C14–M–**502**

4650

**BOARD DIPLOMA EXAMINATION, (C–14)
JUNE—2019**

DME—FIFTH SEMESTER EXAMINATION

DESIGN OF MACHINE ELEMENTS—II

Time : 3 hours]   [*Total Marks* : 80

PART—A   3×10=30

Instructions **:** (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Define the following :
  (a) Slip of belt
  (b) Creep of belt

2. List applications of chain drives.

3. A wheel has 48 teeth and circular pitch 15 mm. Find—
  (a) Pitch circle diameter;
  (b) Module.

4. Define the following :
  (a) Back lash
  (b) Gear ratio

5. Prove that maximum fluctuation of energy $dE = lk_s\omega^2$.

6. What is the turning moment diagram?

7. In what ways the clutches are differed from brakes?

8. What are the materials used for the brake lining?

9. Draw a neat sketch of CAM follower mechanism.

10. Write the applications of Cams.

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PART—B   10×5=50

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Instructions : (1) Answer *any* **five** questions.

                 (2) Each question carries **ten** marks.

                 (3) Answers should be comprehensive and the criteria for valuation are the content but not the length of the answer.

11. A belt is required to transmit 15 kW from a pulley of 1000 mm diameter at 420 r.p.m. The angle of lap is 160° and coefficient of friction is 0·3. If the safe working stress of the belt material is 1·2 N/mm^2, find the width of the belt. Thickness of belt is 10 mm.

12. *(a)* Two pulleys 60 cm and 40 cm diameters are connected by a belt. Central distance between the pulleys is 6 m. Find the length of belt required, for *(i)* open belt drive, *(ii)* crossed belt drive.   6

     (b) Explain the velocity ratio of compound gear train.   4

13. Describe with a neat sketch the working of a motor car (sliding type) gearbox.

14. The speed of the crankshaft of an engine varies from minimum of 118 r.p.m. to a maximum of 122 r.p.m. A flywheel of mass 500 kg and radius of gyration 1·2 m is keyed to the crankshaft. If the work done per cycle is 16 kJ, calculate—

     (a) the maximum fluctuation of energy in the flywheel;

     (b) the coefficient of fluctuation of speed, if the mean speed is 120 rev/min;

     (c) the coefficient of fluctuation of energy.

15. *(a)* In a porter governor two balls of weight 26 N each are joined by four equal links of length 300 mm each. A dead weight of 320 N is used on the sleeve at the centre. If the radius of rotation is 240 mm, find the equilibrium speed.

(b) Explain the working principle of a simple block brake.

16. A plate clutch having a single drive plate with contact surfaces on each side is required to transmit 100 kW at 1446 r.p.m. The outer dia of the contact surfaces is 300 mm and coefficient of friction is 0·3. Find the inner dia of the friction surfaces assuming a uniform pressure of 1·7 bar.

17. *(a)* Explain the working of single plate clutch with a neat sketch. 5

(b) Classify the Cams. 5

18. A cam with a minimum radius of 40 mm, rotating clockwise at a uniform speed, is required to give a knife edge follower the motion as described below :

(a) To move outwards through 40 mm during 100° rotation of the cam

(b) To dwell for next 80° of the cam rotation

(c) To return to its starting position during next 90° rotation of cam

(d) To dwell for the rest period of a revolution i.e. 90°

Draw the profile of the cam, when the line of the follower is off-set by 15 mm. The displacement of the follower is to take place with uniform acceleration and uniform retardation.

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