1332 **Code : 15ME32T**

Register Number | | | | | | | |

III Semester Diploma Examination, April/May-2018

MECHANICS OF MACHINES

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

Note : (i) Answer any **six** from Part – A and **seven** from Part – B.
(ii) Assume any missing data suitably.

PART – A

1. Define kinematic link. Briefly explain its types. **5**

2. Explain with a neat sketch scotch yoke mechanism. **5**

3. Define the following terms : **5**
   (i) Pitch circle
   (ii) Adendum
   (iii) Dedendum
   (iv) Circular pitch
   (v) Module

4. Calculate the power transmitted by a belt running over a pulley of 600 mm diameter at 200 rpm. The co-efficient of friction between the belt and the pulley is 0.25, angle of lap is 160° and maximum tension in the belt is 2500 N. **5**

5. State the laws of solid friction. **5**

6. Construct the displacement and velocity diagram for uniform velocity motion of the follower. **5**

7. Define forced vibrations and damped vibrations. **5**

8. Identify the causes and effects of vibrations. **5**

9. Classify different types of followers. **5**

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PART – B

10. (a) Explain with a neat sketch completely constrained motion. 6
    (b) Differentiate between self closed pair and force closed pair. 4

11. (a) Explain coupling rod of locomotive with a neat sketch. 7
    (b) Define Inversion of mechanism. 3

12. An engine running at 150 rpm drives a line shaft by means of a belt. The engine pulley is 750 mm diameter and the pulley on the line shaft being 450 mm. A 900 mm diameter pulley on the line shaft drives a 150 mm diameter pulley keyed to a dynamo shaft. Calculate the speed of the dynamo shaft, when
    (i) There is no slip, and
    (ii) There is a slip of 2% at each drive. 10

13. A pulley is driven by a flat belt, the angle of lap being 120°. The belt is 100 mm wide and 6 mm thick and density 1000 kg/m^3. If the co-efficient of friction is 0.3 and the maximum stress in the belt is not to exceed 2 MPa, calculate the greatest power which the belt can transmit and the corresponding speed of the belt. 10

14. A single plate clutch, with both sides effective, has outer and inner diameters 300 mm and 200 mm respectively. The maximum intensity of pressure at any point in the contact surface is not to exceed 0.1 N/mm^2. If the co-efficient of friction is 0.3, Determine the power transmitted by a clutch at a speed of 2500 rpm. 10

15. Explain with a neat sketch Internal Expanding Brake. 10

16. Four mases A, B, C and D are attached to a shaft and revolve in the same plane. The masses are 16 kg, 14 kg, 22 kg and 20 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 50 mm. 10

17. Construct the profile of a cam to give the following motion to a knife edged follower : 10
    (i) Outstroke during 60° of cam rotation;
    (ii) Dwell for the next 30° of cam rotation
    (iii) Return stroke during next 60° of cam rotation; and
    (iv) Dwell for the remaining 210° of cam rotation. The stroke of the follower is 40 mm and the minimum radius of the cam is 50 mm. The follower moves with uniform velocity during the outstroke and return strokes with uniform velocity. Draw the profile of the cam when axis of the follower is offset by 20 mm from the axis of the cam shaft.

18. Explain the method of Balancing of different masses revolving in the same plane. 10

19. Construct a cam profile to raise a valve with SHM through 50 mm in 1/3 of a revolution, keep if fully raised through 1/12 revolution and to lower it with harmonic motion in 1/6 revolution. The valve remains closed during the rest of the revolution. The diameter of the roller is 20 mm and the minimum radius of the cam is 25 mm. The diameter of the camshaft is 25 mm. The axis of the valve rod passes through the axis of the cam shaft. 10