3783

C09–M–605

3783

BOARD DIPLOMA EXAMINATION, (C–09)

OCT/NOV—2018

DME—SIXTH SEMESTER EXAMINATION

DESIGN OF MACHINE ELEMENTS

Time : 3 hours] [*Total Marks* : 80

PART—A 3×10=30

Instructions : (1) Answer **all** questions.

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

1. Define allowable stress and factor of safety.

2. A thread is designated by M 24×3-7d. What does it signify?

3. Find diameter of the hole that must be drilled in a M 34 bolt to make a bolt of uniform strength.

4. What is a shaft? Write down the functions of a shaft.

5. Draw a proportioned sketch of GIB Head key.

6. Define :

(a) Circular pitch

(b) Diametrical pitch

(c) Module with reference to gears

7. State any three advantages of gear drive over belt drive.

8. Define :

(a) Cam angle

(b) Base circle

(c) Dwell with reference of Cams

9. Write the difference between a Fly wheell and Governor.

10. What are the types of Governors?

PART—B 10×5=50

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

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

11. *(a)* What are the factors which govern the design of machine part? Explain any two of them.

(b) Two machine components are fastened together tightly by means of a M 50 bolt. If the load tending to separate them is neglected, calculate the stress induced in the bolt due to initial tightening.

12. A steam engine cylinder of 250 mm effective diameter is subjected to a steam pressure of 1.2 N/mm^2. The cylinder cover is connected by means of 6 bolts. The bolts are tightened with initial load of 1.5 times that of stem load. A copper gasket of stiffness factor 0.5 is used to make the joint leak proof. Find the size of the bolts so that the stress induced in bolt is not to exceed $100N/mm^2$.

13. A shaft supported at ends in ball bearing carries a central load of 1000 N and is to transmit 8kW at 100 rpm. The distance between the centres of bearings is 2.8m. If the allowable tensile stress is 45 N/mm^2, determine the size of the shaft.

14. A shaft transmitting 40 kW of power at 160 rpm is to be connected with another by a sleeve coupling. The permissible shear and crushing stresses for the shaft and key material are 30 N/mm^2 and $70N/mm^2$ respectively. Sleeve is made of cast iron whose permissible shear stress is 35 N/mm^2. Design the coupling.

15. Explain the Reverted gear train with neat sketch.

16. Two pulleys 450 mm and 200 mm diameter are on parallel shafts 2m a part and are connected by a crossed belt. What power can be transmitted by the belt when the large pulley rotates at 200 rpm. maximum permissible tension in the belt is 1000N and the co-efficient of fiction between belt and pulley is 0.25.

17. Explain the types of chain drives with neat sketch.

18. A cam is to give the following motion to a knife-edged follower :

(a) Out stroke during 60° of cam rotation

(b) Dwell for the next 30° of cam rotation

(c) Return stroke during next 60° of cam rotation

(d) Return stroke during next 60° of cam rotation

The stroke of the follower is 40 mm and minimum radius of the cam is 50 mm. The follower moves with uniform velocity during both outstroke and return strokes. Draw the profile of the cam when axis of the follower passes through the axis of the cam shaft.

★ ★ ★