Roll No. | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(AE) (Sem.–3)

APPLIED THERMODYNAMICS

Subject Code : AE-205

Paper ID : [A0704]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.**

SECTION -A

1. Write briefly :

i. Define calorific value of fuel.

ii. What is swept volume?

iii. What is Air conditioning?

iv. Define Dew point temperature.

v. What is convection heat transfer?

vi. What is sensible heat factor?

vii. What is a comfort chart?

viii. Define Tonne of refrigeration.

ix. Define isothermal efficiency of a reciprocating air compressor?

x. What is CNG?

SECTION -B

2. Derive the expression for the LMTD of the counter flow heat exchanger.

3. Explain in brief general use of alternate fuel.

4. Explain the performance characteristics and limitations of the bio diesel fuel.

5. 800 m^3/min of circulated air at 22 °C DBT and 10 °C DPT to be mixed with 300 m^3/min of fresh air at 30°C DBT and 50 %R Determine :

   (i) enthalpy

   (ii) specific volume

   (iii) humidity ratio

   (iv) dew point temperature.

6. Discuss how the clearance affects the performance of multistage reciprocating compressors.

SECTION -C

7. Determine the size of the cylinder for double acting air compressor of 50 indicated horse power, in which air is drawn at1 kgf/cm^2 and 15°C and compressed according to the law $pV^{1.2}$= C to 6 kgf/$cm^2$the compressor runs at l00rpm with average piston speed of 152.5 m/min.Neglect clearance.

8. An air conditioned auditorium is to be maintained at 27° C DBT of 60 % RH. The ambient condition is 40°C and 30°C WBT. The total sensible heat load is 100,000 KJ/hr and the total latent heat load is 40,000 KJ/hr. 60 % as the return air is circulated and mixed with 40 % as make up air after cooling coil. The condition as the air leaves the cooling coil is at 18°C. Determine :

   (i) room sensible heat factor

   (ii) condition of air entering auditorium

   (iii) amount of makeup air

   (iv) apparatus dew point (By bass factor as cooling coil).

9. Write the short notes on following :

   (i) vegetable oils

   (ii) automobile fuel