

International Master's Programs in the Graduate School of Engineering, 2025

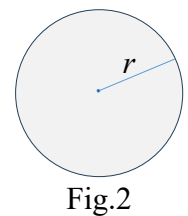
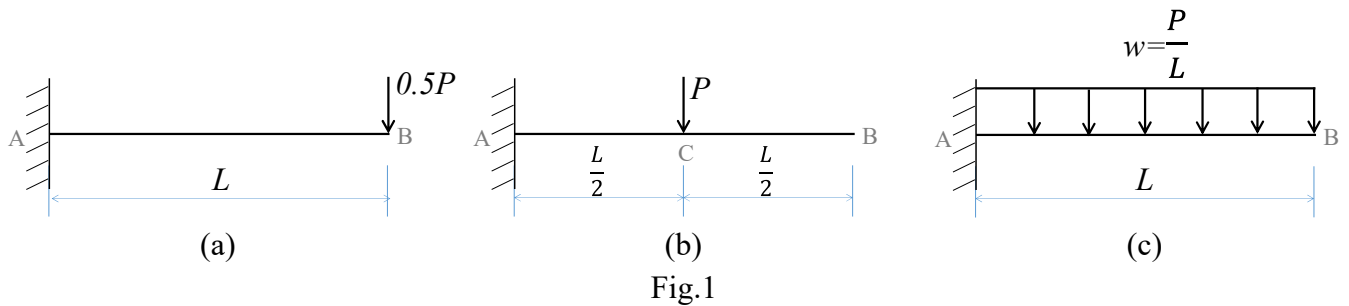
Screening Examination Questions • Answer Sheet

Subject	Structural Mechanics
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Score

【 Q1 】 Solve the following questions (50 points)

(1) Let the deflections at the midpoint of the span of the cantilever beam shown in figures Fig.1(a), (b), and (c) below be δ_a , δ_b , and δ_c , respectively. Express the magnitude relationship between them using equal signs (=) and inequality signs (<, >). The bending rigidity EI is constant. Also, in Fig.1(a), if the beam has a circular cross section as shown in Fig.2, answer the the value of the maximum tensile bending stress σ_{tmax} and at which point it occurs?



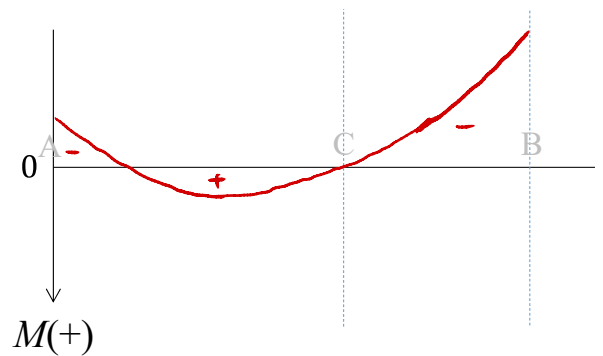
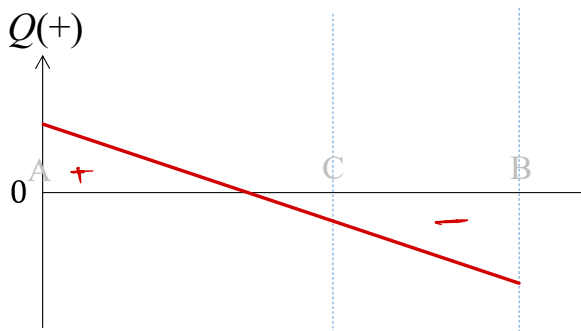
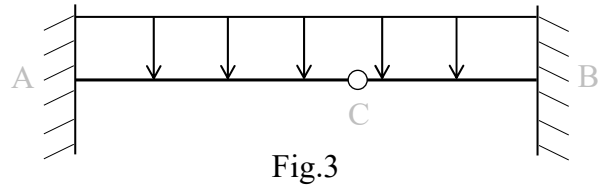
	Magnitude relation	Value of σ_{tmax}	Which point σ_{tmax} occurs
Answer	$\delta_a > \delta_c > \delta_b$	$\frac{2Pl}{\pi r^3}$	Point A

International Master's Programs in the Graduate School of Engineering, 2024

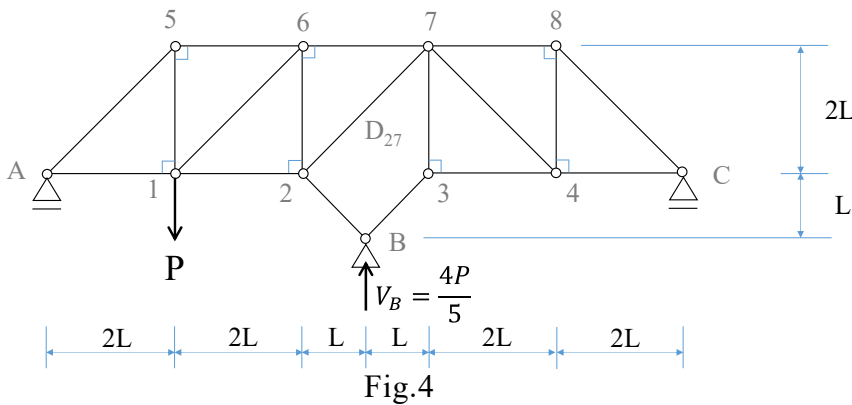
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(2) Draw the shear force (Q) diagram and bending moment (M) diagram for the beam shown in Fig.3. This beam is fixed at both ends and has an intermediate hinge on which a uniformly distributed load acts.



(3) Find the reaction forces V_A , V_C and axial force D_{27} of a diagonal member of the following statically determinate truss structure. The reaction forces at point B are $V_B = (4P)/5$.



	Reaction forces V_A , V_C	Axial force
Answer	$V_A = \frac{2P}{5}, V_C = -\frac{P}{5}$	$D_{27} = \frac{\sqrt{2}P}{5}$