

INDIAN INSTITUTE OF TECHNOLOGY, KHARAGPUR

R9

Date 30 FN/AN, Time: 2/3 Hrs., Full Marks 30, Deptt. M E

No. of Students _____, Mid/End Autumn/Spring Semester Examination _____

Sub. No. ME30608/41001 Sub. Name Applied Thermofluids-I

III Yr. B.Tech.(H) B.Arch.(H) / M.Sc./M.Tech(Dual), Instruction _____

Subject No ME30608/41001 Subject Name: Applied Thermo Fluids-I No Of Students: 129

- Q1. What is cracking and its objective? What are the processes involved in it?
- Q2. Between Gas Turbines and Reciprocating engines why do Reciprocating engines have higher efficiency and peak temperatures?
- Q3. Between Petrol and Diesel Engines which one is more adaptable to a wider range of fuels?
- Q4. A single cylinder and four stroke hydrogen fuelled SI engine develops 20 kW at 6000 rpm. The compression ratio is 8, the volumetric efficiency is 70%, the thermal efficiency is 0.33 and mechanical efficiency is 0.9. Given that the calorific value of fuel is 11,000 KJ/m³, find the swept and clearance volumes.
- Q5. If at full load of 44 KW, the mechanical efficiency is 80%, what is the mechanical efficiency at half load?
- Q6. Two cycles one CARNOT and another OTTO have identical maximum and minimum volumes. Their minimum temperatures and pressures are also the same. Draw their T-S and p-V diagrams and compare their performances.
- Q7. What is the mode of heat transfer that leads to formation of snow found on mountain tops or during snowfall?
- Q8. What are the devices in which heat exchanges occur in an absorption refrigeration system called?
- Q9. Between Window and Split ACs state one performance criteria for each one of them in which they are superior?
- Q10. What is the purpose of having an air washer in an AC Plant?
- Q11. What is a primary refrigerant and what is a secondary one. Name one application each where water plays these roles?
- Q12. Air enters a refrigeration coil at 25°C and 50% humidity at 6000 litres/min. The air leaves the coil saturated at 10°C. Calculate the tons of refrigeration required.

$$P_{sat|25C} = 3.169 \text{ KPa}; P_{sat|10C} = 1.227 \text{ KPa}; W = 0.622 \frac{P_{sat}}{P - P_{sat}}; v = 0.287 \frac{T}{P - P_{sat}};$$

$$h = (1.005 + 1.88W)t + 2501W \frac{\text{KJ}}{\text{kg}}$$