



R18 Regulation  
TKR COLLEGE OF ENGINEERING AND TECHNOLOGY  
(Autonomous, Accredited by NAAC with 'A' Grade)

Subject code:2B2AE

B.Tech II Semester Supplementary Examinations, October 2022

Fundamentals of Mechanical Engineering  
(Common to CE & ME)

Maximum Marks: 70

Date:13.10.2022 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 which carries 10M.
  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 Write the relation between absolute pressure and gauge pressure
- 2 Define Bio-fuel?
- 3 What is the difference between intensive properties and extensive properties?
- 4 Compare Cochran and Lancashire Boiler.
- 5 What are the process of otto cycle, Carnot cycle, Diesel cycle and Rankle cycle?
- 6 How would you say that diesel cycle is known as constant pressure cycle.
- 7 Define "Ton of Refrigeration (TR)"?
- 8 Why air condition is required in air craft.
- 9 Define: (i) Velocity ratio; (ii) slip of a belt drive.
- 10 What is clutch ? Mention broad classification of clutches?

Part-B

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

- 11 Describe some few words about Fossil, Nuclear, Solar and Hydel Fuels? 10M
- OR
- 12 a) Find the steady flow energy equation and solve the problem. 5M  
b) In a system 45 kg/s of working fluid enters with 1m/s velocity and leaves with 19 m/s velocity. The system receive 46 k j/s of heat and does 15kw of work. the outlet is 30 m above the inlet. find the change in specific enthalpy of working fluid. 5M
- 13 Describe the process formation of steam from ice at 0°C and what is meant by internal energy of steam. 10M
- OR
- 14 a) Derive an expression for work done in an adiabatic process. 5M  
b) Enumerate the factors which should be considered for the selection of a boiler. 5M
- 15 a) Explain the principle of fire tube and water tube boilers. 5M  
b) Describe construction and working of locomotive boiler. 5M
- OR
- 16 a) Explain with suitable sketches the working of four-stroke petrol engine. 5M  
b) Explain the following terms as applied to I.C. Engines: Bore, Stroke, T.D.C, B.D.C and Compression ratio. 5M

- 17 What is the power required to drive an air compressor which takes in 15 kg of air per minute at  $27^{\circ}\text{C}$  and 1 bar. The compression is carried out in one stage to 8bar, air is delivered to receiver at this pressure. Compression curve follows  $PV^{1.3}=C$  and mechanical efficiency of compressor being 80%. Neglecting losses due to clearance, cooling and leakage, find also the heat lost through the cylinder walls. 10M

OR

- 18 a) What is the condition for maximum efficiency in multistage compression? 5M  
b) Find the number of pumps required to take water from a deep pump under a head of 89m. All pumps are identical and are running at 800 RPM. The specific speed of pump is 25 while the rated capacity of each pump is  $0.16\text{m}^3/\text{sec}$ . 5M
- 19 A prime mover running at 300 RPM drives a D.C generator at 500 RPM by belt drive. Diameter of the pulley on output shaft of prime mover is 60 cm. Assuming slip of 30 % determine the diameter of generator pulley, if the belt running open it is 6mm thick. Also find diameter of generator pulley when slip is neglected. 10M

OR

- 20 a) What do you mean by crossed belt drive? Find the length of belt in crossed belt drive. 5M  
b) Explain the working principle of a centrifugal clutch? And what are the advantages of centrifugal clutch? 5M