University of Mumbai
Examination 2020

Program: Mechanical Engineering
Curriculum Scheme: Rev2016
Examination: Second Year Semester: III
Course Code: MEC303 and Course Name: Strength of Materials
Time: 1-hour Max. Marks: 50

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

Q1.	A hollow C.I. cylinder 4m long, 300 mm outer diameter and thickness of metal 50mm is subjected to a central load on the top when standing straight. The stress produced is 75,000 kN/m^2. Assume Young's modulus for C.I. as 1.5*10^8 kN/m^2 and find (i) magnitude of the load, (ii) longitudinal strain produced, and (iii) total decrease in length.
Option A:	2.945MN, 5*10^{-4}, 2mm
Option B:	2.945kN, 5*10^{-5}, 1.5mm
Option C:	2.945kN, 4*10^{-4}, 2mm
Option D:	2.945MN, 6*10^{-4}, 1mm
Q2.	Relation between E and G is
Option A:	E=2G(1-μ)
Option B:	E=2G(1+μ)
Option C:	E=3G(1+μ)
Option D:	E=3G(1+2μ)
Q3.	Formula for elongation of a bar due to its self-weight
Option A:	dl=wl/E
Option B:	dl=wl/2E
Option C:	dl=wl^2/E
Option D:	dl=wl^2/2E
Q4.	Formula for temperature stress for free expansion is
Option A:	dl=l*t
Option B:	dl=l*α*t
Option C:	dl=α*t
Option D:	dl=l*α^2*t
Q5.	Which of these unit of temperature is incorrect
Option A:	^{0}C
Option B:	^{0}F
Option C:	^{0}K
Option D:	^{0}R
Q6.	Value of coefficient of thermal expansion for steel is less than that of copper. When both bars are equally heated,

Option A:	steel will expand more
Option B:	copper will expand more
Option C:	both metals will expand equally
Option D:	both metals will start contracting
Q7.	Unit of volumetric strain is
Option A:	N/mm^2
Option B:	pascal
Option C:	mm^3/mm^3
Option D:	watt
Q8.	Unit of strain is
Option A:	N/mm^2
Option B:	kN/mm^2
Option C:	no unit
Option D:	N/m^2
Q9.	Poisson's Ratio is the ratio of
Option A:	Lateral strain/Linear strain
Option B:	Linear strain/Lateral Strain
Option C:	Linear stress/Linear strain
Option D:	Lateral stress/Linear strain
Q10.	M/I = E/R indicates
Option A:	strength criteria for beams
Option B:	rigidity criteria for beams
Option C:	strength criteria for columns
Option D:	rigidity criteria for columns
Q11.	For circumferential stress, pressure is resisted
Option A:	along the length
Option B:	by the circumference
Option C:	both the length and circumference
Option D:	none of the two
Q12.	Bursting force for calculating longitudinal stress is
Option A:	pressure * cross-sectional area
Option B:	stress * cross-sectional area
Option C:	pressure * circumferential area
Option D:	stress * circumferential area
Q13.	Maximum shear stress for thin spherical shell is
Option A:	0
Option B:	1
Option C:	0.5
Option D:	-1
Q14.	A thin cylindrical shell, 3m long and 1m in diameter is subjected to an internal

	pressure of 2N/mm2. If the thickness of the shell is 10mm, find the circumferential and longitudinal stresses respectively. Take E = 200GPa.
Option A:	50,100
Option B:	100, 50
Option C:	150,50
Option D:	100,200
Q15.	Material of the shaft is uniform indicates
Option A:	only E for material is constant in all directions
Option B:	only E and K for material are constant in all directions
Option C:	only E, K and G for material are constant in all directions
Option D:	only E, K, G and μ for material are constant in all directions
Q16.	The ratio of Maximum strain energy to volume represents
Option A:	resilience
Option B:	modulus of resilience
Option C:	proof resilience
Option D:	none of the above
Q17.	Ratio of stress due to suddenly applied load and gradually applied load is
Option A:	2
Option B:	0.5
Option C:	1
Option D:	1.5
Q18.	A shaft is required to transmit 1MW at 240rpm. If the shear stress is not to exceed 55N/mm2 and twist in the shaft should not be more than 1 degree in a length of 15 times the diameter, determine the required diameter of the shaft. Take G = 75GPa. Take Tmax is 30% more than Tmean.
Option A:	167mm
Option B:	177mm
Option C:	180mm
Option D:	150mm
Q19.	Strain Energy is
Option A:	always positive
Option B:	always negative
Option C:	either positive or negative based on tensile or compressive load
Option D:	zero
Q20.	Hooke's Law is applicable to
Option A:	plastic zone of the material
Option B:	elastic zone of the material
Option C:	brittle point of the material
Option D:	none are correct
Q21.	Maximum value of Poisson's Ratio is
Option A:	0.5

Option B:	0.33
Option C:	0
Option D:	1
Q22.	Limitation of Euler's Theory is, it can be applied to
Option A:	only long columns
Option B:	only short columns
Option C:	long and short columns only and not to medium columns
Option D:	only long beams
Q23.	Moment of Inertia (I) for circular cross-section is given by
Option A:	$(\pi/32)*d^2$
Option B:	$(\pi/4)*r^2$
Option C:	$(\pi/32)*d^4$
Option D:	$(\pi/4)*r^4$
Q24.	Relation between effective length (L_e) and actual length (L) for one end free and one end fixed is
Option A:	$L_e = L$
Option B:	$L_e = 2L$
Option C:	$L_e = L/2$
Option D:	$L_e = L/\sqrt{2}$
Q25.	Point of zero shear is the point at which
Option A:	Load intensity is highest
Option B:	Bending moment value is zero
Option C:	Bending moment value is maximum
Option D:	Load intensity is lowest