

5687

BOARD DIPLOMA EXAMINATION, (C.A.G.C., 30),
MARCH - APRIL, 2017
DME - IV SEMESTER EXAMINATION,
DESIGN OF MACHINE ELEMENTS - I

Time : 3 Hours]

PART - A

- Instructions :**
- (1) Answer **ALL** questions.
 - (2) Each question carries **THREE** marks.
 - (3) Answer should be brief and to the point.

- 1 List six important mechanical properties of metals.
- 2 Define factor of safety and working stress.
- 3 Define a kinematic link and give two practical examples.
- 4 What is meant by bolt of uniform strength?
- 5 List out various types of screw fastenings.
- 6 What is the type of riveted joints?
- 7 Design the diameter of shaft to run at 400rpm and transmit 11kW power. Assume shear stress of 40 N/mm^2 .
- 8 What is the difference between rigid coupling and flange coupling?
- 9 State the advantages and disadvantages of rolling contact bearing over sliding contact bearings.
- 10 Define rating life of bearing.

PART - B

- Instructions :**
- (1) Answer any **Five** questions.
 - (2) Each question carries **TEN** marks.
 - (3) Answer should be comprehensive and criterion for valuation is the content but not the length of the answer.
- 11 (a) What are the important theories of elastic failure?
(b) Explain maximum principle stress theory of elastic failure.
 - 12 (a) What are the factors to be considered for the design of machine elements?
(b) State difference between lower pair and higher pair with examples.
 - 13 A steam engine cylinder has an effective diameter of 350 mm and the maximum steam pressure on the cylinder is 1.25 N/mm^2 . Calculate the number and size of bolts required to fix the cylinder cover, assuming the permissible stress in the bolt as 33 MPa .
 - 14 (a) A 20 kN gear box is provided with a steel eye bolt for lifting it. What size of bolt is used if the tensile strength of steel is 80 N/mm^2 .
(b) What are the various types of welded joints?
 - 15 A double riveted cover butt joint in plate of 20 mm thick is made with 25 mm diameter rivet at 100mm pitch. The permissible stresses are Find the efficiency of joint, taking the strength of the rivet in double shear as twice than that of single shear.
 - 16 A mild steel shaft transmits 20kw power at 200 rpm and subjected to a bending moment of 560 Nm. The allowable stress and tensile or compressive stress are 42 N/mm^2 and 56 N/mm^2 . What size of the shaft will be required if it is subjected to gradually applied load
 - 17 Design a cast iron flange coupling to connect two shafts in order to transmit 9kW at 800 rpm. The following permissible stresses may be assumed. Permissible shear stress for shaft, bolt and key materials is 35 N/mm^2 . Permissible crushing stress for bolt and key material is 65 N/mm^2 . Permissible shear stress for CI 20 N/mm^2 .
 - 18 A flat foot step bearing 300mm diameter supports a load of 25Kn. If the Co-efficient of friction is 0.05 and the speed 150 rpm. Calculate the power lost at the bearing under the following condition :
(a) Uniform Pressure
(b) Uniform wear.