C14–M–**502**

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BOARD DIPLOMA EXAMINATION, (C–14)
OCT/NOV—2016
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. Write the factors considered to select a suitable power transmission drive.

2. Two parallel shafts 6 meters apart are provided with pulleys of diameters 600 mm and 800 mm respectively. Find the length of belt for turning the two shafts in opposite direction.

3. Define the terms *(a)* circular pitch, *(b)* module and *(c)* diametral pitch.

4. A gear having 80 teeth meshes with a pinion having 30 teeth. Calculate the centre distance between gear and pinion, if the circular pitch is 12 mm.

5. Write any three differences between governor and flywheel.

6. Define the terms related to governor *(a)* sensitiveness, *(b)* stability and *(c)* isochronism.

7. Differentiate between brake and clutch.

8. Write the classification of clutches.

9. Define the terms related to cam *(a)* dwell, *(b)* base circle, and *(c)* pitch point.

10. Draw a neat sketch of cam mechanism and explain the parts.

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PART—B

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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. A belt 100 mm wide and 9·5 mm thick is used to transmit power. If the safe permissible stress in belt material is $1\ 75\ N/mm^2$, calculate the maximum power that can be transmitted by the belt. Assume ratio of belt tensions as 2 and mass of belt per meter length as 0·95 kg.

12. Explain back gear assembly used in lathe machines with a sketch.

13. Find the diameter and cross-section of a suitable rim of a flywheel having width twice its thickness, so that centrifugal stress in it does not exceed 6 MPa. Density of rim material is $7250\ kg/m^3$. Assume weight of flywheel is to be 1·5 kN and running at a speed of 540 r.p.m.

14. Explain with a neat sketch, working of single-plate clutch.

15. A friction clutch transmits power at 250 r.p.m. The single-plate clutch is effective on both sides. The outer and inner diameters of friction plates are 200 mm and 120 mm respectively. The maximum intensity of pressure is 0 078 N / mm^2 and coefficient of friction is 0·3. Find the axial load and power transmitted. Assume uniform pressure condition.

16. Draw the cam profile for the roller follower of roller diameter 20 mm, the outward and return strokes take place with uniform acceleration and retardation. Out stroke 90°, dwell 30°, return stroke 120° 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 the construction of displacement diagram for a follower moving with simple harmonic motion.

    (b) Two pulleys of diameters 500 mm and 250 mm are connected by a flat belt. Central distance between them is 1·5 m. Find the angle of contact for open-belt drive.

18. *(a)* Describe the compound gear train with a neat sketch.

    (b) Calculate the height of watt governor when it rotates at 60 r.p.m. Also find the change in vertical height when its speed increases to 61 r.p.m.

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