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Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech.(AE) (Sem.-6)**  
**AUTOMOTIVE DESIGN - II**  
**Subject Code : AE-302**  
**Paper ID : [A0719]**

Time : 4 Hrs.

Max. Marks : 60

**INSTRUCTION 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 has to attempt any **FOUR** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students has to attempt any **TWO** questions.

**SECTION-A****1. Write short notes on :**

- a) Name the materials for pulleys.
- b) What is the purpose of chassis springs?
- c) What are various types of helical springs?
- d) What is meant by self contained bearing?
- e) Define helix angle.
- f) What are the functions of piston rings?
- g) What is the purpose of valve springs?
- h) What are different types of crank shaft?
- i) What are safe speeds for belt drives?
- j) How does oil viscosity affect coefficient of friction?

**SECTION-B**

2. A vehicle spring of semi-elliptical type has leaves of 75 mm width and 10 mm thickness and effective length 900 mm. If the stress is not to exceed 220725 kPa when the spring is loaded to 4905 N, estimate the required number of leaves and the deflection under this condition. If the spring is just flat under load, what is the initial radius? Take  $E = 196.2 \times 10^6$  kPa.
3. What is surging phenomenon in springs and how it can be eliminated? Discuss.
4. A 150 mm diameter shaft supporting a load of 10 kN has a speed of 1500 rpm. The shaft runs in a bearing whose length is 1.5 times the shaft diameter. If the diametral clearance of the bearing is 0.15 mm and the absolute viscosity of the oil at the operating temperature is 0.011 kg/m-s, find the power wasted in friction.
5. Enumerate various stresses induced in the connecting rod.
6. Sketch a valve gear mechanism of internal combustion engine and label its various parts.

**SECTION-C**

7. Determine the dimensions of a cast iron pulley which is 1.20 m in diameter and transmits 75 kW at 200 rev/min, It is to be used with a heavy double belt of leather.
8. Discuss the design aspects of intake and exhaust manifolds.
9. Determine the dimensions of an I-section connecting rod for a petrol engine from the following data :
  - Diameter of the piston = 110 mm,
  - Mass of the reciprocating parts = 2 kg,
  - Length of the connecting rod from centre to centre = 325 mm,
  - Stroke length = 150 mm,
  - R.P.M. = 1500 with possible speed of 2500,
  - Maximum explosion pressure = 2.5 N/mm<sup>2</sup>
  - Compression ratio = 4:1.