Reg. No. : | | | | | | | | | | |

Question Paper Code: 54704

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Fourth Semester

Mechanical Engineering

15UME404 - THERMAL ENGINEERING

(Regulation 2015)

(Steam Table and Refrigeration tables are permitted)

Duration: 1.15 hrs Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. The compression ratio of an IC engine is the ratio of CO1- R

   (a) swept volume to clearance volume

   (b) total cylinder volume to clearance volume

   (c) total cylinder volume to swept volume

   (d) pressure after compression to that before compression

2. Which of the following cycle has the highest efficiency ? CO1- R

   (a) Otto cycle (b) Carnot cycle (c) Stirling cycle (d) Joule cycle

3. A carburetor is used to supply CO2- R

   (a) Petrol ,air and lubrication oil (b) Air and diesel

   (c) Petrol and lubricating oil (d) Petrol and air

4. Piston compression rings are made of CO2- R

   (a) cast iron (b) bronze (c) aluminum (d) white metal

5. The flow of steam is super sonic CO3- R

   (a) At the entrance to the nozzle (b) At the throat of the nozzle

   (c) In the convergent portion of the nozzle (d) In the divergent portion of the nozzle

6. What factor limits the maximum temperature in a gas turbine cycle CO3- R

(a) quality of fuel (b) combustion efficiency

(c) turbine blade material (d) rotational speed of turbine blade

7. The absolute pressure of air at the outlet of a compressor is called CO4- R

(a) Back pressure (b) Critical pressure (c) Discharge pressure (d) None of these

8. Roots blower is an example of CO4- R

(a) reciprocating compressor (b) rotary compressor

(c) centrifugal compressor (d) axial flow compressor

9. In refrigerating machine ,heat rejected is_____heat absorbed CO5- R

(a) Equal to (b) Less than (c) Greater than (d) None of these

10. Identify the refrigerant with maximum boiling point CO5- R

(a) ammonia (b) carbon di-oxide (c) Freon - 12 (d) Freon - 22

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. In an air standard dual cycle the pressure and temperature at the beginning of compression are 1bar and 47°c respectively. The heat supplied in the cycle is 1250KJ/Kg two third of this being added at constant volume and rest at constant pressure. If the compression ratio is 16, determine the maximum pressure, temperature in the cycle, thermal efficiency and mean effective pressure. CO1- App (8)

12. Describe the working of electronic ignition system and how it differ from other ignition system. CO2- U (8)

13. Drive the expression for the critical pressure ratio in a steam nozzle. CO3- Ana (8)

14. The free air delivery of a single cylinder single stage reciprocating air compressor is $2.5m^3$/min. The ambient air is at STP conditions and delivery pressure is 7bar. The clearance volume is 5% of the stroke volume and the law of compression and expansion is $PV^{1.25} = C$. If L =1.2D and the compressor runs at 150rpm, determine the size of the cylinder. CO4- U (8)

15 Explain the working of Lithium bromide refrigeration system. CO5- U (8)