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Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech. (AE) (2011 Onwards) (Sem.-6)**  
**COMPUTER AIDED AUTOMOTIVE DESIGN**  
Subject Code : BTAE-601  
Paper ID : [A2380]

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A****Q1. Write briefly :**

- a) What are the methods and materials used in manufacturing of crank shafts?
- b) Name the material used for piston.
- c) What are the applications of hauling chains?
- d) What is concept of minimum number of teeth on a sprocket? Explain.
- e) Why the face of the pulley is crowned?
- f) What are main differences between rolling and sliding type of bearing?
- g) What is load correction factor for flat -belt?
- h) Which material is used for leaf spring?
- i) What is thick film lubrication?
- j) Write types of failure of connecting rod.

**SECTION-B**

- Q2. Discuss advantages and drawbacks of worm gear drives. Suggest materials for worm wheel and worm with proper justification.
- Q3. Explain the differences between design methodology used for a sliding and rolling type bearing.
- Q4. Discuss design aspects of intake manifolds.
- Q5. What will be the main difference in the design of shaft for a spur gear assembly versus that for a helical gear assembly?
- Q6. What do you mean by nipping of leaf springs and derive its formula?

**SECTION-C**

- Q7. Explain the design procedure for lubrication systems.
- Q8. A compressor requires 100 kW to run at 240 *r.p.m.* from an electric motor of speed 750 *r.p.m.*, by means of a V-belt drive. The diameter of the compressor shaft pulley should not be more than 1 m while the centre distance between the shaft is 2 m. The belt speed should not be exceed 25 m/s. Determine the no. of v-belts required to transmit the power of each belt has a cross sectional area of  $375\text{mm}^2$ , density  $1000\text{ kg/m}^3$ , and an allowable tensile stress of 2.5 MPa. The pulley groove angle is  $40^\circ$  and coefficient of friction between the belt and the pulley side is 0.25.
- Q9. The length of connecting rod of a gas engine running at 340 rpm is 600 mm and the crank is 120 mm long when the piston has moved  $1/4^{\text{th}}$  stroke during outstroke. Determine :
- The angular position of crank.
  - The angular speed of connecting rod.
  - The acceleration of piston.