

MECHANICAL SCIENCE & ENGINEERING

TIME: 3 HOURS

MAX MARKS: 100

Instructions:

- (1) Answer one full question from each section - I, II, III, IV and V.
(2) Each one full question carries 20 marks.

SECTION - I

1. a) State the classifications of engineering materials. 5
b) Explain the ductility and creep of materials. 5
c) What are the effects of silicon and phosphorus on cast iron? 5
d) List any five properties of aluminum. 5

2. a) Explain the meaning of alloy and need of alloying. 5
b) List the advantages of nonferrous materials. 5
c) List different types of nonferrous metals. 5
d) Explain the composite materials with their advantages 5

SECTION - II

3. a) Explain the meaning of heat treatment and list its applications. 5
b) List any five types of keys. 5
c) Classify the types of bearings. 5
d) Explain the working of ball bearing with a neat sketch. 5
4. a) List any five advantages of rolling contact bearings. 5
b) Explain the woodruff key with a neat sketch. 5
c) List any five requirements of good coupling. 5
d) Sketch and label the flange coupling. 5

SECTION - III

5. a) Sketch and label compound belt drive. 5
b) List the advantages of chain drive compared to belt drives. 5
c) Explain slip and creep in belt drive. 5
d) Sketch and label compound gear drive. 5

6. a) Sketch and label crossed belt drive. 5
b) Explain the helical and bevel gears with their applications. 5
c) List merits and demerits of V belt drive. 5
d) Sketch and label the chain drive. 5

SECTION - IV

7. a) Sketch and label rack and pinion gear drive. 5
b) Explain the screw thread terminology of screws with a sketch. 10
c) Explain the need of nut locking and list types of nut locking. 5

8. a) Sketch and label worn and worm wheel drive. 5
b) List merits and demerits of temporary fasteners. 5
c) Explain the lap riveting with a sketch. 5
d) Draw and label castle nut and split pin locking method. 5

SECTION - V

9. a) Explain the terms, TDC and compression ratio. 5
b) Explain the term brake specific fuel consumption. 5
c) Illustrate the working of four stroke petrol engine with sketch. 10
10. a) Explain the terms cylinder capacity and stroke length. 5
b) Explain the term brake thermal efficiency. 5
c) Illustrate the working of four stroke diesel engine with neat sketch. 10