



C14-M-402

4448

**BOARD DIPLOMA EXAMINATION, (C-14)
OCTOBER/NOVEMBER-2018
DME – FOURTH SEMESTER EXAMINATION**

DESIGN OF MACHINE ELEMENTS – I

Time : 3 Hours]

[Total Marks: 80

PART-A

3X10=30

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

1. Define the terms principle plane and principle stresses.
2. List out any six factors to be considered while designing a product.
- * 3. What are the failures occur in bolts due to initial tightening?
4. Determine the safe tensile load for a M36 bolt, if the safe tensile stress is 90N/mm^2
5. Define welding terms reinforcement, throat and leg.
6. Design the diameter of a shaft to run at 400 rpm and transmit 11kw power and safe shear stress is 40N/mm^2
7. What is the effect of keyway on the shaft strength?
8. What is the function of couplings and state any three reasons for joining the shaft with couplings?
9. Write any three differences between radial bearing and thrust bearing.
10. How does rolling bearing number 304 is designated?

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PART-B

10X5=50

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

11. Explain theories of failure of element of machine when subjected to stresses.
12. Derive an expression for the torque required to raise a load in power screw.
13. (a) Write about the selection of material for designing an element.
(b) The head of the steam engine cylinder 600mm is subjected to a pressure of 1.2Mpa. The head is held tightly by 16 bolts of M-39 size. A copper gasket is used to make the joint steam tight, compute the stress in the bolt. Take stiffness constant for gasket $K=0.25$.
14. Explain the failures of a riveted joint.
15. What are the advantages and disadvantages of welded joints?
16. A drive shaft is to transmit 3×10^3 kw at a speed of 250 rev/min. The torque fluctuates slightly, but the mean torque is found to be 0.85 times that of maximum torque, find the diameter if the maximum shear stress induced is 75 N/mm^2
17. Design a muff coupling which is used to connect two steel shafts transmitting 40 KW at 350 RPM, design shaft and muff from strength point of view and other dimensions by empirical formulae. Sheer stress for muff and shaft are respectively 15 N/mm^2 and 30 N/mm^2 . Assume maximum torque to be 25% more than average torque.
18. A journal bearing whose diameter is 60mm is subjected to load of 4.5 KN while rotating at 180 rpm. If the co-efficient of friction is 0.02 and 1/D ratio is 3. Find bearing pressure and power lost in friction.

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