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**5th Sem / Branch : Mech.
Sub.: Machine Design**

Time : 3Hrs.

M.M. : 100

SECTION-A

Note: Multiple choice questions. All questions are compulsory (10x1=10)

- Q.1 Which of the following material is more elastic?
a) Rubber b) Glass
c) Steel d) Wood
- Q.2 When a section is subjected to two equal and opposite forces tangentially to the section, the stress produced is known as
a) Tensile stress b) Lateral Stress
c) Shear stress d) No Stress
- Q.3 Maximum shear stress theory is mostly used for
a) Ductile materials b) Brittle materials
c) Hard materials d) Tough materials
- Q.4 Shaft used in factories and workshops is known as
a) Flexible shaft b) machine shaft
c) Prime shaft d) Line Shaft
- Q.5 The type of light duty key is
a) Hollow saddle key b) Flat saddle key
c) Both A & B d) Gib Key

- Q.6 Failure of cotter occurs due to
a) Shearing b) Bending
c) Crushing d) All of the above
- Q.7 In transverse fillet weld, the size of weld is equal to
a) $2t$ b) $\frac{D}{2}t$
c) t d) $0.5t$
- Q.8 According to IRB, the factor of safety in riveted joint should not be less than
a) 2 b) 3
c) 4 d) 5
- Q.9 A coupling used to connect two perfect aligned shafts is
a) Bush pin coupling b) Oldham's coupling
c) Rigid flange coupling d) None of these
- Q.10 Flank is defined as the surface
a) Between top and bottom
b) Between pitch and root
c) Between crest and root
d) Between pitch and crest

SECTION-B

Note: Objective type questions. All questions are compulsory. (10x2=20)

- Q.11 Define factor of safety.

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- Q.12 Define the endurance limit.
- Q.13 Name the various types of shafts.
- Q.14 Define equivalent twisting moment.
- Q.15 Classify sunk key.
- Q.16 Define the cotter.
- Q.17 Define welded joint.
- Q.18 Define the margin in riveted joint.
- Q.19 Define the fullering.
- Q.20 Write the function of flexible coupling.

SECTION-C

Note: Short answer type questions. Attempt any three questions out of four questions. $(10 \times 3 = 30)$

- Q.21 Define stress concentration and give the various methods to reduce it.
- Q.22 Explain any two design failure theories with their formulae.
- Q.23 Explain the nomenclatures of screw threads with the help of neat sketch.
- Q.24 Explain the necessity of coupling and list the various types of couplings.

SECTION-D

Note: Long answer type questions. Attempt any two questions out of three questions. $(2 \times 20 = 40)$

- Q.25 A 15 kW, 1000rpm motor has a steel shaft of 50mm diameter. The extension of the shaft is 70mm. Design the key required. Take permissible shear and crushing stress for the material of key as 55N/mm^2 and 110N/mm^2 respectively. Also check the shear strength of key against the normal strength of the shaft.
- Q.26 Design and draw a knuckle joint to transmit 150kN. The various design stresses are, tensile stress = 70N/mm^2 , shear stress = 60N/mm^2 and crushing stress = 160 N/mm^2 .
- Q.27 A double riveted lap joint is to be designed for 18mm thick plates. The riveting is chain type. The permissible stresses are, tensile stress = 100 Mpa, shear stress = 85MPa and crushing stress = 150 Mpa. Find the efficiency of the joint and show how the joint will fail.