

JK LAKSHMIPAT UNIVERSITY, JAIPUR

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (backlog), November 2016

B. Tech. in Civil Engineering

Roll No.....

CE405 : Structure Analysis II

Time: 3 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1A	Objective type multiple choice questions (10 questions @ 1 mark)	10
i.	Which of the machine component is designed under bending stress? 1. Shaft 2. Arm of a lever 3. Key 4. Belts and rope	
ii.	Which of the following statements is/are true? 1. The bending stress distribution in bending of straight beams is nonlinear 2. The bending stress distribution in bending of curved beams is hyperbolic 3. The neutral axis coincides with geometrical axis during bending of curved beams 4. All of the above	
iii.	Leaf springs are used where, 1. Space is a problem 2. Space s no problem 3. Large amount of energy is to be absorbed 4. None of the above	
iv.	Flat spring are used in, 1. Road vehicles 2. Watches 3. Railway wagons 4. cycles	
v.	Euler's formula holds good only for, 1. short columns 2. long columns 3. medium columns 4. both short and long column	
vi.	Define Hoop stress.	
vii.	Define longitudinal stress of thin cylindrical shell.	

viii.	Which of the following methods of structural analysis is a force method? 1. Slope deflection method 2. Column analogy method 3. Moment distribution method 4. None of the above	
ix.	Pick up the correct statement from the following: 1. The structural member subjected to compression and whose dimensions are small as compared to its length, is called a stnt 2. The vertical compression members are generally known as columns or stanchions 3. Deflection in lateral direction of a long column, is generally known as buckling 4. All the above	
x.	Among the cylindrical and spherical thin vessels of same material, diameter and pressure which has the lesser thickness 1. Cylindrical shell 2. Spherical shell 3. Cylindrical shell with semi spherical heads 4. None of the above	

Q.2	Short answer type questions: (2.5 marks @4 quotation)	10
A.	Explain types of spring.	
B.	Difference between Static determinacy and indeterminacy of structure.	
C.	Give Examples of Closely-coiled Helical spring, Open - coiled Helical Springs.	
D.	Derive Muller Breslau's Principle.	
Q.3	Derivation of stress equations for curved beam.	15
Q.4	A cylindrical shell is 4.5 meter long and having 1 meter internal diameter and 18 mm thickness. Calculate the maximum intensity of shear stress induced and also the changes in dimensions of shell if it is subjected to an internal fluid pressure of 2.5 N/mm ² . Take $E = 2 \times 10^5 \text{ N/mm}^2$ and $\mu = 0.3$.	15
Q.5	Explain Three Moment Theorem.	15
Q.6	A load of 200N is dropped from a height of 10 cm on to the center of carrying spring which is simply supported at its ends. The spring has 10 steel plates each 5cm wide and 6 mm thick, the longest plate being 75 cm. calculate the maximum instantaneous stress in the plates and initial radius of curvature of the spring if the impact just flattens the spring. $E = 200 \text{ GPa}$ OR	20

Q.6	Derive Rankine 's formula and find euler's crushing load for a hollow cylindrical cast-iron column, having 15 cm external diameter and 2 cm thickness, if it is 6 m long and hinged at both ends. $E = 80 \text{ GPa}$. Compare this load with crushing load as given by Rankine 's formula using constants 550 MPa and $1/1600$. For what length of strut of this cross section does the Euler formula cease to apply?	20
Q.7	Derive Euler's equations for column's both ends fixed and both ends hinged.	15