

4650**BOARD DIPLOMA EXAMINATION, (C-14)****MARCH /APRIL-2019****DME - FIFTH SEMESTER EXAMINATION****DESIGN OF MACHINE ELEMENTS - II**

Time : 3 hours]

[Max.Marks: 80

PART-A**10x3=30M**

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
 - a) Velocity ratio
 - b) Slip
- 2) Differentiate silent chain and roller chain.
- 3) Sketch reverted gear train?
- 4) What is a gear drive? State its applications.
- 5) Define the following
 - a) Coefficient of fluctuation of speed
 - b) Coefficient of fluctuation of energy
- 6) Write the differences between governor and flywheel.
- 7) Give the classification of clutches.
- 8) Write the functions of brake system.
- 9) List the various types of follower motion.
- 10) Define the following terms relating to cam
 - a) Cam profile
 - b) Trace point.

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PART-B

5x10=50M

- Instructions:** 1) Answer any **five** questions.
2) Each question carries **ten** marks.
3) The answers should be comprehensive and the criteria for valuation is the content but not the length of the answer.
- 11) Two pulleys of 450 mm and 200 mm diameter are on parallel shafts 2m apart and are connected by a cross belt. What power can be transmitted by the belt when the larger pulley rotates at 200 rpm, if the maximum permissible tension in the belt is 1000N, Assume $\mu = 0.25$
- 12) a) A belt drive is designed to transmit 7.5kW at a belt speed of 12m/s. The ratio of belt tensions is 2.25. Determine the angle of lap and belt tensions if the coefficient of friction is 0.3.
b) Explain the epicyclic gear train with a neat sketch.
- 13) Design a Spur gear of straight teeth to transmit 26 kW at 480 rpm. It has 40 teeth and its face width is 8 times the module. Allowable static stress is 120 N/mm². Assume gear functions for 8-10 hours a day at steady load. Assume gear tooth factor $y = 0.154 - 0.912/T$ and velocity factor $C_v = 3/(3+V)$ where V is expressed in m/sec Arms have elliptical cross-section and major axis is twice the minor axis. Take module as 12 mm. Assume diameter of the shaft is 80mm. Service factor = 0.8.
- 14) Explain the porter governor with a neat sketch.
- 15) a) A porter governor has equal arms each 250mm long and pivoted on the axis of rotation. Each ball has a mass of 5kg and the mass of central load on the sleeve is 15kg. The radius of rotation of the ball is 150 mm when the governor begins to lift and 200 mm when the governor is at maximum speed. Find the minimum and maximum speeds of the governor.
b) Explain the construction of displacement diagram for a follower moving with SHM.
- 16) A plate clutch having a single drive plate with contact surfaces is 300 mm diameter and coefficient of friction is 0.3. Find the inner diameter of the friction surfaces assuming a uniform pressure of 1.7 bar.

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17) Explain the principle of working of Band Brake.

18) Draw the profile of a CAM to give the following motion to a reciprocating follower with a flat contact of face

- a) Out stroke during 120° of CAM rotation
- b) Dwell for next 30° of CAM rotation
- c) Return stroke during 120° of CAM rotation
- d) Dwell for remaining 90° of CAM rotation.

The stroke of the follower is 30mm and the maximum radius of CAM is 25mm. The follower moves with uniform velocity during both out stroke and return stroke. The axis of the follower passes through axis of the CAM shaft.

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