

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(AE) (Sem.-5)
AUTOMOTIVE DESIGN-I
Subject Code : AE-301
Paper ID : [A0713]

Time : 3 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.
4. Use of only **P.S.G.** design data book is permitted.

SECTION-A

1. Write briefly :

- i) What is meant by problem identification?
- ii) Explain crushing.
- iii) What is stress concentration?
- iv) How do you classify materials for engineering use?
- v) What is an economical joint?
- vi) What is a cotter joint?
- vii) Why is it necessary to dissipate the heat generated when clutch operates?
- viii) What are the materials used for brake lining?
- ix) What do you understand by semi-floating rear shaft?
- x) What stresses are at different sections of front axle?

SECTION-B

2. A plate 100 mm wide and 10 mm thick is to be welded to another plate by means of double parallel fillets. The plates are subjected to a static load of 80 kN. Find the length of weld if the permissible shear stress in the weld does not exceed 55 MPa.
3. What do you understand by human factors in engineering? Discuss.
4. Explain the self energizing condition of brakes.
5. What are the design considerations for frame of passenger vehicle? Discuss.
6. Explain the concept of tearing, shearing and bending.

SECTION-C

7. Determine the maximum, minimum and average pressure in a plate clutch when axial force is 4 kN. The inside radius of the contact surface is 50 mm and the outside radius is 100 mm. Assume uniform wear.
8. Design a cast iron protective flange coupling to connect two shafts in order to transmit 7.5 kW at 720 rpm. The following permissible stress may be used:
Permissible shear stress for shaft, bolt and key material = 33 MPa
Permissible crushing stress for bolt and key material = 60 MPa
Permissible shear stress for cast iron = 15 MPa.
9. Write a note on feasibility study.