337652(37)

B. E. (Sixth Semester) Examination, Nov.-Dec. 2021

(New Scheme)

(Mech. Branch)

ENERGY SYSTEMS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Part (a) of each question is compulsory. Solve any two from part (b), (c) and (d). Part (a) is of 2 marks & (b), (c), (d) is of 7 marks.

Unit - I

1. (a) Define the thrust power.

    (b) The diameter of the propeller of an air crafts it 2.5 m. It files at a speed of 500 kmph at an altitude of 8000 m. For a flight to the jet speed ratio of 0.75 determine :

The flow rate of air through the propeller

Thrust produced

Specific thrust

Specific impulse

The thrust power

Take density of air = 0.525 kg/m^3

(c) Briefly explain pulse jet with suitable schematic and T-S diagram. Write the advantages and disadvantages.

(d) Define the following :

(i) Propulsive efficiency

(ii) Thermal efficiency

(iii) Overall efficiency

(iv) Specific Thrust

Unit - II

2. (a) Write the name of two monopropellant liquid.

(b) Define the following terms :

(i) Propulsive efficiency of rocket

(ii) Weight flow coefficient

(iii) Thrust coefficient

(iv) Impulse to weight ratio

(v) Characteristics velocity

(c) Define the orbital and escape velocity of a space or earth satellite.

(d) Show that the maximum altitude for vertical height of rocket is.

$$Z = f\left(ls, \xi, t_p\right)$$

Unit - III

3. (a) Declination angle.

(b) Define and derive the following term on the basic earth sun angle with diagram.

(i) Solar azimuth angle

(ii) Zenith angle

(iii) Surface azimuth angel

(iv) Altitude angle

(v) Hour angle

(vi) Latitude angle

(c) Calculate the number of day light hours at delhi on December 21 and June in a leap year.

(d) What are the solar energy collectors? Write the

types of solar energy collectors.

Unit - IV

4. (a) What is Biomass Energy?

(b) Explain the constructional detail and working of KVIC digester?

(c) Prove that the maximum power can be extracted from wing is 59.3%.

(d) Write the factors affecting generation of biogas.

Unit - V

5. (a) Write the two difference of fuel cell over battery.

(b) Explain the principle and operation of Fuel Cell.

(c) Explain the principle and operation of MHD.

(d) Explain the principle and operation of OTEC system.