a calorific value of 4000 kJ/m^3. The volume of gas required per hour when the plant is running at full load condition is 450 m^3/hr. Find: i) Input Power and ii) Overall Efficiency of the plant. **[5]**

OR

Q2) a) Draw a layout of Steam Power Plant and mention all its components. **[4]**

b) Explain different ways of extracting energy from biomass and applications of biomass energy. **[6]**

c) A wind mill of 41.28 % efficiency produces 1200 kW of power, when it receives the wind at the speed of 12 m/s. Find the blade diameter of the wind mill, Consider density of air as 1.19 kg/m^3. **[5]**

P.T.O.

Q3) a) Explain i) Heat Engine ii) Refrigerator and iii) Heat Pump with neat block diagram. **[6]**

b) Explain Fourier's law of heat conduction. A plane wall has a thermal conductivity of 1.15 W/mK. If the inner surface is at 1100ºC and outer surface is at 350ºC, then What should be thickness (in meter) of the wall to maintain a steady heat flux of 2500 W/m^2? **[4]**

c) Differentiate between 4-stroke S.I and C.I engine. **[5]**

OR

Q4) a) Explain with examples, classification of steam generators. **[5]**

b) Differentiate between different modes of heat transfer. **[4]**

c) A heat engine operates between sources and sinks temperatures of 235ºC and 30°C respectively. If heat engine receives 35 kW from the source, Find, i) The net work done by the engine ii) Heat rejected to the sink by the engine and iii) Efficiency of the engine. Draw the sketch of the system. **[6]**