These are sample MCQs to indicate pattern, may or may not appear in examination

University of Mumbai

Examination 2020

Program: BE Mechanical Engineering

Curriculum Scheme: Revised 2016

Examination: Third Year Semester VI

Course Code: MEC 602 and Course Name: Machine Design I

Time: 1 hour Max. Marks: 50

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

Q1.	By using R 10 basic series of preffered numbers , how many standard sizes can be obtained between 1 to 10
Option A:	100
Option B:	20
Option C:	10
Option D:	40
Q2.	In simple tensile test, when maximum principle stress reaches the value of yield point, the material subjected to complex stresses fail. This theory is called as _____.
Option A:	Coulumb's theory
Option B:	Rankine's theory
Option C:	Venant's theory
Option D:	Von Mises theory
Q3.	For cast iron components under static loading, which of the following strength are considered to be the failure criterion?
Option A:	Yield Strength
Option B:	Endurance limit
Option C:	Ultimate tensile strength
Option D:	Proportinal limit on stress strain curve
Q4.	The principal stresses at a point in a critical section of a machine component are σ_1=60MPa,σ_2=5MPaand σ_3= − 40MPa. For the material of the component, the tensile yield strength is σ_y=200MPa. According to the maximum shear stress theory, the factor of safety is
Option A:	1.67
Option B:	2
Option C:	3.2
Option D:	4

Q5.	In a structure subjected to fatigue loading, the minimum and maximum stresses developed in a cycle are 200MPa and 1000MPa respectively. The value of amplitude stress (in MPa) is
Option A:	400
Option B:	500
Option C:	1000
Option D:	800
Q6.	A thick walled hollow cylinder having outside and inside radii of 80 mm and 30 mm respectively is subjected to an external pressure of 400 MN/m^2. The maximum circumferential stress in the cylinder will occur at a radius of
Option A:	30 mm
Option B:	80 mm
Option C:	50 mm
Option D:	60 mm
Q7.	In curved beams stress distribution is,
Option A:	Linearly increasing
Option B:	hyperbolic
Option C:	Parabolic
Option D:	Linearly decreasing
Q8.	The surface finish factor for a mirror polished material is
Option A:	0.5
Option B:	0
Option C:	0.8
Option D:	1
Q9.	Which one of the following is the most conservative fatigue failure criterion?
Option A:	Soderberg
Option B:	Gerber
Option C:	Goodman
Option D:	Yield line
Q10.	To plot S - N curve, rotating beam speciman in fatigue test is subject to
Option A:	completely reversed stress
Option B:	repeated stress
Option C:	static tensile load
Option D:	static compressive load
Q11.	If number of coils in helical spring are 10 and wire diameter of spring is 4mm, then solid length is given by?
Option A:	2.5 mm
Option B:	6 mm
Option C:	40 mm

Option D:	14 mm
Q12.	If a helical compression spring has plain ends then number of active coils are? (N_t= total number of coils)
Option A:	N_t
Option B:	N_t-2
Option C:	N_t-1
Option D:	N_t-3
Q13.	Find the shear stress in the spring wire used to design a helical compression sprig if a load of 1200N is applied on the spring. Spring index is 6, and wire diameter 7mm.
Option A:	452.2N/mm²
Option B:	254.45N/mm²
Option C:	468.6N/mm²
Option D:	846 N/mm²
Q14.	A leaf spring consists of 3 extra full length leaves and 14 graduated length leaves. The maximum force that can act on the spring is 70kN and the distance between eyes of the spring is 1.2m. Width and thickness of the leaves are 100mm and 12mm respectively. Calculate the initial pre load required to close the nip.
Option A:	4332.2N
Option B:	4674.1N
Option C:	4985.4N
Option D:	7000 N
Q15.	When the tensile force is applied to the knuckle joint, the kunckle pin is likely to fail by
Option A:	tesile failure
Option B:	Buckling
Option C:	direct shear failure
Option D:	torsional shear failure
Q16.	In knuckle joint each rod is subjected to an axial tensile force of 50 kN. If the permitted stress in tension is 100 N/mm^2,then the diameter of the rod is,
Option A:	13.23 mm
Option B:	25.23 mm
Option C:	50.23 mm
Option D:	15.23 mm
Q17.	If nominal diameter of square screw thread=50mm and pitch=10mm then the mean diameter of the screw thread will be?
Option A:	50 mm
Option B:	25 mm
Option C:	40 mm
Option D:	45 mm
Q18.	If friction angle is 30^0 then the maximum efficiency of the square threaded power screw is____%

Option A:	66.66
Option B:	50
Option C:	30
Option D:	33.33
Q19.	In turnbuckle the coupler is made of CI of ultimate tensile strength of 200 N/mm^2, if the factor of safety is 2.5 the permissible shear strength for coupler is-_____ N/mm^2
Option A:	40
Option B:	200
Option C:	100
Option D:	80
Q20.	Which type of butt weld joint is used to weld plates of thickness less than 5 mm?
Option A:	Single V butt weld
Option B:	Single U butt weld
Option C:	Square butt weld
Option D:	Double U butt weld
Q21.	A propeller shaft is required to transmit 50 kW power at 600 rpm. It is a hollow shaft, having an inside diameter 0.8 times of outside diameter. It is made of plain carbon steel & the permissible shear stress is 47.5 N/mm2. calculate outside diameter of the shaft.
Option A:	52.5 mm
Option B:	25.5 mm
Option C:	5 mm
Option D:	45 mm
Q22.	Determine diameter of a shaft made of 30 C8 (Syt = 400 N/mm2) , transmitting a power of 25 kW at 360 rpm when fos is 4 , using maximum shear stress theory.
Option A:	30 mm
Option B:	25 mm
Option C:	41 mm
Option D:	35 mm
Q23.	Calculate the force acting on the each pin in flexible coupling if torque transmitted is 450 N-m and PCD=120mm with number of pins 6
Option A:	1875 N
Option B:	1250 N
Option C:	187 N
Option D:	2015 N
Q24.	a key which fits in the keyway of the hub only is
Option A:	A sunk key
Option B:	A woodruff key
Option C:	kennedy key
Option D:	A saddle key

Q25.	The standard cross section for a flat key, which is fitted on a 50 mm diameter shaft, is 16 X 10 mm. length of the key is 50 mm. & it is transmitting 475 N-m torque from shaft to the hub. Induced crushing stress in a key is -------N/mm^2.
Option A:	23.75
Option B:	32.75
Option C:	76
Option D:	67