

1. The number of significant figures in 15.0 is

- ☐ A 1
- ☐ B 2
- ☐ C 3
- ☐ D 4
- ☐ E 5

2. The average speed of a moving object during a given interval of time is always:

- ☐ A the magnitude of its average velocity over the interval
- ☐ B the distance covered during the time interval divided by the time interval
- ☐ C one-half its speed at the end of the interval
- ☐ D its acceleration multiplied by the time interval
- ☐ E one-half its acceleration multiplied by the time interval.

3. Special Question: Two automobiles are 150 kilometers apart and traveling toward each other. One automobile is moving at 60km/h and the other is moving at 40km/h mph. In how many hours will they meet?

- ☐ A 2.5
- ☐ B 2.0
- ☐ C 1.75
- ☐ D 1.5
- ☐ E 1.25

4. A car starts from Hither, goes 50 km in a straight line to Yon, immediately turns around, and returns to Hither. The time for this round trip is 2 hours. The magnitude of the average velocity of the car for this round trip is:

- ☐ A 0
- ☐ B 50 km/hr
- ☐ C 100 km/hr
- ☐ D 200 km/hr
- ☐ E cannot be calculated without knowing the acceleration

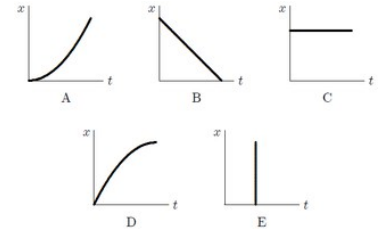
5. A car starts from Hither, goes 50 km in a straight line to Yon, immediately turns around, and returns to Hither. The time for this round trip is 2 hours. The average speed of the car for this round trip is:

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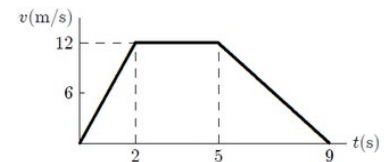
6. Which of the following five coordinate versus time graphs represents the motion of an object moving with a constant nonzero speed?

- ☐ A A
- ☐ B B
- ☐ C C
- ☐ D D
- ☐ E E



7. The graph represents the straight line motion of a car. How far does the car travel between  $t = 2$  s and  $t = 5$  s?

- ☐ A 4 m
- ☐ B 12 m
- ☐ C 24 m
- ☐ D 36 m
- ☐ E 60 m



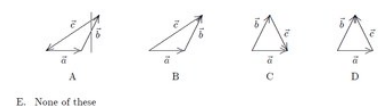
8. The graph represents the straight line motion of a car. How far does the car travel between  $t = 2$  s and  $t = 9$  s?

- ☐ A 4 m
- ☐ B 24 m
- ☐ C 36 m
- ☐ D 12 m
- ☐ E 60 m



9. The vectors  $\vec{a}$ ,  $\vec{b}$ , and  $\vec{c}$  are related by  $\vec{c} = \vec{b} + \vec{a}$ . Which diagram below illustrates this relationship?

- ☐ A A
- ☐ B B
- ☐ C C
- ☐ D D
- ☐ E E



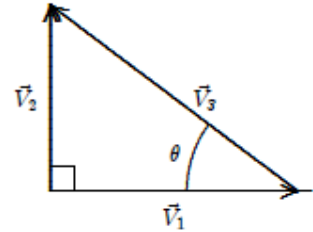
10. The vector " $-\vec{A}$ " is

- ☐ A greater than A in magnitude

- ☐ B less than A in magnitude
- ☐ C in the same direction as A
- ☐ D in the direction opposite to A
- ☐ E perpendicular to A

11. The vector  $V_2$  in the diagram is equal to:

- ☐ A  $V_1 - V_3$
- ☐ B  $V_1 + V_3$
- ☐ C  $V_3 - V_1$
- ☐ D  $V_1 \cos \theta$
- ☐ E  $V_1 / (\cos \theta)$



12. What does the slope of a position graph represent?

- ☐ A Distance
- ☐ B Displacement
- ☐ C Speed
- ☐ D Velocity
- ☐ E Acceleration

13. What does the area under the curve of a velocity graph represent?

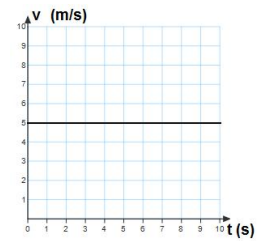
- ☐ A Distance
- ☐ B Displacement
- ☐ C Speed
- ☐ D Velocity
- ☐ E Acceleration

14. A car travels 90 km/hr. How long does it take for it to travel 400 km?

- ☐ A 4.4 hours
- ☐ B 0.225 hours
- ☐ C 310 hours
- ☐ D 10.3 hours
- ☐ E 1.4 hours

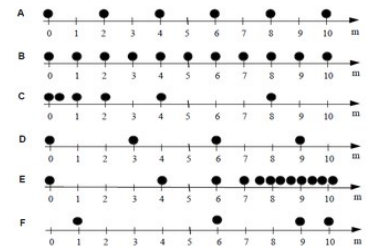
15. According to the velocity vs. time graph, which of the following statements is true?

- (A) the object speeds up
- (B) the object slows down
- (C) the object moves with a constant velocity
- (D) the object stays at rest
- (E) the object must be falling to the ground



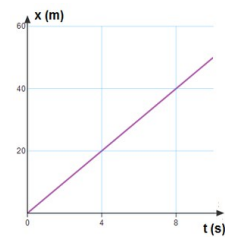
16. Consider these motion diagrams. All balls are moving to the RIGHT. Which of the 6 balls has the greatest displacement over the FIRST 3 SECONDS (From time  $t=0$  to  $t=3$ )? If there is a tie among several, select all that apply.

- (A) A
- (B) B
- (C) C
- (D) D
- (E) E
- (F) F



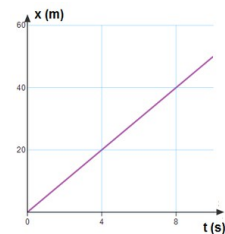
17. Provided the position vs. time graph, which of the following is true?

- (A) the object increases its velocity
- (B) the object decreases its velocity
- (C) the object's velocity stays unchanged
- (D) the object is at rest
- (E) more information is required



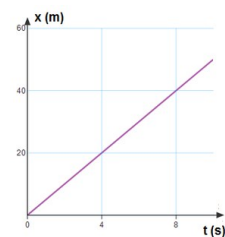
18. What is the velocity of the object at  $t = 4$  seconds?

- (A) 4 m/s
- (B) 20 m/s
- (C) 8 m/s
- (D) 40 m/s
- (E) 5 m/s



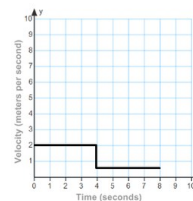
19. What is the velocity of the object at  $t = 0.1221354$  seconds?

- (A) 4 m/s
- (B) 20 m/s
- (C) 8 m/s
- (D) 40 m/s
- (E) 5 m/s



20. What is the displacement from  $t = 0$ s to  $t = 8$ s

- (A) 8 m
- (B) 2 m
- (C) 6 m
- (D) 10 m
- (E) 14 m



21. In a laboratory experiment, the amount of significant figures recorded for a measurement should be based on

- (A) Having at least 3 significant figures
- (B) Knowing what the exact value should be
- (C) The precision of the instrument making the measurement
- (D) Lying

22. With the data provided, what type of relationship exists?

- (A) linear
- (B) power
- (C) inverse
- (D) constant
- (E) root

Variable 1 (a)	Variable 2 (b)
1.0	177.4
1.5	118.4
2.0	88.2
2.5	70.6
3.0	59.2
3.5	50.8
4.0	43.6
4.5	39.8
5.0	35.0

23. With the data provided, what is the proportionality?

- (A)  $b \propto a$
- (B)  $a \propto \sqrt{b}$
- (C)  $a^2 \propto b$
- (D)  $b \propto a^{-1}$
- (E)  $a \propto b^{-2}$

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4.5	39.8
5.0	35.0

24. Which equation best depicts the relationship between the variables?

- (A)  $b = 177.67 a^{-1} - 0.273$
- (B)  $b = 177.67 a^2 - 0.273$
- (C)  $b = -30.5 a^{-1} + 167.3$
- (D)  $b = -30.5 a^2 + 167.3$
- (E)  $b = 54.4 a^{-1} + 27.6$

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