

Total No. of Questions : 8]

SEAT No. :

P3921

[Total No. of Pages : 3

[60011-4004

E.E.

**SYSTEMS IN MECHANICAL ENGINEERING (SME)
(2019 Credit Pattern) (Semester - I) (102003)**

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer Q.No.1 or Q.No.2, Q.No.3 or Q.No.4, Q.No.5 or Q.No.6, Q.No.7 or Q.No.8.
- 2) Neat Diagram must be drawn wherever necessary.
- 3) Figures to the right indicates full marks.

- Q1)** a) Classify automobiles based on various considerations. [7]
b) Define vehicle specification, Explain following engine specifications -[7]
i) Torque
ii) Power and
iii) Stroke
c) Compare vehicle specifications for two-wheeler and three-wheeler vehicles. [4]

OR

- Q2)** a) Explain various components of S. I engine with neat sketch. [7]
b) Explain hybrid vehicle with neat sketch. Mention its components. [7]
c) State difference between electric and hybrid vehicle with examples. [4]

- Q3)** a) Explain the working principle of ABS system in vehicle with neat sketch. State its importance over conventional braking system. [7]
b) Explain construction and working of disc brake system with neat sketch. [7]
c) Define Gear Ratio for gear box. Determine gear ratio, if a pinion 110 mm with pitch circle diameter meshes with a gear of 450 mm pitch circle diameter. The number of teeth on pinion is 20 and it rotates at 1550 rpm. [3]

OR

P.T.O.

- Q4)** a) State types of steering system? Explain Ackerman steering mechanism with neat sketch. [7]
- b) Explain construction and working of single plate clutch with neat sketch. [7]
- c) Why safety arrangements needed in vehicle? Explain the importance of seat belts and air bags in the vehicle. [3]
- Q5)** a) State the importance of sheet metal working in manufacturing. Explain Punching and Blanking with neat sketch. [7]
- b) State significance of Metal Cutting process in industry. Explain following metal cutting processes: [7]
- i) Turning
- ii) Milling and
- iii) Drilling operation with neat sketch.
- c) Draw a block diagram of 3D printer with all its components. [4]

OR

- Q6)** a) Explain sand casting process with neat sketch. State its advantages and disadvantages. [7]
- b) With neat sketch explain the shielded metal arc welding. State its applications. [7]
- c) Write a short note on open and closed die forging. [4]
- Q7)** a) Using block diagrams, write a short note on [7]
- i) Electric Geyser and
- ii) Electric iron State specifications for Electric Geyser. [7]

- b) Explain with block diagram, working of a refrigerator, state its domestic and industrial applications. [7]
- c) An electric motor driven pump fills an over headed tank placed at a height of 20 m from the ground level. The mass of the water pumped per second is 5.56 kg. Input power of the motor is 2200 W. Calculate the efficiency of the motor. (Use $g = 9.81 \text{ m/s}^2$) [3]

OR

- Q8) a) Using block diagram, explain the application of blower in kitchen chimney and vacuum cleaner. [7]
- b) State various applications of springs in domestic appliances. With neat sketch, explain any one mechanism making use of spring. [7]
- c) A refrigerator has working temperatures in the evaporator and condenser coils as -30°C and 32°C . What is the maximum COP of the system? Draw its block diagram. [3]
