Uka Tarsadia University	
Diploma Engineering MCQ Question bank	
Subject Code: 020030304	Date:
Subject Name: Structural Mechanics-I	

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Each question is of 1 mark.
4. Use of SIMPLE CALCULATOR is permissible. (Scientific/Higher Version not allowed)
5. English version is authentic.

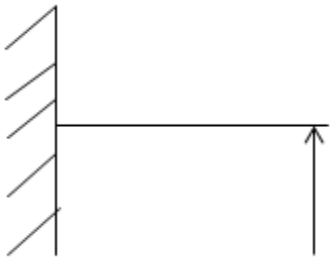
Unit 1- Direct Stress and Strain				
1	The dimension of strain is?			
		LT^{-2}		N/m_2
		N		Dimensionless
2	What is tensile strain?			
		The ratio of change in length to the original length		The ratio of original length to the change in length
		The ratio of tensile force to the change in length		The ratio of change in length to the tensile force applied
3	Find the strain of a brass rod of length 250mm which is subjected to a tensile load of 50kN when the extension of rod is equal to 0.3mm?			
		0.025		0.0012
		0.0046		0.0014
4	Find the elongation of a steel rod of 100mm length when it is subjected to a tensile strain of 0.005?			
		0.2mm		0.3mm
		0.5mm		0.1mm
5	A tensile test was conducted on a mild steel bar. The diameter and the gauge length of bat was 3cm and 20cm respectively. The extension was 0.21mm. What is the value to strain?			
		0.0010		0.00105
		0.0105		0.005
6	i) Strain is a fundamental behaviour of a material. ii) Strain does not have a unit.			
		Both i and ii are true and ii is the correct explanation of i		Both i and ii ate true but ii is not the correct explanation of i
		i is true but ii is false		ii is true but i is false

7	A tensile test was conducted on a steel bar. The gauge length of the bar was 10cm and the extension was 2mm. What will be the percentage elongation?			
		0.002		0.02
		0.2		2
8	The lateral strain is _____			
		The ratio of axial deformation to the original length		The ratio of deformation in area to the original area
		The strain at right angles to the direction of applied load		The ratio of length of body to the tensile force applied on it
9	The unit of force in S.I. units is ?			
		Kilogram		Newton
		Watt		Dyne
10	A rod 200cm long is subjected to an axial pull due to which it elongates about 2mm. Calculate the amount of strain?			
		0.001		0.01
		0.02		0.002
11	The property by which a body returns to its original shape after removal of the force is called _____			
		Plasticity		Elasticity
		Ductility		Malleability
12	Which law is also called the elasticity law?			
		Bernoulli's law		Stress law
		Hooke's law		Poisson's law
13	The materials which have the same elastic properties in all directions are called __			
		Isotropic		Brittle
		Homogeneous		Hard
14	A member which does not regain its original shape after removal of the load producing deformation is said _____			
		Plastic		Elastic
		Rigid		None of the mentioned
15	The body will regain its previous shape and size only when the deformation caused by the external forces, is within a certain limit. What is that limit?			
		Plastic limit		Elastic limit
		Deformation limit		None of the mentioned
16	As the elastic limit reaches, tensile strain ___			
		Increases more rapidly		Decreases more rapidly
		Increases in proportion to the stress		Decreases in proportion to the stress
17	What is the factor of safety?			
		The ratio of stress to strain		The ratio of permissible stress to the

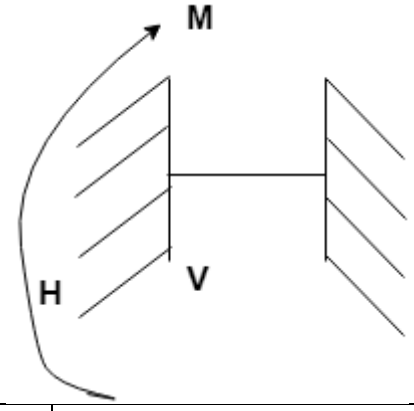
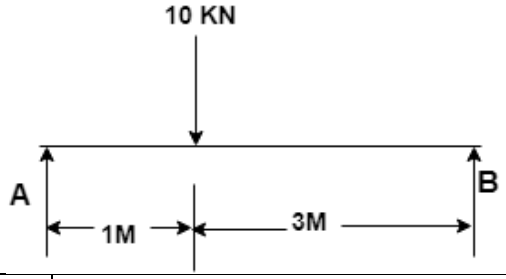
				ultimate stress
		The ratio of ultimate stress to the permissible stress		The ratio of longitudinal strain to stress
18	Where in the stress-strain curve, the hooke's law is valid?			
		Strain hardening region		Necking region
		Elastic range		Valid everywhere
19	What will be the ratio of Young's modulus to the modulus of rigidity of a material having Poisson's ratio 0.25?			
		3.75		3.00
		1.5		2.5
20	A bar of 40mm dia and 40cm length is subjected to an axial load of 100 kN. It elongates by 0.005mm. Calculate the Poisson's ratio of the material of the bar?			
		0.25		0.25
		0.30		0.33
21	What is the stress-strain curve?			
		It is the percentage of stress and stain		It is the relationship between stress and strain
		It is the difference between stress and strain		None of the mentioned
22	The stress which acts in a direction perpendicular to the None of the mentioned area is called _____			
		Shear stress		Normal stress
		Thermal stress		None of the mentioned
23	Which of these are types of normal stresses?			
		Tensile and compressive stresses		Tensile and thermal stresses
		Shear and bending		Compressive and plane stresses
24	Which type of stress in a reinforcement bar is taken by the concrete?			
		Tensile stress		Compressive stress
		Shear stress		Bending stress
25	A material has a Poisson's ratio of 0.5. If uniform pressure of 300GPa is applied to that material, What will be the volumetric strain of it?			
		0.50		0.20
		0.25		0
26	The stress induced in a body, when subjected to two equal and opposite forces which are acting tangentially across the resisting section resulting the shearing of the body across its section is called _____			
		Bending stress		Compressive stress
		Shear strain		Shear stress

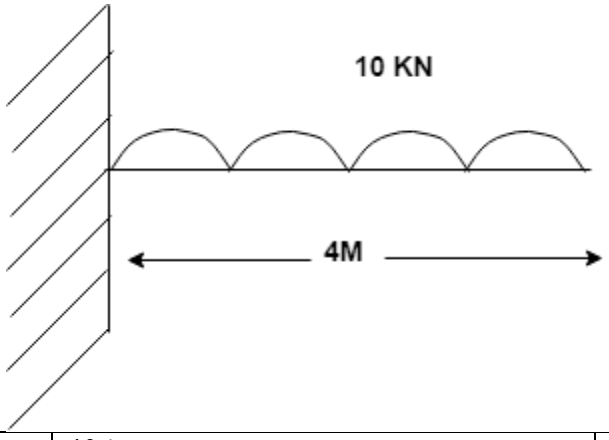
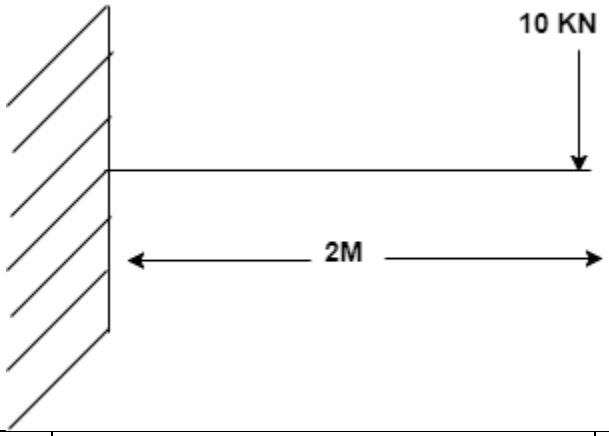
27	When equal and opposite forces applied to a body, tend to elongate it, the stress so produced, is called _____			
		Shear stress		Compressive stress
		Tensile stress		Transverse stress
28	What is the formula for shear stress?			
		Shear resistance/shear area		Force/unit area
		Bending strain/area		Shear stress/length
29	A rod 150cm long and of diameter 2cm is subjected to an axial pull of 20 kN. What will be the stress?			
		60 N/mm^2		65 N/mm^2
		63.6 N/mm^2		71.2 N/mm^2
30	The stress in a rod is 70 N/mm2 and the modulus of elasticity is $E = 2 \times 10^5$ N/mm^2. what will be the strain in the rod?			
		0.00052		0.00035
		0.00030		0.00047
31	What will be the unit of compressive stress?			
		N		N/mm
		N/mm^2		Nmm^2
32	A steel bar of 40mm x 40mm square cross-section is subjected to an axial compressive load of 200kN. If the length of the bar is 2m and E=200GPa, the elongation of the bar well be _____			
		1.25mm		2.70mm
		4.05mm		5.40mm
33	If a bar of sections of two different lengths and different diameters are in a line and P load is acting axially on them then what will be the change in length of the bar?			
		$P/E \times (L_1 + L_2)$		$P/E \times (A_1/L_1 + A_2/ L_2)$
		$P/E \times (L_1/A_1 + L_2/A_2)$		$E/P \times (L_1/A_1 + L_2/A_2)$
34	A composite rod is 1000mm long, its two ends are 40 mm^2 and 30mm2 in area and length are 400mm and 600mm respectively. If the rod is subjected to an axial tensile load of 1000N, what will be its total elongation(E = 200GPa)?			
		0.130m		0.197mm
		0.160mm		0.150mm
35	A composite rod is 1000mm long, its two ends are $40mm^2$ and $30mm^2$ in area and length are 300mm and 200mm respectively. The middle portion of the rod is $20mm^2$ in area. If the rod is subjected to an axial tensile load of 1000N, what will be its total elongation (E = 200GPa)?			
		0.145mm		0.127mm
		0.187mm		0.196mm
36	The strain energy in a member is proportional to _____			
		Product of stress and the strain		Total strain multiplied by the volume of the member

		The maximum strain multiplied by the length of the member		Product of strain and Young's modulus of the material
37	Which of the following is hook's law?			
		$E = \sigma / \varepsilon$		$E = \sigma \times \varepsilon$
		$\sigma = E \times \varepsilon$		None of the above
38	A rod of two sections of area 625mm^2 and 2500mm^2 of length 120cm and 60cm respectively. If the load applied is 45kN then what will be the elongation (E = 1.05 x 10^5 N/mm^2)?			
		0.462mm		0.521mm
		0.365mm		0.514mm
39	A tensile load of 60kN is gradually applied to a circular bar of 4cm diameter and 5m long. What is the stretch in the rod if E = 2×10^5 N/mm^2?			
		1.1mm		1.24mm
		2mm		1.19mm
40	A tensile load of 50kN is gradually applied to a circular bar of 5cm diameter and 5m long. What is the strain energy absorbed by the rod (E = 200GPa)?			
		14 N-m		15.9 N-mm
		15.9 N-m		14 N-mm
41	What will be the elongation of a bar of 1250mm2 area and 90cm length when applied with a force of 130kN if E = 1.05 x 10^5 N/mm^2?			
		0.947mm		0.891mm
		0.845mm		0.745mm
42	A bar of cross-section A and length L is subjected to an axial load W. the strain energy stored in the bar would be _____			
		WL / AE		$W^2L / 4AE$
		$W^2L / 2AE$		WL / 4AE
43	A member ABCD is subjected to points load P_1=45kN, P_2, P_3=450kN and P_4=130kN. What will be the total elongation of the member, assuming the modulus of elasticity to be 2.1 x 105 N/mm^2. The cross sectional area is 625mm, 2500mm, 1250mm respectively.			
		0.4914mm		0.4235mm
		0.4621mm		0.4354mm
44	A rectangular block of size 400mm x 50mm x 50mm is subjected to a shear stress of 500kg/cm^2. If the modulus of rigidity of the material is 1×10^6 kg/cm^2, the strain energy will be _____			
		125 kg-cm		1000 kg-cm
		500 kg-cm		100 kg-cm
45	A steel bar of 20mm x 20mm square cross-section is subjected to an axial compressive load of 100kN. If the length of the bar is 1m and E=200GPa, then what will be the elongation of the bar?			
		1.25mm		2.70mm
		5.40mm		4.05mm

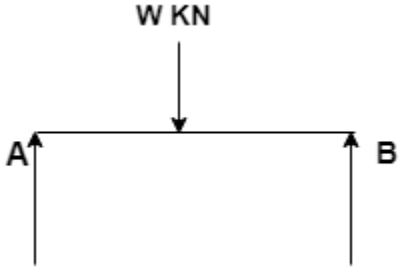
46	Strain energy stored in a body to uniform stress s of volume V and modulus of elasticity E is _____			
		$S^2V/2E$		SV/E
		SV^2/E		SV/2E
47	A bar is in two sections having equal lengths. The area of cross section of 1st is double that of 2nd. if the bar carries an axial load of P, then what will be the ratio of elongation in section 2nd to section 1st ?			
		1/2		2
		4		1/4
48	What is the strain energy stored in a body due to gradually applied load?			
		$\sigma E/V$		$\sigma E^2/V$
		$\sigma V^2/E$		$\sigma V^2/2E$
49	A rod, which tapers uniformly from 5cm diameter to 3cm diameter in a length of 50cm, is subjected to an axial load of 6000N. if E = 2,00,000 N/mm^2, what will be the extension of the rod?			
		0.00114cm		0.00124cm
		0.00127cm		0.00154cm
50	A round bar made of the same material consists of 4 parts each of 100mm length having diameters of 40mm, 50mm, 60mm and 70mm, respectively. If the bar is subjected to an axial load of 10kN, what will be the total elongation of the bar in mm?			
		$0.4/\pi E$ (1/16 + 1/25 + 1/36 + 1/49)		$4/\pi E$ (1/16 + 1/25 + 1/36 + 1/49)
		$2/\pi E$ (1/16 + 1/25 + 1/36 + 1/49)		$40/\pi E$ (1/16 + 1/25 + 1/36 + 1/49)
	Unit 3- Shear Force and Bending moment Diagram			
1	_____ is a horizontal structural member subjected to transverse loads perpendicular to its axis.			
		Strut		Column
		Beam		Truss
2	Example for cantilever beam is _____			
		Portico slabs		Roof slab
		Bridges		Railway sleepers
3	The diagram depicts _ kind of beam. 			
		Cantilever		Continuous
		Over hanging		Propped cantilever

4	Fixed beam is also known as _____			
		Encastered beam		Built on beam
		Rigid beam		Tie beam
5	U.D.L stands for?			
		Uniformly diluted length		Uniformly developed loads
		Uniaxial distributed load		Uniformly distributed loads
6	Given below diagram is _____ load. 			
		Uniformly distributed load		Uniformly varying load
		Uniformly decess load		Point load
7	Moving train is an example of ____ load.			
		Point load		Cantered load
		Rolling load		Uniformly varying load
8	Continuous beams are _____			
		Statically determinate beams		Statically indeterminate beams
		Statically gravity beams		Framed beams
9	A beam which extends beyond it supports can be termed as _____			
		Overhanging beam		Over span beam
		Isolated beams		Tee beams
10	Units of U.D.L?			
		KN/m		KN-m
		KN-m×m		KN
11	A simple support offers only_____ reaction normal to the axis of the beam.			
		Horizontal		Vertical
		Inclined		Moment
12	To avoid _____ stresses in beams, one end of the beam is placed on the rollers.			
		Compressive		Pyro
		Temperature		Tensile
13	_____ support develops support moment.			
		Hinged		Simple
		Fixed		Joint
14	Hinge support is called as _____			
		Socket joint		Swivel joint
		Ball joint		Pin joint

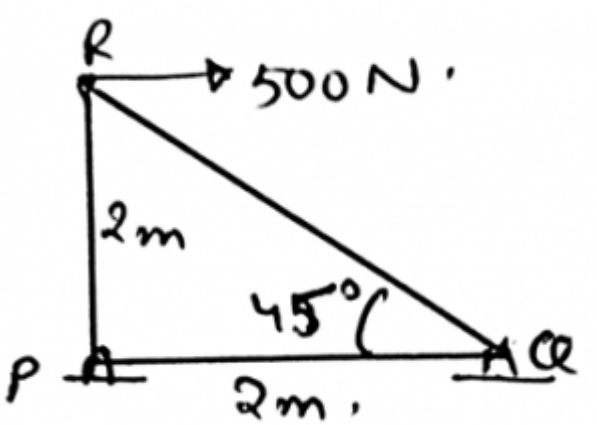
15	Name the support from the following figure. 			
		Hinge support		Fixed support
		Free support		Roller support
16	For a simply supported beam, the moment at the support is always _____			
		Maximum		Zero
		Minimum		Can not be determined
17	“Hinged support offers resistance against rotation”.			
		True		False
18	Find the reaction at simple support A? 			
		6.5 kN		9 kN
		10 kN		7.5 kN
19	Roller support is same as _____			
		Hinged support		Fixed support
		Simply support		Roller support
20	Hinged supports offer vertical and _____ reaction.			
		Horizontal		Moment
		Rotation		Couple
21	Shear force is unbalanced _____ to the left or right of the section.			
		Horizontal force		Vertical force
		Inclined force		Conditional force
22	SI units of shear force is _____			

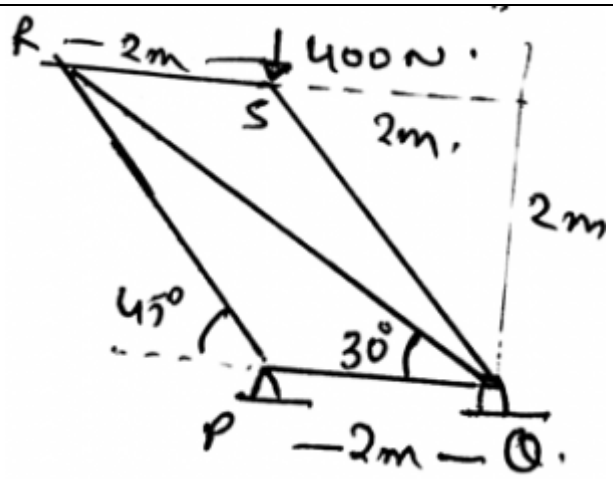
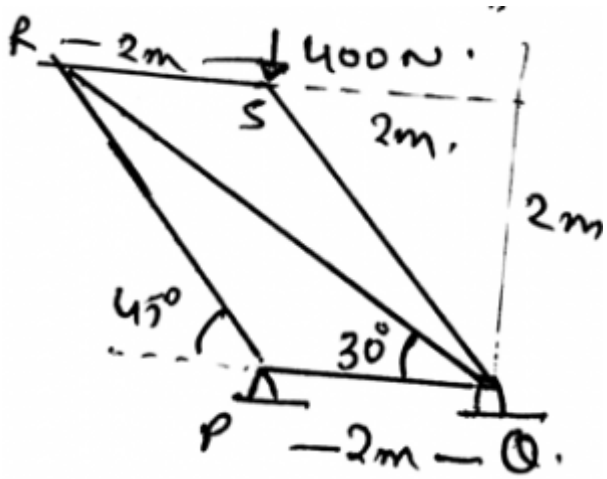
		KN/m		KN-m
		KN-m×m		KN
23	Determine the moment at fixed end. 			
		40 kNm		50 kNm
		60 kNm		80 kNm
24	Shear force is diagram is _____ representation of shear force plotted as ordinate.			
		Scalar		Aerial
		Graphical		Statically
25	Hogging is_____			
		Negative bending moment		Positive shear force
		Positive bending moment		Negative shear force
26	At the point of contraflexure, the value of bending moment is _____			
		Zero		Maximum
		Can't be determined		Minimum
27	_____ positive/negative bending moments occur where shear force changes its sign.			
		Minimum		Zero
		Maximum		Remains same
28	Shear force of following diagram 			
		Rectangle		Square

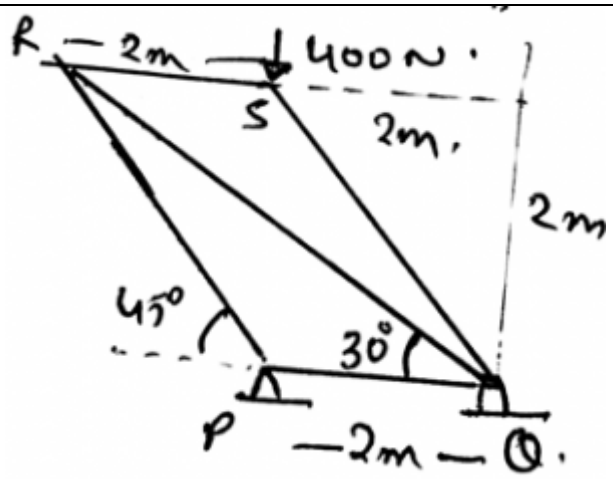
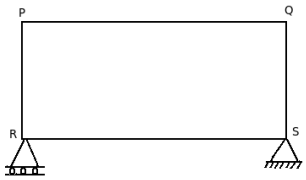
		Circle		Trapezoidal
29	SI units of Bending moment is _____			
		kN		kN^2
		kNm		km
30	What is the other name for a positive bending moment?			
		Hogging		Sagging
		Inflation		Contraflexure
31	Which of these is the correct way of sign convention for shear force?			
		RUP (Right Upward Positive)		LUP (Left Upward Positive)
		RUP (Right Upward Negative)		LUP (Left Downward Positive)
32	At hinge, the moments will be _____			
		Minimum		Maximum
		Uniform		Zero
33	What is variation in SFD, if the type of loading in the simply supported beam is U.D.L is ____			
		Rectangle		Linear
		Trapezoidal		Parabolic
34	The rate of change of shear force is equal to _____			
		Direction of load		Change in BMD
		Intensity of loading		Maximum bending
35	The shear force in a beam subjected to pure positive bending is _____			
		Positive		Negative
		Uniform		Zero
36	In SFD, vertical lines are for _____			
		Point loads		UDL
		UVL		LDP
37	A cantilever beam loaded with udl throughout, the maximum shear force occurs at____			
		Free end		Fixed end
		At centre		At point of contraflexure
38	A simply supported beam of span 1 m carries a point load “w” in the centre to determine the shear force in the half left of the beam.			
		W/3		W/4
		W/2		W
39	Point of inflection is known as _____			
		Point of recurrence		Point of contraflexure
		Point of rigid factor		Point of flexural moment
40	When SF is zero, the bending moment is _____			

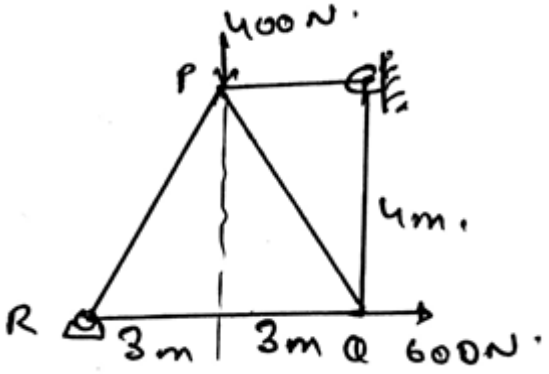
		Zero		Maximum
		Very difficult to say		Minimum
41	A cantilever beam subjected to point load at its free end, the maximum bending moment develops at the _____ of the beam.			
		Free end		Fixed end
		Centre		Point of inflection
42	Bending moment in a beam is maximum when the _____			
		Shear force is minimum		Shear force is maximum
		Shear force is zero		Shear force is constant
43	A simply supported beam of span "x" meters carries a udl of "w" per unit length over the entire span, the maximum bending moment occurs at _____			
		At point of contra flexure		Centre
		End supports		Anywhere on the beam
44	Bending moment can be denoted by ____			
		K		M
		N		F
45	Number of points of contra flexure for a double overhanging beam.			
		3		2
		4		Infinite
46	Maximum bending moment in a cantilever beam subjected to udl (w)over the entire span (l).			
		wl		wl^3
		wl^2		w
47	Determine the maximum bending moment for the below figure. 			
		wl/2		wl/3
		wl/4		wl
48	What is the variation in the BM, if the simply supported beam carries a point load at the centre.			
		Triangular		Rectangular
		Trapezoidal		Other quadrilateral
49	What is the bending moment at end supports of a simply supported beam?			
		Maximum		Minimum
		Zero		Uniform

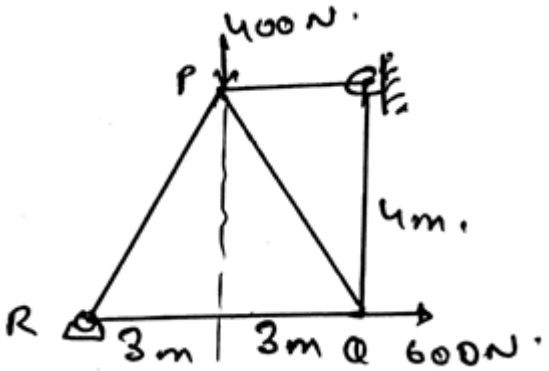
50	What is the maximum shear force, when a cantilever beam is loaded with udl throughout?			
		w x l		w
		w / l		w + l
51	Sagging, the bending moment occurs at the _____ of the beam.			
		At supports		Mid span
		Point of contraflexure		Point of emergence
52	How do point loads and udl be represented in SFD?			
		Simple lines and curved lines		Curved lines and inclined lines
		Simple lines and inclined lines		Can't represent any more
53	The relation between slope and maximum bending moment is _____			
		Directly proportion		Inversely proportion
		Relative proportion		Mutual incidence
	Unit 5-Analysis of Truss			
1	_____ is a framed structure composed of members.			
		Purlin		Gussets
		Ridge tops		Truss
2	Trusses are subjected to _____ stress.			
		Compressive		Tensile
		Direct		Lateral
3	Trusses are adopted for _____ span.			
		Medium		Short
		Very large		Large
4	The top line of roof truss is called as _____			
		Eves		Main tie
		Pitch		Ridge line
5	If the members connected don't lie in the same plane, then structures are called _____			
		Space truss		Plane truss
		Main truss		Foot truss
6	_____ is a structure made of slender members which are joined together at their endpoints.			
		Truss		Beam
		Pillar		Support
7	---------- trusses lie on a plane.			
		Planar		2D
		Linear		3D
8	In a roof supporting truss the load is transmitted when _____			

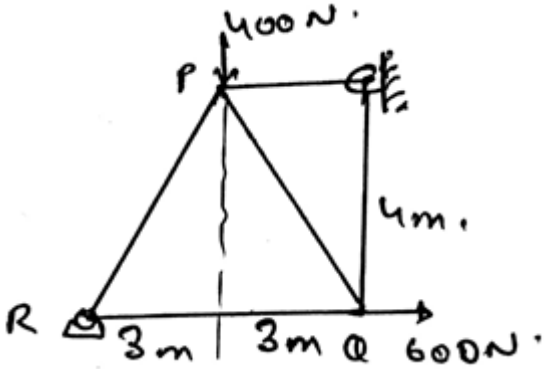
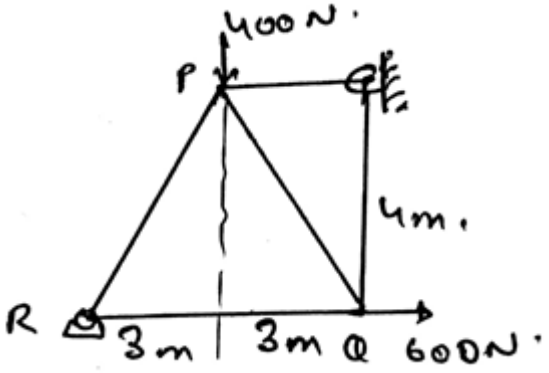
		First to the truss then the joints through purlins		First to the purlins then the joints through trusses
		First to the truss then the purlins through joints		First to the joints then the trusses through purlins
9	As the loading is acting in the two dimensions, that is in a single plane. Thus the calculations involved in the trusses are in 2D.			
		True		False
10	Find the force in the member RP of the frame shown below.  			
		707.1N		500N
		505N		784N
11	To design the trusses which of the following rules is followed?			
		All the loads are applied by the use of cables		The loads are applied at the joints
		All the loads are not applied at the joints		The loads are not applied at all to the joints
12	The rules which are used to design the trusses are having various rules. Of them one is that the smooth pins are not used to join the members.			
		Statement is correct		Statement is incorrect
		Statement is incorrect because there are no rules		Statement is incorrect as the rolling pins are used
13	Find the force in the member RQ of the frame shown below.			

				
		566N		400N
		773N		1090N
14	Find the force in the member QS of the frame shown below. 			
		566N		400N
		773N		1090N
15	A _____ truss is in a triangular section.			
		Equilateral		Simple
		Complex		Lateral
16	Find the force in the member PQ of the frame shown below.			

				
		566N		546N
		773N		1090N
17	Which of the following is correct?			
		To know the direction of the unknown force we take the assumption of it		The direction of the unknown force is known to us already
		The direction of the unknown can't be determined		The direction of the unknown is of no use, it is not founded
18	Identify the type of truss shown below. 			
		Deficient truss		Perfect truss
		Redundant truss		All of the above
19	If a truss consists of 8 joints, 10 members and 4 reaction components then, it is a _____			
		cantilever truss		deficient truss
		redundant truss		none of the above
20	If n > 2j – R, then the truss is called as _____. (n = number of joints, j = number of members, R = number of reaction components)			
		perfect truss		redundant truss
		deficient truss		none of the above
21	Which of the following statements is false about frame/truss?			

		Bent member is never used in a truss		Internal hinges are used to connect members in a truss
		All members in the truss are two force members		Multiforce members can be used in a frame
22	Redundant truss is a type of _____			
		perfect truss		imperfect truss
		stable truss		none of the above
23	Which of the following conditions is satisfied for cantilever truss?			
		$m > 2j - R$		$m < 2j - R$
		$m = 2j - R$		$m \neq 2j - R$
24	Which axial force is determined while analyzing a truss?			
		compressive force		tensile force
		both a. and b.		none of the above
25	Which of the following material is not used in making trusses?			
		Wooden struts		Metal bars
		Channel		Concrete
26	There is no bending stresses in truss due to			
		Assumptions made		Design
		Materials used		Neither of them
27	If the whole truss is in equilibrium then all the joints which are connected to that truss is in equilibrium. This is known a			
		Section method		Scalar field method
		Vector equilibrium method		Method of joints
28	Find the force in the member vertical at the right, joined by the hinge.  			
		750N		450N
		200N		250N
29	The free body diagram of which part of the section of the truss is made to make use of method			

	of joints?			
		Joints		Truss
		The whole structure		The combination of joint and the whole structure
30	For applying the method of joint at joints the forces need to coplanar.			
		True		False
31	For applying the method of joint at joints the forces need to be concurrent.			
		True		False
32	Find the force in the member RQ. 			
		750N		450N
		200N		250N
33	We use the method of joints to find the forces acting over the joints. In this we start from the joint having at least one known force and at the most two unknown forces.			
		The first part of the statement is false and other part is true		The first part of the statement is false and other part is false too
		The first part of the statement is true and other part is false		The first part of the statement is true and other part is true too
34	We use the method of joint to find the net force acting over the entire structure.			
		True		False
35	The magnitude of the unknown force can't be known. But the direction can be founded out.			
		The first part of the statement is false and other part is true		The first part of the statement is false and other part is false too
		The first part of the statement is true and other part is false		The first part of the statement is true and other part is true too
36	What is after taking the assumption of the direction of the force, the direction comes opposite?			

		The assumption made was wrong and the question can't be solved further		The assumptions are not to be taken
		The direction is in the opposite sense, and hence the direction is known to us		The direction will be already given to us, no need of assuming
37	Find the force in the member PQ.  			
		750N		450N
		200N		250N
38	The magnitude of the resultant of the two vectors is always:			
		Greater than one of the vector's magnitude		Smaller than one of the vector's magnitude
		Depends on the angle between them		Axis we choose to calculate the magnitude
39	Find the force in the member PR.  			
		750N		450N
		200N		250N
40	Which of the following is not an application of trusses?			
		Electric tower		Base of the building
		Roof		Advertisement Hoarding
41	Which of the following material can not be used for truss?			
		Concrete		Carbon Steel

		Tor Steel		GI
42	Which of the following is a Pin joint in truss?			
		Top Joint		Bottom most joint
		Lateral joints		All the joints
43	How to denote if the value of member force is in compression?			
		By showing positive		By showing Negative
		Both A and B		Either A or B
44	Which of the following condition can be used to solve a truss			
		$\Sigma H = 0$		$\Sigma V = 0$
		Both A and B		None of the above
45	If a joint has only two non-collinear members and there is no external load or support reaction at that joint, then those two members are ____			
		Redundant members		Zero members
		Deficient members		None of the above
46	Which type of drawing is required to analyse the truss?			
		Clear dimension drawing		Free body diagram
		Double line diagram		Working drawing
47	Reactions can never be ___			
		Vertical forces		Horizontal forces
		Moments		None of the above
48	What is an assumption to be made while analysing the truss?			
		All unknown member forces act in Compression		All unknown member forces act in tension
		Both A and B		Either A or B
49	Zero-force members can be _____when analyzing the truss.			
		Added		Removed
		Doubled		None of the above
50	How to denote if the value of member force is in tension?			
		By showing positive		By showing Negative
		Both A and B		Either A or B

Best of Luck