C14–M–**502**

# 4650

## BOARD DIPLOMA EXAMINATION, (C–14)
## MARCH/APRIL—2017
## 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 slip and creep of a belt.

2. Two pulleys 400 mm and 800 mm diameters which are fixed to two parallel shafts 4 m apart are connected by open belt. Find the length of belt.

3. State the law of gearing.

4. Write about the materials used for manufacturing of gears.

5. What are the applications of a flywheel?

6. Define the following :

   *(a)* Sensitiveness

   *(b)* Stability of a Governor

**7.** What is the difference between brake and clutch?

**8.** State the different types of brakes.

**9.** Define the following :

(a) Cam profile

(b) Base circle of a cam

**10.** What is the function of a cam?

### PART—B

10×5=50

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

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

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

**11.** Two pulleys 450 mm and 200 mm diameter are on parallel shafts 2 m apart, and are connected by a crossed belt. Find *(a)* the length of belt required and *(b)* the angle of contact between the belt and each pulley. What power can be transmitted by the belt? When the larger pulley rotates at 200 rev/min, the maximum permissible tension in the belt is 1000 N and the coefficient of friction between belt and pulley is 0·25.

**12.** *(a)* What is chain drive? Write the advantages and disadvantages of chain drive.

*(b)* Calculate the percentage change in the speed of a simple watt governor designed to raise a height of 202 mm from 190 mm.

**13.** Discuss the following :

(a) Advantages and disadvantages of gear drives

(b) Classification of cams

**14.** The speed of the crankshaft of an engine varies from minimum of 118 rev/min to a maximum of 122 rev/min. 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.** With the help of a neat sketch, explain the back gear arrangement of a lathe head stock.

**16.** Explain the working of band brake with a neat sketch.

**17.** Explain the working of single-plate clutch with a neat sketch.

**18.** Draw the profile of a cam operating a knife-edge follower from the following data :

*(a)* Lift the follower through 25 mm during 60 degrees with SHM

*(b)* The follower remains rest for the next 45 degrees of rotation of the cam

*(c)* The follower then descends to its original position during 90 degrees rotation of the cam with SHM

*(d)* The follower remains at rest for the remaining part of the revolution. The least diameter of the cam is 50 mm, the axis of knife-edge follower passes through the axis of the camshaft

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