



PHYS 110 1<sup>st</sup> EXAM

11/4/1430H

Time: 90 min.

Student Name: **Morouj Q**

Student Number:

Section:

- Q.1**  $10^4$  milliseconds is equal to:  
(A)  $10^3$  s (B)  $10^2$  s (C) 1 s (D) 10 s (E)  $10^{-1}$  s
- Q.2** A cubic box with an edge of exactly 3 cm has a volume of: (volume = edge<sup>3</sup>)  
(A)  $10^{-6}$  m<sup>3</sup> (B)  $8 \times 10^{-6}$  m<sup>3</sup> (C)  $2.7 \times 10^{-5}$  m<sup>3</sup> (D)  $6.4 \times 10^{-5}$  m<sup>3</sup> (E)  $4 \times 10^{-6}$  m<sup>3</sup>
- Q.3** The speed  $v$  in m/s of a car is given by  $v = bt^3$  where the time  $t$  is in seconds. The unit of  $b$  is:  
(A) m/s<sup>4</sup> (B) ms (C) m/s (D) m/s<sup>3</sup> (E) m/s<sup>2</sup>
- Q.4** The instantaneous acceleration  $\bar{a}$  is given as:  
(A)  $\frac{dx}{dt}$  (B)  $\frac{d}{dt} \left( \frac{d^2x}{dt^2} \right)$  (C)  $\frac{d^2}{dt^2} \left( \frac{dx}{dt} \right)$  (D)  $\frac{d^2}{dt^2} \left( \frac{dv}{dt} \right)$  (E)  $\frac{d}{dt} \left( \frac{dx}{dt} \right)$
- Q.5** A particle is moving along the negative x-axis with constant velocity. The magnitude of its acceleration is:  
(A)  $-9.8$  m/s<sup>2</sup> (B) zero (C) constant (D)  $9.8$  m/s<sup>2</sup> (E)  $980$  cm/s<sup>2</sup>
- Q.6** A car moves along a straight line with velocity in m/s given by  $v = t^2 + 3$ . The velocity at  $t=0$  is:  
(A) zero (B) 4 m/s (C) 3 m/s (D) 2 m/s (E) 6 m/s
- Q.7** Referring to question 6, the acceleration of the car at  $t = 4$  s is:  
(A)  $6$  m/s<sup>2</sup> (B)  $8$  m/s<sup>2</sup> (C)  $10$  m/s<sup>2</sup> (D)  $12$  m/s<sup>2</sup> (E)  $4$  m/s<sup>2</sup>
- Q.8** The position of an object is given by  $x = 4t + 2t^2$ . Its average velocity over the time interval from  $t = 0$  to  $t = 4$  s is:  
(A) 8 m/s (B) 10 m/s (C) 12 m/s (D) 14 m/s (E) 16 m/s
- Q.9** A particle is moving along a straight line. At  $t=3$  s its velocity is 20 m/s and at  $t=8$  s its velocity is zero. The average acceleration is:  
(A)  $-6$  m/s<sup>2</sup> (B)  $-2$  m/s<sup>2</sup> (C)  $-3$  m/s<sup>2</sup> (D)  $-4$  m/s<sup>2</sup> (E)  $-5$  m/s<sup>2</sup>
- Q.10** A car travels in a straight line with an initial velocity of 4 m/s and an acceleration of  $2$  m/s<sup>2</sup>. The distance traveled in 4 s is:  
(A) 36 m (B) 40 m (C) 24 m (D) 28 m (E) 32 m
- Q.11** A car, initially at rest, travels 32 m in 4 s along a straight line with constant acceleration. The acceleration of the car is:  
(A)  $4$  m/s<sup>2</sup> (B)  $5$  m/s<sup>2</sup> (C)  $6$  m/s<sup>2</sup> (D)  $2$  m/s<sup>2</sup> (E)  $3$  m/s<sup>2</sup>
- Q.12** What is the initial speed of a car moving a distance of 60 m in 6 s if the final speed was 15 m/s?  
(A) 15 m/s (B) 10 m/s (C) 5 m/s (D) zero (E) 20 m/s
- Q.13** A baseball is thrown vertically up into the air. The acceleration of the ball at its highest point is:  
(A)  $-19.6$  m/s<sup>2</sup> (B)  $19.6$  m/s<sup>2</sup> (C)  $+9.8$  m/s<sup>2</sup> (D)  $-9.8$  m/s<sup>2</sup> (E) zero
- Q.14** An object is thrown straight up from ground level with a speed of 30 m/s. Its height after 1.0 s is:  
(A) 15.1 m (B) 5.1 m (C) 45.1 m (D) 35.1 m (E) 25.1 m
- Q.15** Referring to question 14, the maximum height is:  
(A) 10.2 m (B) 127.6 m (C) 81.6 m (D) 45.9 m (E) 20.4 m
- Q.16** A stone dropped off a 75 m high building reaches the ground in:  
(A) 3.91 s (B) 2.86 s (C) 1.35 s (D) 5.53 s (E) 4.95 s

Q.17 Referring to question 16, the speed of the stone just before reaching the ground is: **Morouj Q**

- (A) 54.2 m/s      (B) 48.5 m/s      (C) 38.3 m/s      (D) 28 m/s      (E) zero

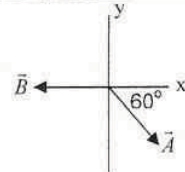
Q.18 A vector  $\vec{A}$  has x-component of 10 m and y-component of 15 m. The magnitude of this vector is:

- (A) 14.14 m      (B) 18 m      (C) 22.36 m      (D) 35.12 m      (E) 11.18 m

Q.19 A vector has a magnitude of 14 units makes an angle of  $30^\circ$  with the x axis. Its y component is:

- (A) 8 units      (B) 9 units      (C) 5 units      (D) 6 units      (E) 7 units

Q.20 As shown in the figure, if the magnitudes of  $\vec{A}$  and  $\vec{B}$  are 10 units and 15 units respectively then the x-component of the resultant of  $\vec{A}$  and  $\vec{B}$  is:



- (A) -10 units      (B) -15 units      (C) -20 units      (D) zero      (E) -5 units

Q.21 The scalar product  $\hat{i} \cdot \hat{j}$  is equal to:

- (A)  $\hat{k}$       (B)  $2\hat{i}$       (C)  $2\hat{j}$       (D) zero      (E)  $\hat{i}\hat{j}$

Q.22 If  $\vec{A} = 4\hat{i} - 6\hat{j}$  then the vector  $\frac{1}{2}\vec{A}$  is:

- (A)  $2\hat{i} - \hat{j}$       (B)  $2\hat{i} - 5\hat{j}$       (C)  $2\hat{i} - 4\hat{j}$       (D)  $2\hat{i} - 3\hat{j}$       (E)  $2\hat{i} - 2\hat{j}$

Q.23 Two vectors are given as  $\vec{A} = 2\hat{i} - 2\hat{j} + 4\hat{k}$  and  $\vec{B} = -\hat{i} + \hat{j} + 4\hat{k}$ . The result of  $\vec{A} - \vec{B}$  is:

- (A)  $5\hat{i} - 3\hat{j}$       (B)  $4\hat{i} - 3\hat{j}$       (C)  $3\hat{i} - 3\hat{j}$       (D)  $2\hat{i} - 3\hat{j}$       (E)  $\hat{i} - 3\hat{j}$

Q.24 If the magnitude of a vector is 18m and its x-component of 10m. The angle it makes with the positive x-axis is:

- (A)  $48.2^\circ$       (B)  $63.4^\circ$       (C)  $66.4^\circ$       (D)  $60^\circ$       (E)  $56.25^\circ$

Q.25 If the magnitude of two vectors are 10 units and 20 units and the angle between them is  $60^\circ$  then their scalar product is:

- (A) 100      (B) 125      (C) zero      (D) 25      (E) 75

Q.26 Two vectors are given as  $\vec{A} = 5\hat{j} + 4\hat{k}$  and  $\vec{B} = -\hat{i} + \hat{j}$ , their scalar product  $\vec{A} \cdot \vec{B}$  is:

- (A) 4      (B) 5      (C) 6      (D) 7      (E) 3

Q.27 The vector product  $\hat{j} \times \hat{i}$  is equal to:

- (A)  $\hat{j}$       (B)  $-\hat{i}$       (C)  $\hat{k}$       (D) 1      (E)  $-\hat{k}$

Q.28 The value of  $\hat{i} \cdot (\hat{k} \times \hat{j})$  is:

- (A)  $\hat{j}$       (B) zero      (C)  $\hat{k}$       (D) -1      (E) 1

Q.29 Two vectors  $\vec{A} = 8\hat{i} + 6\hat{j}$  and  $\vec{B} = -6\hat{i}$ , their vector product  $\vec{A} \times \vec{B}$  is:

- (A)  $48\hat{k}$       (B)  $30\hat{k}$       (C)  $36\hat{k}$       (D)  $42\hat{k}$       (E)  $48\hat{k}$

Q.30 If the angle between  $\vec{A}$  and  $\vec{B}$  is  $30^\circ$ , and  $A = 5$  units,  $B = 10$  units, then the magnitude of the vector product  $\vec{A} \times \vec{B}$  is:

- (A) 25      (B) 20      (C) 15      (D) 30      (E) 35