

Class – XI

Chapter - Vector

St. Lawrence High School A Jesuit Christian Minority Institution <u>Term : 1st</u> Solution of Work Sheet – 10 Subject – Physics



Date - 25.06.20

Topic –Vector Resolution & Relative velocity

Choose the correct option for the following questions.

- 1. The component of a nonzero vector at a perpendicular direction is
 - a. Equal to the magnitude of the vector
 - b. Equal to $\frac{1}{2}$ the magnitude of the vector
 - c. Zero
 - d. None of these

Ans: c. Zero

- 2. A vector of magnitude 16 units makes an angle of 120^{0} with the positive X axis. What is the component of the vector along positive X axis?
 - a. $8\sqrt{3}$ unit
 - b. 8 Unit.
 - c. $-8\sqrt{3}$ unit
 - d. -8 unit
 - <mark>Ans: d. –8 unit</mark>
- 3. In the above problem, the component of the vector along +ve Y axis is
 - a. $8\sqrt{3}$ unit
 - b. 8 Unit.
 - c. $-8\sqrt{3}$ unit
 - d. -8 unit

<mark>Ans: a. 8√3 unit</mark>

- 4. The velocities of two bodies A and B are given as $\overline{v_a} = 2\hat{\imath} \hat{\jmath}$ m/s and $\overline{v_b} = 23 + 3\hat{\jmath}$ m/s respectively. what is the velocity of B relative to A?
 - a. $-\hat{\iota} 4\hat{j}$ m/s
 - b. $\hat{\iota} + 4\hat{j}$ m/s
 - c. $5\hat{\imath} + 2\hat{\jmath}$ m/s
 - d. None of these
 - <mark>Ans: b. î + 4ĵ m/s</mark>
- 5. In the above case, what is the component of the relative velocity of B w.r.t A, along -ve Y axis ?
 - a. -4 m/s
 - b. 4 m/s
 - c. $\sqrt{17}$ m/s
 - d. None of these

<mark>Ans: a. –4 m/s</mark>

 $1 \times 15 = 15$

- 6. In question no. 4, what is the direction of the velocity of B as appear to A?
 - a. $\sqrt{17}$ $\hat{\iota}+4\hat{j}$ b. $\frac{1}{\sqrt{17}}$

 - c. $\frac{5\hat{\imath}+2\hat{\jmath}}{\sqrt{17}}$
 - d. None of these
 - Ans: b. $\frac{\hat{\iota}+4\hat{j}}{\sqrt{17}}$

7. A man wants to run with a speed of 10km/h while it's raining and the rain drops are vertically downward with speed of $10\sqrt{3}$ km/h. At what angle the man should hold his umbrella w.r.t the horizontal?

- a. 30°
- b. 37°
- c. 45°
- d. 60°

Ans: d. 60°

- 8. In the above problem, what is the speed of the rain drops as appears to the person?
 - a. $10\sqrt{3}$ km/h
 - b. $20\sqrt{3}$ km/h
 - c. 20 km/h
 - d. $10(\sqrt{3}-1)$ km/h Ans: c. 20 km/h
- 9. When a car moves with a speed v_c rain drops appear to the driver to fall inclined making an angle less than 45° with the horizontal road. If the speed of the rain drops is v_r , then –
 - a. $v_r = v_c$
 - b. $v_r > v_c$
 - c. $v_r < v_c$
 - d. Cannot be predicted

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Ans: c. v_r < v_c
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- 10. To a moving car, the rain drops appear to fall inclined making an angle 30° with the horizontal road. If the speed of the car is 60km/h, what is the speed of the rain drops?
 - a. $60\sqrt{3}$ km/h
 - b. 60 km/h
 - c. $20\sqrt{3}$ km/h
 - d. 20km/h

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Ans: c. 20√3 km/h
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- 11. To a person moving with a speed of 15km/h, rain drops appear to fall vertically downward. If the actual speed of rain drops is 30km/h, then what angle the raindrops make with the vertically upward direction?
 - a. $90^{\circ} \tan^{-1}(2)$
 - b. 1120°
 - c. 60°
 - d. 30°

Ans: d. 30°

12. In the above case what is the magnitude of velocity of raindrops as appeared to the man?

- a. $15\sqrt{3}$ km/h
- b. 33.5 km/h
- c. 15km/h
- d. None of these Ans: a. 15√3 km/h

- 13. The velocity of a particle is given as $\vec{V} = 3\hat{\imath} 4\hat{\jmath}$ m/s. what is the displacement of the of the particle along +ve x-axis in 20sec?
 - a. 60m
 - b. 80m
 - c. 80m
 - d. 100m

<mark>Ans: a. 60m</mark>

- 14. A bird is flying horizontally with speed 5km/s at a height of 500m above the ground. At the same time another bird is flying vertically upward from ground with a speed of $\sqrt{11}$ km/h. what will be the speed of the 2nd bird as seen by the 1st bird?
 - a. 6 km/h
 - b. $5\sqrt{11}$ km/h
 - c. $(5 \sqrt{11}) \text{ km/h}$
 - d. $(5 + \sqrt{11})$ km/h Ans: a. 6 km/h
- 15. As shown in the figure a solid ball of mass 6kg is hung by two mass less inextensible string. What is the tension T in the string as indicated in the figure? $(g = 10m/s^2)$
 - a. $3\sqrt{3}$ N
 - b. $4\sqrt{3}$ N
 - c. $30\sqrt{3}$ N
 - d. $40\sqrt{3}$ N

<mark>Ans: d. 40√3 N</mark>



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