Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (ME) (2018 Batch) (Sem.–3)

THEORY OF MACHINES – I

Subject Code : BTME-302-18

M.Code : 76418

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

Write briefly :

1. Define kinematic pair.
2. What is a machine?
3. Name the various engine indicators which work on the straight line motion mechanism.
4. Write the important factors upon which the selection of a belt drive depends.
5. State laws of solid friction.
6. Write the factors on which the capacity of breaks depends.
7. Write the function of loose and fast pulley.
8. What is 'Slip' in case of belt drive?
9. Write the application of universal joint.
10. What is the function of counter shaft pulley?

SECTION-B

11. Sketch and explain any two inversions of a double slider crank chain.

12. Derive the condition for transmitting the maximum power in a flat belt drive.

13. Write the classification of Followers with suitable sketch.

14. State the different types of governors. What is the difference between centrifugal and inertia type governors? Why is the former preferred to the latter?

15. The flywheel of a steam engine has a radius of gyration of 1 m and mass 2500 kg. The starting torque of the steam engine is 1500 N-m and may be assumed constant.

    Determine :

    a. Angular acceleration of the flywheel.

    b. Kinetic energy of the flywheel after 10 seconds from the start.

SECTION-C

16. Describe the Watt's parallel mechanism for straight line motion and derive the condition under which the straight line is traced.

17. Describe with sketches one form of torsion dynamometer and explain with detail the calculations involved in finding the power transmitted.

18. A single cylinder double acting steam engine develops 150 kW at a mean speed of 80 r.p.m. The coefficient of fluctuation of energy is 0.1 and the fluctuation of speed is ± 2% of mean speed. If the mean diameter of the flywheel rim is 2 metre and the hub and spokes provide 5% of the rotational inertia of the flywheel, find the mass and cross-sectional area of the flywheel rim. Assume the density of the flywheel material (which is cast iron) as 7200 kg/m^3.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.