1275

Code : 15ME32T

Register Number | | | | | | | |

III Semester Diploma Examination, Nov./Dec. 2017

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 suitably assumed.

PART – A

6 × 5 = 30

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

2. Explain self closed pair and force-closed pair. **5**

3. List the advantages and disadvantages of belt over rope drive. **5**

4. Explain with neat diagram, stepped or cone pulley drive. **5**

5. Explain with neat diagram friction in a journal bearing. **5**

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

7. Identify causes and effects of vibrations. **5**

8. Explain with sketches the longitudinal and transverse vibrations. **5**

9. Define CAM terms : **5**
   (i) base circle
   (ii) pressure angle and
   (iii) trace point

PART – B $7 \times 10 = 70$

10. Explain single slider crank chain with sketch and mention its inversions. **10**

11. (a) Explain elliptical trammel with a neat sketch. **5**

    (b) Explain Oldham's coupling with a neat sketch. **5**

12. Two parallel shafts that are 3.5 m apart are connected by two pulleys of 1 m and 400 mm diameters. The larger pulley being the driver runs at 220 rpm.

    The belt weighs 1.2 kg per metre length. The maximum tension in the belt is not to exceed 1.8 kN. The co-efficient of friction is 0.28. Owing to slip on one of the pulleys, the velocity of the driven shaft is 520 rpm only. **10**

    Determine :

    (i) Torque on each shaft

    (ii) Power transmitted

    (iii) Power lost in friction

13. (a) Two spur gears have a velocity ratio of $\frac{1}{3}$. The driven gear has 72 teeth of 8 mm module and rotates at 300 rpm. Calculate the number of teeth and speed of the driver. **5**

    (b) A compound gear train consists of six gears, A, B, C, D, E, F having number of teeth 24, 56, 30, 80, 32 and 72 respectively. The gears B-C and D-E are compound gears.

    The motor shaft rotating at 800 rpm is connected to gear A and output shaft of gear F. Determine the speed of the gear F. **5**

14. The force required just to move a body on a rough horizontal surface by pulling is 320 N inclined at 30° and by pushing 380 N at the same angle. Find the weight of the body and co-efficient of friction. **10**

15. (a) Explain with neat sketch, the different types of pivot bearings. **5**

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

16. Three masses of 8 kg, 12 kg and 15 kg attached at radial distances of 80 mm, 100 mm and 60 mm respectively to a disc on a shaft are in compete balance.

Determine the angular positions of the masses of 12 kg and 15 kg relative to the 8 kg mass, by graphical or analytical method. **10**

17. (a) Explain the balancing of rotating parts necessary for high speed engines. **5**

(b) Explain the method of balancing different masses revolving in the same plane. **5**

18. (a) List the types of followers with classification. **5**

(b) Interpret why a roller follower is preferred to that of a knife edged ? **5**

19. Draw the profile of CAM operating a knife edge follower having a lift of 30 mm. The CAM raises the follower with SHM for 150° of the motion followed by a period of dwell for 60°. The follower descends for the next 100° rotation of the CAM with uniform velocity, again followed by a dwell period. **10**