1261

Code : 15ME32T

Register Number | | | | | | | | | | |

III Semester Diploma Examination, Nov./Dec.-2018

MECHANICS OF MACHINES

Time : 3 Hours] **[Max. Marks : 100**

Note : (i) Answer any **six** from Part – A and any **seven** from Part – B.
(ii) Missing data may be assumed.

PART – A

1. Explain with a neat sketch beam engine. 5
2. List the advantages of flat belt over V-belt drive. 5
3. Explain with a neat sketch four bar chain. 5
4. Explain open belt and cross belt drives. 5
5. Explain the method of balancing of different masses revolving in the same plane. 5
6. State the laws of solid friction. 5
7. Explain the terms 'Static Balancing' and 'Dynamic Balancing'. 5
8. Classify different types of followers. 5
9. Define forced vibrations and damped vibrations. 5

PART – B

10. (a) Differentiate between machine and a structure. 5
    (b) Explain with a neat sketch 'Scotch Yoke Mechanism'. 5

11. (a) Define inversion of mechanism and list inversion of single slider crank chain. 5
    (b) Explain pendulum pump with a neat sketch. 5

12. Two parallel shafts are to be connected by spur gearing. The approximate distance between the shafts is 600 mm. If one shaft runs at 120 rpm and the other at 360 rpm, find the number of teeth on each wheel. If the module is 8 mm, determine the exact distance apart of the two shafts. 10

13. A shaft rotating at 200 rpm. Drives another shaft at 300 rpm and transmits 6 kW through a belt. The belt is 100 mm wide and 10 mm thick. The distance between the shafts is 4 m. The smaller pulley is 0.5 m in diameter. Calculate the stress in the belt, if it is cross belt drive. Take $\mu = 0.3$. 10

14. (a) Explain with a neat sketch multi-plate clutch. 5

(b) A vertical shaft 150 mm in diameter rotating at 100 rpm rest on a flat end foot step bearing. The shaft carries a vertical load of 20 kN. Assuming uniform pressure and co-efficient of friction equal to 0.05, calculate power lost in friction. 5

15. (a) Explain with a neat sketch internal expanding brake. 5

(b) A multi disc clutch has five plates having four pairs of active friction surfaces. If the intensity of pressure is not to exceed 0.127 N/mm^2, find the power transmitted at 500 rpm. The outer and inner radii of friction surfaces are 125 mm and 75 mm respectively. Assume uniform wear and take co-efficient of friction = 0.3. 5

16. Four masses A, B, C and D are attached to a shaft and revolve in the same plane. The masses are 12 kg, 10 kg, 18 kg and 15 kg respectively and their radii of rotations are 40 mm, 50 mm, 60 mm and 30 mm. The angular position of the masses B, C and D are 60°, 135° and 270° from the mass 'A'. Calculate the magnitude and position of the balancing mass at a radius of 100 mm (analytical method). 10

17. Draw the CAM profile of a CAM which raises valve with SHM through 30 mm in 1/3 of the revolution, keep it fully raised through 1/12 revolution and it is closed in next 1/3 revolution with SHM. The valve remains closed during the rest of the revolution. The diameter of the roller is 10 mm and minimum radius of the CAM is to be 40 mm. The axis of the valve rod passes through the axis of the CAM shaft. 10

18. (a) Identify the causes and effects of vibrations. 5

(b) Explain the term 'Whirling Speed' or 'Critical Speed' of a shaft. 5

19. Define the following terms : 10

(i) Base Circle

(ii) Pitch Circle

(iii) Pressure Angle

(iv) Stroke of the follower

(v) Trace Point