



C09-M-605

3783

BOARD DIPLOMA EXAMINATION, (C-09)

MARCH/APRIL—2021

DME - SIXTH SEMESTER EXAMINATION

DESIGN OF MACHINE ELEMENTS

Time : 3 hours]

[Total Marks : 80

PART—A

4×5=20

- Instructions :** (1) Answer *any five* questions.
(2) Each question carries **four** marks.
(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. List four factors that are to be considered for designing of a machine element.
2. What are the stresses developed in bolts?
3. List any three types of screw threads.
4. Define (a) shaft and (b) axle.
5. List the types of couplings.
6. Write any two advantages of chain drive over belt drive.
7. Define velocity ratio of a gear train.
8. List any three types of followers used in cam assembly.
9. State the necessity of a flywheel.
10. List various types of governors.

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PART—B

15×4=60

- Instructions :** (1) Answer *any four* questions.
(2) Each question carries **fifteen** marks.
(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

- 11.** (a) Explain general sequence of steps in designing a machine element.
(b) Draw a neat sketch of screw thread profile and label the terms.
- 12.** An eye bolt has to lift a load of 100 kN. The permissible tensile stress in the bolt material is 120 N/mm². Design the eye bolt and draw a proportionate sketch.
- 13.** A mild steel shaft transmits a torque of 12000 N-m and Bending moment of 10000 N-m. Shear stress and bending stress for the shaft are 30 N/mm² and 50 N/mm². Compute the diameter of the shaft.
- 14.** Design and draw a muff coupling consists of Shaft, Muff and Key which is used to connect two steel shafts transmitting 100 kW at 600 r.p.m. Shear stresses for muff and shaft are 30 N/mm² and 50 N/mm².
- 15.** Calculate the length of belt required, for (a) open belt drive and (b) crossed belt drive if two pulleys of diameters 600 mm and 400 mm having central distance 6 m are connected by the belt drive.
- 16.** Explain the working of a reverted gear train with a neat sketch.
- 17.** Explain back gear assembly used in lathe machines with a sketch.
- 18.** Draw the cam profile for a knife edged follower moving with SHM for the following data : 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. The axis of the follower passes through the axis of the camshaft.

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