

JEE MAIN WAVES — SPEED OF A TRAVELLING WAVE (STRING, SOUND) — PYQS

Max. Marks: 24
Questions: 6

Section A (MCQ) — 5 questions

- Q.1** The speed of a longitudinal wave in a metallic bar is 400 m/s. If the density and Young's modulus of the bar material are increased by 0.5% and 1%, respectively then the speed of the wave is changed approximately to _____ m/s.

[JEE Main 2026 (Online) 28th January Evening Shift]

- (1) 398 (2) 402 (3) 401 (4) 399

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- Q.2** Two strings (A, B) having linear densities $\mu_A = 2 \times 10^{-4}$ kg/m and $\mu_B = 4 \times 10^{-4}$ kg/m and lengths $L_A = 2.5$ m and $L_B = 1.5$ m respectively are joined. Free ends of A and B are tied to two rigid supports C and D, respectively creating a tension of 500 N in the wire. Two identical pulses, sent from C and D ends, take time t_1 and t_2 , respectively, to reach the joint. The ratio t_1/t_2 is:

[JEE Main 2026 (Online) 21st January Morning Shift]

- (1) 1.90 (2) 1.18 (3) 1.08 (4) 1.67

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- Q.3** Two strings with circular cross section and made of same material, are stretched to have same amount of tension. A transverse wave is then made to pass through both the strings. The velocity of the wave in the first string having the radius of cross section R is v_1 , and that in the other string having radius of cross section R/2 is v_2 . Then $\frac{v_2}{v_1} =$

[JEE Main 2025 (Online) 8th April Evening Shift]

- (1) 8 (2) 4 (3) 2 (4) $\sqrt{2}$

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- Q.4** Consider the sound wave travelling in ideal gases of He, CH₄, and CO₂. All the gases have the same ratio $\frac{P}{\rho}$, where P is the pressure and ρ is the density. The ratio of the speed of sound through the gases $V_{\text{He}} : V_{\text{CH}_4} : V_{\text{CO}_2}$ is given by

[JEE Main 2025 (Online) 4th April Morning Shift]

- (1) $\sqrt{\frac{7}{5}} : \sqrt{\frac{5}{3}} : \sqrt{\frac{4}{3}}$ (2) $\sqrt{\frac{5}{3}} : \sqrt{\frac{4}{3}} : \sqrt{\frac{4}{3}}$
 (3) $\sqrt{\frac{5}{3}} : \sqrt{\frac{4}{3}} : \sqrt{\frac{7}{5}}$ (4) $\sqrt{\frac{4}{3}} : \sqrt{\frac{5}{3}} : \sqrt{\frac{7}{5}}$

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- Q.5** Given below are two statements : one is labelled as **Assertion A** and the other is labelled as **Reason R**
Assertion (A): A sound wave has higher speed in solids than gases.

Reason (R): Gases have higher value of Bulk modulus than solids.

In the light of the above statements, choose the correct answer from the options given below

[JEE Main 2025 (Online) 28th January Morning Shift]

- (1) Both A and R are true and R is the correct explanation of A
 (2) A is false but R is true
 (3) A is true but R is false
 (4) Both A and R are true but R is NOT the correct explanation of A

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Section B (Numerical) — 1 question

- Q.6** The velocity of sound in air is doubled when the temperature is raised from 0°C to $\alpha^\circ\text{C}$. The value of α is _____.

[JEE Main 2026 (Online) 23rd January Evening Shift]

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ANSWER KEY

Section A (MCQ) — 5 questions

Ques.	1	2	3	4	5					
Ans.	3	2	3	3	3					

Section B (Numerical) — 1 question

Ques.	6						
Ans.	819						