



C14-M-502

4650

**BOARD DIPLOMA EXAMINATION, (C-14)**  
**OCT/NOV—2018**  
**DME—FIFTH SEMESTER EXAMINATION**  
**DESIGN OF MACHINE ELEMENTS—II**

Time : 3 hours ]

[ Total Marks : 80

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**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 terms (a) velocity ratio and (b) slip related to belt drives.
2. State the advantages of silent chain over a roller chain.
3. A toothed wheel of module 6 mm and 46 teeth rotates at 100 rpm. Find the peripheral speed of gear wheel.
4. State the difference between simple gear train and compound gear train.
5. Define the terms :
  - (a) Height of a governor
  - (b) Equilibrium speed of a governor

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6. Define the terms :
  - (a) Coefficient of fluctuation of energy
  - (b) Coefficient of fluctuation of speed
7. What are the desired characteristics of lining materials used for a brake?
8. State the difference between positive clutch and friction clutch.
9. Define the terms related to cam :
  - (a) Cam angle
  - (b) Pressure angle
  - (c) Lift or stroke
10. How do you classify the followers?

**PART—B**

10×5=50

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

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

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

11. A belt transmitting power from a motor to machine having a mass of 2.45 kg per meter length and the maximum permissible tension in it is 1000 N. The angle of contact is spread over  $\frac{5}{9}$  of the pulley circumference. Coefficient of friction is 0.28. If the belt runs under maximum power condition, determine the optimum belt speed and maximum power transmitted.

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12. A set of gears has to transmit a power of 40 kW, when the pinion rotates at 400 rpm. The gear ratio is 1:4, the permissible stresses for pinion and driver gear materials are  $130 \text{ N/mm}^2$  and  $110 \text{ N/mm}^2$  respectively. The pinion gear has 22 teeth and face width 12 times the module. Compute (a) module and (b) face width.

- \* **13.** A porter governor has equal arms each 250 mm long and pivoted on the axis of rotation. Each ball has a mass of 5 kg and the mass of the central load on the sleeve is 15 kg. The radius of rotation of the balls is 150 mm when the governor begins to life and 200 mm when the governor is at maximum speed. Find the minimum and maximum speeds of the governor. Also find the range of speeds.
- 14.** Explain the working of shoe brake with a neat sketch.
- 15.** A multi-plate clutch has three plates on the driving shaft and two on the driven shaft. The outer radius of contact surfaces is 120 mm and inner radius is 60 mm. Assuming uniform wear condition and coefficient of friction is 0.3; find the maximum axial intensity of pressure between the plates for transmitting a power of 25 kW at a speed of 1575 rpm.
- 16.** Draw the cam profile for the flat faced follower, the outward and return strokes takes place with uniform velocity. Out stroke  $90^\circ$ , dwell  $30^\circ$ , return stroke  $120^\circ$  and dwell for the remaining cam rotation. Stroke of the follower is 40 mm and minimum radius of the cam is 30 mm, axis of the follower passes through axis of the camshaft.
- 17.** (a) Explain in short about (i) flat faced follower and (ii) roller flower.  
(b) Write the differences between flywheel and governor.
- \* **18.** (a) State the different belt drives. Describe stepped pulley drive with a neat sketch.  
(b) Write the advantages and limitations of gear drives.

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