AR13

CODE: 13CE2006 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, October-2021

STRENGTH OF MATERIALS-II

(Civil Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1.	a)	Design of a thin shell under pressure is done on the basis of what stress?	1M
	b)	For the same internal diameter, wall thickness, material and internal pressure, what is the ratio of maximum stress induced in a thin cylindrical and in a thin spherical vessel?	1M
	c)	A thin spherical shell under internal pressure will fail under_____(maximum shear stress/ maximum tensile stress/ principal compressive stress)	1M
	d)	A spherical pressure vessel is made of thin magnesium plate 5 mm thick. The main diameter of the sphere is 500 cm and allowable stress in tension is 1000 kg/cm^2. What would be safe internal gas pressure for the vessel?	1M
	e)	A circular shaft subjected to a pure torque produces ___in the shaft.	1M
	f)	A long shaft of diameter d is subjected to twisting moment T at its ends. What is the maximum normal stress acting at its cross section?	1M
	g)	Normal stresses of equal magnitude p, but of opposite signs, act at a point of a strained material in perpendicular direction. What is the magnitude of the resultant normal stress on a plane inclined at 45 degrees to the applied stresses?	1M
	h)	If the principal stresses in a plane stress problem, are 100 MPa and 40 MPa, then what is the the magnitude of the maximum shear stress (MPa)?	1M
	i)	In long and short columns which will have greater crushing load carrying capacity and why?	1M
	j)	When a column carries an axial tensile load, the column is subjected to what kind of a stress?	1M

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2.	a)	Derive the equation for finding the volumetric strain in a thin spherical shell subjected to internal pressure p.	4M
	b)	A thin spherical shell of diameter 1.30 m is subjected a pressure of 2.30 MPa. Determine the minimum thickness required if the stress is not to exceed 40 MPa. Take the joint efficiency as 80%. Also, find the change in diameter of the sphere if E=200 GPa and μ=0.30.	8M
		(OR)	
3.	a)	Derive the equation for finding the stress in a thin spherical shell subjected to internal pressure p with a help of neat figure.	4M
	b)	A thin spherical shell of diameter 1 m is subjected an internal pressure of 2 MPa. Determine the minimum thickness required if the stress is not to exceed 50 MPa. Take the joint efficiency as 75%. Also, find the change in volume of the sphere if E=200 GPa and μ=0.30.	8M

UNIT-II

4. a) Define thick cylinders and how these are advantageous? 4M

   b) A cylinder is 150 mm ID and 450 mm OD. The internal pressure is 160 MPa and the external pressure is 80 MPa. Find the maximum radial and tangential stresses and the maximum shear stress. The ends are closed. 8M

(OR)

5. a) How stresses in thick cylinder are different from that of thin cylinder? 4M

   b) A steel cylinder is 160 mm ID and 320 mm OD. If it is subject to an internal pressure of 150 MPa, determine the radial and tangential stress distributions and show the results on a plot (using a spreadsheet). Determine the maximum shear stress in the cylinder. Assume it has closed ends. 8M

UNIT-III

6. a) Derive the expressions for normal and shear stress on an oblique plane due to normal stresses acting on two mutually perpendicular plane. 6M

   b) A point in a stressed body have a major principal stress as 100 MPa (tensile) and minor principal stress as 50 MPa (Comp). Determine the inclination of planes along which only shear stresses are setup. 6M

(OR)

7. a) Explain in detail Mohr's circle construction for principal stresses. 6M

   b) At a point in a bracket the normal stresses on two mutually perpendicular planes are 120 N/mm^2 tensile and 60 N/mm^2 tensile. The shear stress across these planes is 30 N/mm^2. Find using the Mohr's stress circle, i) the directions and magnitudes of principal stresses and ii) maximum shear stress. 6M

UNIT-IV

8. a) A solid steel bar of 40 mm diameter and length 1350mm is subjected to a uniform torque T. If the allowable shear stress is 40 N/mm^2 and the allowable angle of twist is 2.5^o, find the maximum permissible torque. Take G=8 x 10^4 N/mm^2. 6M

   b) A solid shaft of 80 mm diameter transmits a power of 100 kW at 160 rpm. Find the shear stress in the shaft if the maximum torque transmitted in the shaft in each revolution exceeds the mean by 20%. 6M

(OR)

9. a) Determine the torsional resistance of a hollow shaft with the help of neat sketch. 6M

   b) A hollow shaft is to have an outside diameter'd' and inside diameter 'd/2' . Calculate the minimum value of'd' if it is to transmit 375 kW at 105 rpm with a working stress of 40 N/mm^2. Determine the twist in a length equal to 10 times the external diameter. Take G= 8x 10^4 N/mm^2. 6M

UNIT-V

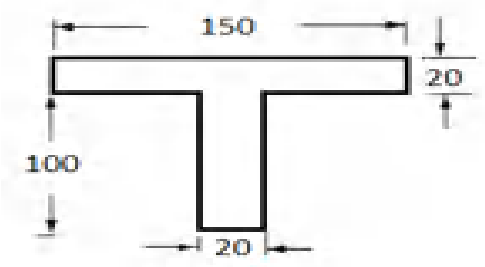
10. a) Derive the Euler's buckling load for a column with one end fixed and the other end is hinged. 6M

    b) An aluminum strut, 2 m long is a tubular cross section of external diameter 60 mm. The strut has to carry an axial load of 25 kN with a factor of safety 2. Find the thickness of the tube if both the ends are fixed. Take E=72 MPa. 6M

(OR)

11. a) Deduce a formula for the Euler's critical load of a column having both ends fixed. 6M

    b) Determine the Euler's buckling load for a column as shown in fig. The length of the column is 4 m and its one end is fixed while the other is hinged. Take E=200 GPa. All dimensions given in fig are in mm. 6M



AR13 SET 1

CODE: 13ME2012

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech II Semester Supplementary Examinations, October-2021

MACHINE DRAWING

(Mechanical Engineering)

Time: 3 Hours **Max Marks: 70**

Answer two questions from Part-A
&
Part-B is compulsory

PART-A

Answer two questions from Part-A **[2 X 15=30Marks]**

1 Draw the following dimensioned sketch of a Universal coupling to join two shafts of 50mm diameter.
a) Half sectional front view b) Top view c) Side view

2. (i) Prepare a dimensioned sketch of a cotter joint with sleeve in half sectional front view for two 50 mm diameter rods. Also draw the side view of the above.

(ii) Draw the Conventional representation of gears.

3 Draw the sectional front view and top view of the double riveted double strap zig-zag butt joint with dia of the rivet as 14 mm.

PART-B

Part-B is compulsory

4. Assemble all the parts of SCREW JACK as shown in Fig.1 and draw the following assembled views: **[1x40=40M]**
a) Sectional front view b) Top view

AR13 SET 1

CODE: 13ME2012

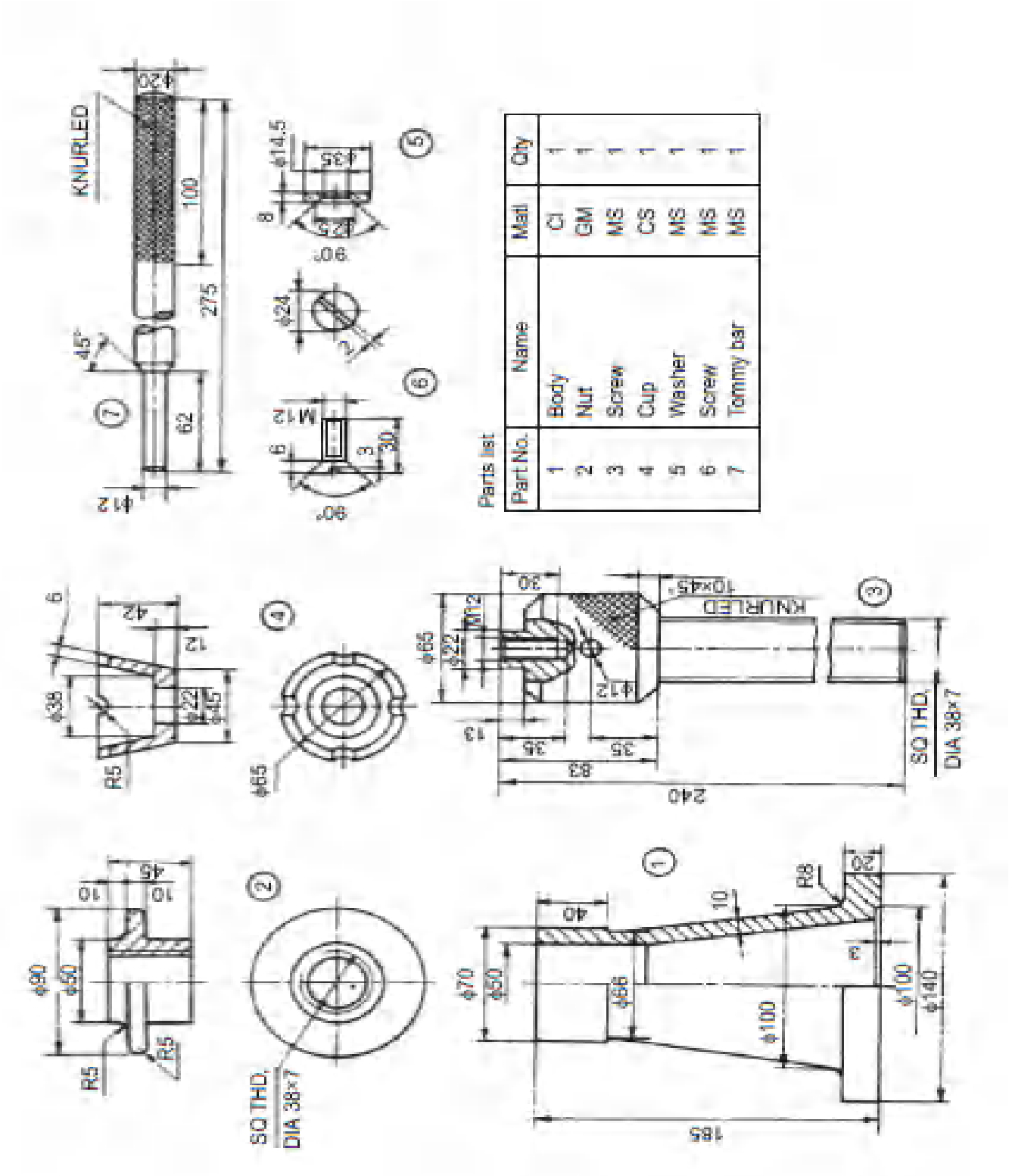


Fig. 1 Screw Jack

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AR13

CODE: 13EC2010 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, October-2021

PULSE AND DIGITAL CIRCUITS
(Electronics and Communication Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) Define attenuator?
   b) Define the following types of waveforms a) Step b) Pulse.
   c) What do you mean by Double ended clipping?
   d) State clamping circuit theorem.
   e) Define Transition time of a diode?
   f) What are the applications of Bistable Multivibrator?
   g) What do you mean by Unsymmetrical Triggering?
   h) What do you mean by Voltage Time base Generator?
   i) What are the different methods of Generating Time Base Waveform?
   j) Which blocking oscillator is used to obtain abrupt pulses from slowing varying input voltages?

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. Explain the response of RC High Pass circuit for the Step input. 12M

(OR)

3. a) Explain about RC lowpass circuit acts as an integrator? 6M
   b) Calculate the lowest square wave frequency that can be passed by an amplifier with a lower 3-db frequency of 5 Hz. If the maximum allowable tilt in the Output is 2%. 6M

UNIT-II

4. Draw the circuit diagram of an emitter –coupled clipping circuit and draw its Transfer characteristics indicating all intercepts, slopes and voltage levels. 12M

(OR)

5. Draw the basic circuit diagram of positive clamper circuits and explain its operation using waveforms? 12M

UNIT-III

6. a) Explain in detail the transistor switching times. 6M
   b) Distinguish between unsymmetrical and Symmetrical triggering? Why it is used? 6M

(OR)

7. With the help of neat circuit diagram explain the working of fixed bias bistable multivibrator 12M

UNIT-IV

8.	a)	Explain the application of Astable Multivibrator as a voltage to frequency Converter.	6M
	b)	List out the different methods for generating time base waveforms.	6M
		(OR)	
9.	a)	With the help of circuit diagram, explain the working of Monostable multivibrator.	6M
	b)	Explain how UJT is used for sweep circuit.	6M

UNIT-V

10.		With the help of neat circuit diagram explain the working of Bidirectional sampling gate.	12M
		(OR)	
11.	a)	What do you mean by blocking oscillator? Mention applications of blocking oscillators.	6M
	b)	Write the basic concept of sampling gate. Mention the applications of sampling gates?	6M