Program: BE Mechanical Engineering

Curriculum Scheme: Revised 2016

Examination: Third Year Semester VI

Course Code: MEC602 Course Name: Machine Design I

Time: 1 hour Max. Marks: 50

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Note to the students: - All Questions are compulsory and carry equal marks.

Q1.	While designing a forging, the profile is selected such that the fibrous lines are _____ to the tensile forces and perpendicular to shear forces.
Option A:	Parallel
Option B:	not parallel
Option C:	Intersecting
Option D:	Non-continuous
Q2.	_____ surfaces have bad surface finishing.
Option A:	Cast
Option B:	Forged
Option C:	CNC machined
Option D:	Lathe machined
Q3.	Among casting, forging, machining and forming which has the slowest rate of production?
Option A:	Casting
Option B:	Forging
Option C:	Machining
Option D:	Forming
Q4.	The region of safety in maximum shear stress theory contains which of the given shape?
Option A:	Hexagon
Option B:	Rectangle
Option C:	Square

Option D:	Triangular
Q5.	The constant factor in case of R10 series of preferred numbers is _____.
Option A:	1.06
Option B:	1.12
Option C:	1.26
Option D:	1.58
Q6.	In a curved beam the neutral axis is _____.
Option A:	Shifted away from the centre
Option B:	Shifted towards the centre of
Option C:	Shifted to left end of the beam.
Option D:	Shifted to right end of the beam.
Q7.	Lame's equation is used to determine the wall thickness of thick cylinder when the material of the cylinder is _____.
Option A:	Brittle
Option B:	Ductile
Option C:	Hard
Option D:	Soft
Q8.	In thick cylinders, the tangential stress is _____.
Option A:	Highest magnitude at the outer surface of the cylinder and gradually decreases towards the inner surface.
Option B:	Highest magnitude at the inner surface of the cylinder and gradually decreases towards the outer surface.
Option C:	Highest magnitude at the outer surface of the cylinder and zero at the inner surface.
Option D:	Highest magnitude at the inner surface of the cylinder and zero at the outer surface.
Q9.	Stress in the outermost fiber of a curved beam is _____. (Here P is the load applied, M is the bending moment, A is the area of the cross-section and Z is the section modulus)

Option A:	P/A
Option B:	M/Z
Option C:	P/A – M/Z
Option D:	P/A + M/Z
Q10.	What type of friction in case of a cup is recommended for the design of a set screw?
Option A:	Sliding
Option B:	Rolling
Option C:	Static
Option D:	Dynamic
Q11.	If friction angle is 30' then the maximum efficiency of the screw is _____.
Option A:	33%
Option B:	66%
Option C:	50%
Option D:	100%
Q12.	If knuckle joint is to fail by crushing failure of the pin in the fork, then determine the diameter of knuckle pin when 50 kN axial tensile force act on rods. Given: Max allowable compressive stress=25N/mm², thickness of each eye of fork=25mm.
Option A:	40 mm
Option B:	50 mm
Option C:	60 mm
Option D:	70 mm
Q13.	What is the efficiency of differential screws when pitch of the two screws are 12 mm and 8 mm? The nut is rotated by applying a force of 120 N at a radius of 300 mm and the two screws remain stationary. The torque of raising and lowering for the two screws is 5k N-mm and 2.5k N-mm where k is the effective axial weight on the screw.
Option A:	6.48 %
Option B:	8.48 %
Option C:	23.1 %

Option D:	42.8 %
Q14.	_____ doesn't exhibit clearly the fatigue limit.
Option A:	Titanium alloys
Option B:	Aluminium
Option C:	Stainless steel
Option D:	High Strength Steel
Q15.	Endurance limit of the materials subjected to fatigue loading _____.
Option A:	increases with increase in ultimate tensile stress
Option B:	increases with decrease in ultimate tensile stress
Option C:	decreases with decrease in ultimate tensile stress
Option D:	is independent of ultimate tensile stress
Q16.	What number of cycles range is chosen for endurance limit?
Option A:	$10^2 – 10^3$
Option B:	$10^5 – 10^6$
Option C:	$10^7 – 10^8$
Option D:	$10^{11} – 10^{12}$
Q17.	Which of the following equations is correct for Soderberg Criteria?
Option A:	$(\sigma_m / S_{ut}) + (\sigma_a / S_e) = (1 / N_f)$
Option B:	$(\sigma_m / S_{ut}) - (\sigma_a / S_e) = (1 / N_f)$
Option C:	$(\sigma_m / S_{yt}) + (\sigma_a / S_e) = (1 / N_f)$
Option D:	$(\sigma_m / S_{yt}) - (\sigma_a / S_e) = (1 / N_f)$
Q18.	Maximum normal stress theory is used for _____.
Option A:	Brittle Materials
Option B:	Ductile Materials
Option C:	Plastic Materials
Option D:	Non-Ferrous Materials

Q19.	The taper on rectangular sunk key is _____.
Option A:	1 in 16
Option B:	1 in 32
Option C:	1 in 48
Option D:	1 in 100
Q20.	When a shaft is subjected to a bending moment M & twisting moment T, then equivalent twisting moment is equal to _____.
Option A:	M + T
Option B:	$M^2 + T^2$
Option C:	$(M^2 + T^2)^{½}$
Option D:	$(M^2 - T^2)^{½}$
Q21.	Which one of the following statements is correct?
Option A:	Rigid couplings can accommodate misalignments.
Option B:	Rigid couplings can absorb shocks & vibrations.
Option C:	Rigid couplings are simple in construction as compared to flexible couplings.
Option D:	Rigid couplings are costlier than flexible couplings.
Q22.	The springs in brakes and clutches are used _____.
Option A:	To apply forces.
Option B:	To measure forces.
Option C:	To absorb shocks.
Option D:	To absorb strain energy.
Q23.	Coil diameter of a helical spring is 40 mm whereas the wire diameter is 4 mm. The shear stress factor for the spring is _____.
Option A:	1.5
Option B:	1.05
Option C:	3.0
Option D:	2.1

Q24.	A helical compression spring is used to absorb the shock. The initial compression of the spring is 30 mm and it is further compressed by 50 mm while absorbing the shock. The spring is to absorb 250 J of energy during the process. The spring stiffness required is _____.
Option A:	90.91 N/m
Option B:	90.91 N/mm
Option C:	90.91 N/cm
Option D:	12.5 N/mm
Q25.	Which one of the following statements with regards to the loads applied on the spring is ***false***?
Option A:	A spring is never subjected to a completely reversed loads.
Option B:	A helical extension spring is subjected to purely tensile forces.
Option C:	A spring is always subjected to a completely reversed loads.
Option D:	A helical compression spring is subjected to purely compressive forces.