1E3107

Total No. of Questions : 22 Total No. of Pages : 03

Roll No. .....

1E3107

B.Tech. 1-Sem. (Main/Back) Exam. - 2024

1FY3-07/Basic Mechanical Engineering

Maximum Marks : 70

Time : 3 Hours

Instructions to Candidates :

Attempt all ten questions from Part-A, five questions out of seven questions from Part-B and three questions out of five questions from Part-C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly. Use of following supporting material is permitted during examination.

(Mentioned in Form No. 205)

1. ..... 2. .....

PART-A **[10x2=20]**

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1. State the Zeroth law of thermodynamics.

Q.2. Discuss the two important properties of Steam.

Q.3. What are the main components of IC engine?

Q.4. What is meant by priming in centrifugal pumps?

Q.5. Define the performance measure of a refrigerator and a heat pump.

Q.6. Why gear drive is called as positive drive?

Q.7. List the different fields of mechanical engineering.

Q.8. What is the difference between open belt and cross belt?

Q.9. Give the name of four types of patterns.

Q.10. What is 18:4:1 steel? State its application.

PART-B **[5x4=20]**

(Analytical/Problem solving questions)

Attempt any five questions

Q.1. Explain the second law of thermodynamics. Is it possible for a heat engine to operate without rejecting any waste heat to a low temperature reservoir? Explain.

Q.2. Discuss the classification of the Steam Boilers. Explain the working of any boiler with the neat sketch.

Q.3. Derive an expression for the air standard efficiency of Otto cycle. Draw neat P-V and T-S diagrams.

Q.4. Differentiate among the welding, brazing and soldering.

Q.5. Compare the working of two stroke and four stroke Internal Combustion Engine.

Q.6. Derive an expression for the ratio of tensions in a V-belt drive.

Q.7 Discuss the following manufacturing processes:

(a) Rolling

(b) Extrusion

PART-C [3x10=30]

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

Q.1. Explain the oxy-acetylene gas welding and metal arc welding with neat sketches. Also state their applications.

Q.2. Explain the working of a reciprocating pump with neat sketch.

Q.3. Find the power transmitted by a belt running over a pulley of 500 mm diameter at 300 rpm. The coefficient of friction between the belt and pulley is 0.24, angle of lap is 150° and maximum tension in the belt is 2.45 kN.

Q.4. Explain the following:

(a) Vapour compression refrigeration cycle

(b) Comfort air conditioning

Q.5. Write a short note on **any two** of the following:

(a) Classification of IC engines

(b) Forging manufacturing process

(c) Various engineering materials and their properties

---- X -----