



Roll No.....

Department of Food Technology
School of Interdisciplinary Sciences and Technology
Jamia Hamdard, New Delhi-110062

End Semester Examination (December 2025, B.Tech IIIrd SEM)
Paper Title: Solid Mechanics; Paper Code: BFTC-302

B.Tech.
3rd Sem
2025
10/12/25

Time Allotted: 2.30Hrs.

Max Marks: 60

Note: Write to the point. Before answering make sure you have mentioned the Question No.

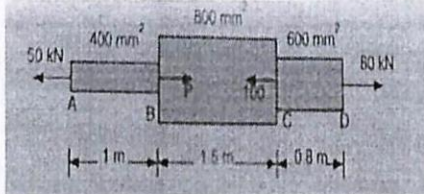
Section-A (2 Marks each, Attempt All)

Q1	Define proof stress.?	Co1Po3
Q2	Write down the relation between G Pa and N/mm ² ?	Co1Po2
Q3	What do you understand by bulk modulus?	Co1Po3
Q4	Define limit of proportionality?	Co1Po2
Q5	Define principal planes	Co1Po1

Section-B (6 Marks Each, Attempt any 5)

Q6	Derive the expression for the stresses in the bars of Uniformly tapering circular section.	Co1Po3
Q7	What do you understand by equivalent bar? Derive the relation between the modulus of elasticity of a compound bar and equivalent bar.	Co2Po2
Q8	A metallic cube of side 100 cm is subjected to a uniform force acting normal to the whole surface of the cube. The pressure is 106 Pa. If the volume changes by $1.5 \times 10^{-5} \text{ m}^3$, calculate the bulk modulus of the material.	Co2Po3
Q9	Derive the relation $\Delta l = P.L/A.E$	Co2Po2
Q10	Explain the term plasticity and ductility.	Co2Po3
Q11	A steel rod 1 m long and 400 mm^2 in cross-section is subjected to a tensile force of 40 KN. Determine the elongation of the rod, If modulus of elasticity for the rod material is 200 G.Pa	Co2Po2
Q12	Derive the relation between bulk modulus and elastic constants	Co2Po2

Section-C (10 Marks Each, Attempt any 2)

Q13	A steel bar ABCD of varying sections is subjected to the axial forces as shown in figure. Find the value of P necessary for equilibrium? If $E=210 \text{ KN/mm}^2$. Determine the total elongation of the bar. 	Co3Po4
Q14	A rod has a cross-sectional area of 90 mm^2 and a length of 3 m. What is the strain energy if 300MPa of stress is applied to stretching the rod. $E = 200 \text{ G Pa}$.	Co2Po3
Q15	Write short notes on the following... a. Principal Plane and principal stress b. Malleability and Brittleness	Co2Po3
Q16	What do you understand by strain energy? Derive the expression for the strain energy in a body when the load is gradually applied.	Co3Po3