

1E3107

Total No. of Questions : 22

Total No. of Pages :

03

Roll No.

1E3107

B.Tech. I-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

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