R18 Regulation *Subject code:* 2P5CB

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech V Semester Regular/Supplementary Examinations, December 2021

THERMAL ENGINEERING-I

(MECHANICAL ENGINEERING)

Maximum Marks: 70 *Date:03.01.2021* Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10x2M=20 Marks)

1 List out the differences between the SI engine and CI engine.
2 What is the function of a carburetor? What is carburetion?
3 List out various factors influencing delay period.
4 Classify the CI Engine Combustion chambers.
5 Define Specific fuel consumption.
6 List out the advantages of reciprocating compressor.
7 Draw the diagrams of Roots blower and vane blower compressor.
8 Explain the concept of slip factor in centrifugal compressor.
9 Define Ton of refrigeration.
10 What are the processes involving in Bell- Colemn Cycle.

Part-B

Answer All the following questions. (5X10M=50Marks)

11 a) What are the important requirements of fuel injection system in a C.I Engine? (5M)
b) Mention the various methods of lubrication system and explain any two in detail. (5M)

OR

12 a) Explain the working of 4-Stroke CI engine with help of diagrams. (5M)
b) Why the actual cycle efficiency is much lower than the air standard cycle efficiency? List the major losses in the actual engine. (5M)

13 a) Explain the phenomenon of knock in CI engine and compare it with SI engine knock. (5M)
b) Briefly explain the stages of combusting in SI engines elaborating the flame front propagation. (5M)

OR

14 a) How the stages of Combustion in CI engine take place. (5M)
b) Discuss the effect of turbulence and compression ratio on the combustion characteristics in SI engine. (5M)

15 a) Explain Rope brake dynamometer to determine the brake power of an engine? (5M)
b) Derive an expression for volumetric efficiency of air compressor. (5M)

OR

16 a) The following date was recorded during testing of a four-stroke cycle gas engine. Area of indicator diagram = 900 mm ^{2}; Length of indicator diagram = 70 mm; spring scale = 0.3 bar/mm; Diameter of piston = 200 mm; Length of stroke = 250 mm; Speed = 300 rpm. Determine
i) Indicated mean effective pressure ii) Indicated power(5M)
b) With a neat sketch explain the working of roots blower. (5M)

17 a) What is degree of reaction? Derive the expression for degree of reaction for axial flow compressor(5M)
b) Compare the Centrifugal and Axial Compressor(5M)

OR

18 a) Draw the velocity diagrams for inlet and outlet of the impeller of a centrifugal compressor by assuming the air entry is axial. (5M)
b) List the various types of rotary compressors and explain the working principles of Vane blower. (5M)

19 a) State merits and demerits of 'Vapour compression system' over Air refrigeration system. (5M)
b) Explain with neat diagram the working of central system of air-conditioning. (5M)

OR

20 A Bell-Coleman refrigerator operates between pressure limits of 1 bar and 8 bar. Air is drawn from the cold chamber at 9°C, compressed and then it is cooled to 29°C before entering the expansion cylinder. Expansion and compression follow the law $PV^{1.35}$ = constant. Calculate the theoretical C.O.P. of the system. (10M)