18081

BRAINWARE UNIVERSITY

Term End Examination 2025-2026
Programme – B.Tech.(ME)-2021/B.Tech.(ME)-2023
Course Name – Design of Machine Elements
Course Code - PCC-ME503
(Semester V)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Choose the theory of failure is commonly used for the design of pressure vessels.
a) Rankine theory b) Coulomb-Mohr theory
c) Tresca theory d) Distortion Energy theory

(ii) In the Goodman diagram, the horizontal axis identify
a) Alternating stress b) Mean stress
c) Safety factor d) Cycles to failure

(iii) Select the failure that is identified by Goodman diagram.
a) Cycles to failure b) Safety factor
c) Fatigue strength d) Ultimate tensile strength

(iv) Select the cotter joint material .
a) Aluminum b) Brass
c) Steel d) Copper

(v) Choose the type of load that is a fillet weld primarily designed to resist
a) Axial tensile load b) Axial compressive load
c) Shear load d) Torsional load

(vi) Select the type of locknut that is commonly used in applications where frequent adjustments are required.
a) Castle nut b) Wing nut
c) Nyloc nut d) Flange nut

(vii) Identify the type of riveted joint that is used to join two plates overlapping each other
a) Lap joint b) Butt joint
c) Corner joint d) T-joint

(viii) Identify the principle of the design of a shaft .
a) Length b) Diameter
c) Material d) Weight

(ix) Select the type of shaft supports the loads on journals at both ends.

a) Cantilever shaft
b) Overhanging shaft
c) Built-up shaft
d) Simple shaft

(x) Select the maximum shear stress in a solid circular shaft.

a) The center of the shaft
b) The fixed ends of the shaft
c) The free ends of the shaft
d) The diametric plane of the shaft

(xi) Select the type of belt drive is suitable for long-distance power transmission.

a) V-belt drive
b) Flat belt drive
c) Toothed belt drive
d) Chain drive

(xii) Select the primary function of a spring.

a) Support a shaft
b) Store and release mechanical energy
c) Connect two shafts together
d) Measure the torque in a shaft

(xiii) Choose the possible value of the factor of safety.

a) =1
b) >1
c) <1
d) 0

(xiv) Identify the material that has the maximum brittleness.

a) Mild steel
b) Cast iron
c) Copper
d) Aluminium

(xv) Choose the full form of CAD stand for in the context of mechanical engineering design.

a) Computer-Aided Design
b) Creative Analysis and Development
c) Conceptual Architecture Design
d) Computer Application Division

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Explain Maximum Principal Stress Theory. (3)
3. Write the application of cotter joint and knuckle joint . (3)
4. Explain a short note on the Factor of safety. (3)
5. Define hardness and Creep. (3)
6. Explain Caulking and Fullering of Riveted Joint. (3)

OR

Illustrate the uses of a lock nut. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Illustrate the characteristics of stress concentration factor. (5)
8. Illustrate two advantages of a hydrodynamic bearing over a hydrostatic bearing. (5)
9. Write the difference between clutch and flange coupling. (5)
10. Write the difference between open belt drive and cross belt drive. (5)
11. Explain the term : (i) Spring Index (ii) Stiffness of Spring (5)
12. Explain the advantage and drawback of centrifugal clutch. (5)

OR

Classify the types of failure along with the explanation. (5)

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