

# PYQSide

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

Max. Marks: 24

Questions: 6

### Section A (MCQ)

- 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

Scan or tap for the  
full solution



- 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, CH<sub>4</sub>, and CO<sub>2</sub>. All the gases have the same ratio  $\frac{P}{\rho}$ , where P is the pressure and  $\rho$  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)

- 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  $\alpha$  is \_\_\_\_\_.

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

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### ANSWER KEY

#### Section A (MCQ)

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

#### Section B (Numerical)

| Ques. | 6   |  |  |  |  |  |  |  |  |
|-------|-----|--|--|--|--|--|--|--|--|
| Ans.  | 819 |  |  |  |  |  |  |  |  |