

## JEE MAIN WAVES — DISPLACEMENT RELATION IN A PROGRESSIVE WAVE — PYQS

**Max. Marks: 20**
**Questions: 5**

### Section A (MCQ) — 4 questions

- Q.1** The equation of a plane progressive wave is given by  $y = 5\cos\pi\left(200t - \frac{x}{150}\right)$  where  $x$  and  $y$  are in cm and  $t$  is in second. The velocity of the wave is \_\_\_\_\_ m/s.

[JEE Main 2026 (Online) 2nd April Morning Shift]

- (1) 120      (2) 150      (3) 200      (4) 300

Scan or tap for the full solution



- Q.2** The equation of a wave travelling on a string is  $y = \sin[20\pi x + 10\pi t]$ , where  $x$  and  $t$  are distance and time in SI units. The minimum distance between two points having the same oscillating speed is :

[JEE Main 2025 (Online) 7th April Evening Shift]

- (1) 10 cm      (2) 2.5 cm      (3) 20 cm      (4) 5.0 cm

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- Q.3** Displacement of a wave is expressed as  $x(t) = 5\cos\left(628t + \frac{\pi}{2}\right)$  m. The wavelength of the wave when its velocity is 300 m/s is : ( $\pi = 3.14$ )

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

- (1) 0.33 m      (2) 0.5 m      (3) 3 m      (4) 5 m

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- Q.4** A sinusoidal wave of wavelength 7.5 cm travels a distance of 1.2 cm along the  $x$ -direction in 0.3 sec. The crest P is at  $x = 0$  at  $t = 0$  sec and maximum displacement of the wave is 2 cm. Which equation correctly represents this wave?

[JEE Main 2025 (Online) 2nd April Evening Shift]

- (1)  $y = 2\cos(0.83x - 3.35t)$  cm  
 (2)  $y = 2\sin(0.83x - 3.5t)$  cm  
 (3)  $y = 2\cos(0.13x - 0.5t)$  cm  
 (4)  $y = 2\cos(3.35x - 0.83t)$  cm

Scan or tap for the full solution



### Section B (Numerical) — 1 question

- Q.5** A transverse wave on a string is described by  $y = 3\sin(36t + 0.018x + \pi/4)$ , where  $x, y$  are in cm and  $t$  in seconds. The least distance between the two successive crests in the wave is \_\_\_\_\_ cm. (Nearest integer) ( $\pi = 3.14$ )

[JEE Main 2026 (Online) 5th April Morning Shift]

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### ANSWER KEY

#### Section A (MCQ) — 4 questions

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

#### Section B (Numerical) — 1 question

| Ques. | 5   |  |  |  |  |  |  |
|-------|-----|--|--|--|--|--|--|
| Ans.  | 349 |  |  |  |  |  |  |