

MARKING SCHEME AND MODEL ANSWERS

Chapter 8: Mechanical Properties of Solids

Maximum Marks: 40 | Suggested time: 60 minutes

Use after attempting the paper. Accept equivalent correct methods.

Suggested mark allocation:

1 mark: Correct fact, formula, unit or direction.

2 marks: Principle/formula (1); explanation, working or result (1).

3 marks: Relation (1); working/reasoning (1); final result and unit (1).

4 marks: Principle (1); setup/equation (1); working (1); result/interpretation (1).

Mark splits are a guide; award partial credit for valid steps.

Q1 - 1 mark

Restoring force per unit area.

Q2 - 1 mark

Pa.

Q3 - 1 mark

$\Delta L/L$.

Q4 - 1 mark

Within proportional limit, stress is proportional to strain.

Q5 - 1 mark

Bulk modulus.

Q6 - 1 mark

Yes.

Q7 - 1 mark

Material is relatively stiff.

Q8 - 1 mark

F/A.

Q9 - 2 marks

5×10^5 Pa.

Q10 - 2 marks

5×10^{-4} .

Q11 - 2 marks

2×10^{11} Pa.

Q12 - 2 marks

0.01.

Q13 - 2 marks

1×10^{-4} m.

Q14 - 2 marks

Steel carries tensile stress effectively; concrete is strong in compression.

Q15 - 3 marks

0.001 m.

Q16 - 3 marks

2×10^{11} Pa.

Q17 - 3 marks

3×10^5 Pa.

Q18 - 3 marks

ΔL proportional to L .

Q19 - 4 marks

Proportional limit ends linearity; elastic limit is the greatest stress for full recovery after unloading.

Q20 - 4 marks

$\Delta L = FL/(AY) = 3.75 \times 10^{-4}$ m.