KING ABDULAZIZ UNIVERSITY
FACULTY OF SCIENCE
Physics department
1st Semester
First Exam

A

Physics 110 **27/11/1432H** **Time: 2Hours**

Name:	**Number:**	**Section:**

Choose the correct answer:

1. $(5\times10^{4})\times(5\times10^{6})=$

A) 2.5×10^{10} **B)** 2.5×10^{11} **C)** 2.5×10^{6} **D)** 2.5×10^{8}

2. 3 days =

A) 30240 s **B)** 1814400 s **C)** 259200 s **D)** 2419200 s

3. 7.87 g/cm^3 =

A) 7870 kg/m^3 **B)** 0.00787 kg/m^3 **C)** 7.87×10^{6} kg/m^3 **D)** 7.87×10^{-6} kg/m^3

4. The conversion factor ($\frac{10^{6}\,\mathrm{mm}}{1\,\mathrm{km}}$) is used to convert .....to mm

A) 1 m **B)** 1 mm **C)** 1 km **D)** 1 mi

5. 500 kg =

A) 5×10^{3} g **B)** 5×10^{4} g **C)** 5×10^{5} g **D)** 5×10^{6} g

6. 2.71 gigawatts =

A) 2.71×10^{9} Watts **B)** 2.71×10^{6} Watts **C)** 271×10^{9} Watts **D)** 271×10^{6} Watts

7. The position of a body moving along the $x-$axis is given by $x = 3t - 4t^2 + t^3$, where x in meters and t in seconds. Its **displacment** in the time interval $t = 0$ to $t = 4$ s is

A) $\Delta x = 140$ m **B)** $\Delta x = 12$ m **C)** $\Delta x = 52$ m **D)** $\Delta x = 40$ m

8. The **position** of an object is given by $x = t - 2t^2$, where x in meters and t in seconds. At $t = 10$ s, it is

A) -190 m **B)** -100 m **C)** -10 m **D)** -90 m

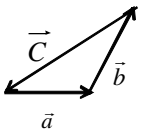
9. A car travelled 50 km in 0.75 h, then travelled 100 km in 1.2 h. The **average speed** is

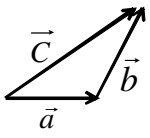
A) 77 km/h **B)** 333 km/h **C)** 111 km/h **D)** 26 km/h

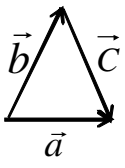
10. A car changed position from $x = 25$ m to $x = 150$ m in the time interval from 3 s to 8 s, the **average velocity** of the car is

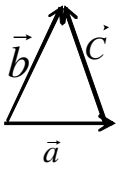
A) 25 m/s **B)** 11.4 m/s **C)** 35 m/s **D)** 16 m/s

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

A) 

B) 

C) 

D) 

12. A particle is moving along $x-$axis according to the equation $x = 12t - 2t^2$, where x in meters and t in seconds. Its **velocity** and **acceleration** at t =3 s, respectively (على التوالي), are

A) $v = 0$, a = -4 m/s^2
B) $v = 18$ m/s, a = 0
C) $v = 24$ m/s, a = 8 m/s^2
D) $v = -24$ m/s, a = 4 m/s^2

13. The position of a particale is given by $x(t) = 20t - 5t^3$, where x in meters and t in seconds, its velocity is zero at ***t* =**

A) 1.2 s **B)** 0.87 s **C)** 1.4 s **D)** 0.7 s

14. A particle has a constant acceleration (-1.25×10^{14} m/s^2) enters a region with a speed of 5×10^6 m/s. **How far does the particle take to stop**

A) 0.1 m **B)** -0.1 m **C)** 1 m **D)** -1 m

15. An electron has a constant acceleration +3.2 m/s^2 at a certain instant, its velocity is +9.6 m/s. What is **the velocity** at t =2.5s

A) 17.6 m/s **B)** 8 m/s **C)** 27.2 m/s **D)** 0.8 m/s

16. The **velocity** of a stone falling from a height of 100 m just before hitting the ground is

A) -1960 m/s **B)** -980 m/s **C)** -31.3 m/s **D)** -44.3 m/s

17. A ball dropped from a building, its **velocity and position** after 3 s are

A) v=-29 m/s, y = -44 m
B) v=-44 m/s, y = -29 m
C) v=0, y = 0
D) v=0, y = -44 m

18. A baseball is thrown vertically into the air. The **acceleration** of the ball at its highest point is

A) a=zero **B)** $a>9.8$ m/s^2 **C)** a=9.8 m/s^2 **D)** a=-9.8 m/s^2

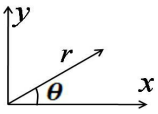
19. If $\vec{R}\times\vec{S}=\vec{C}$, then the direction of $\vec{C}$ is

A) perpendicular to both $\vec{R}$ and $\vec{S}$
B) perpendicular to $\vec{R}$
C) perpendicular to $\vec{S}$
D) in the same direction of $\vec{R}$ and $\vec{S}$

20. The magnitudes of displacment $\vec{a}$ and $\vec{b}$ are 8 m and 15 m, respectively (على التوالي). **The maximum possible magnitude** for $\vec{c}$ according to the equation $\vec{c}=\vec{a}+\vec{b}$ is

A) 7 m **B)** 23 m **C)** 15 m **D)** 8m

21. A displacment vector $\vec{r}$ in xy plane is 15 m long and directed at angle $\theta = 30^0$ as in the figure, **the** $x-$**component** and $y-$**component** of the vector $\vec{r}$ is



A) $r_x = 13$ m, $r_y = 7.5$ m

B) $r_x = 7.5$ m, $r_y = 13$ m

C) $r_x = 0.9$ m, $r_y = 0.5$ m

D) $r_x = 0.5$ m, $r_y = 0.9$ m

22. For the vectors $\vec{a} = 6\ \hat{i} + 5\ \hat{j}$ and $\vec{b} = -3\ \hat{i} - \hat{j}$. **The magnitude** of $|\vec{a} + \vec{b}|$ is

A) 7.8 m **B)** 5 m **C)** 2.2 m **D)** 10.8 m

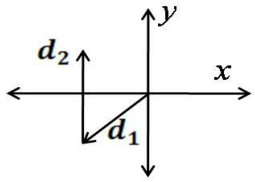
23. The $x-$component of $\vec{A}$ is 81 m and the $y-$component of $\vec{A}$ is 200 m, then **the angle** θ between the direction of $\vec{A}$ and the positive direction of x is

A) $\tan^{-1}(\frac{200}{81})$ **B)** $\tan^{-1}(\frac{-200}{81})$ **C)** $\tan^{-1}(\frac{81}{200})$ **D)** $\tan^{-1}(\frac{-81}{200})$

24. The **speed** of a particle moves with an instantaneous velocity v **=-**25 m/s is:

A) S = 5 m/s **B)** S = -25 m/s **C)** S = 25 m/s **D)** S =-5 m/s

25. In the figure, what are **the signs of** x **and** $y-$**components** of the sum $\vec{d_1} + \vec{d_2}$, respectively



A) (+, -) **B)** (+ , +) **C)** (- , +) **D)** (- , -)

26. If $\vec{a} = 3\ \hat{i} + 3\ \hat{j} - 2\ \hat{k}$ and $\vec{b} = -\ \hat{i} - 4\ \hat{j} + 2\ \hat{k}$, then $3\vec{a} \cdot \vec{b} =$

A) -57 **B)** -19 **C)** 12 **D)** -21

27. Vectors $\vec{C}$ and $\vec{D}$ have magnitude of 5 units and 3.6 units, respectively (على التوالي). **What is the angle** between the direction of $\vec{C}$ and $\vec{D}$ if $\vec{C}\cdot\vec{D}$ equals to -6 units

A) 109.5^0 **B)** -19.4^0 **C)** -18.4^0 **D)** 95^0

28. If $\vec{A}$ = 18 unit, $\vec{B}$ =12 unit and ϕ=90^0. If $\vec{C}$= $\vec{A}\times\vec{B}$, then **the magnitude** of a vector $\vec{C}$ is

A) 216 **B)** 0 **C)** 187.1 **D)** 108

29. The value of $\hat{i}\cdot(\hat{k}\times\hat{i})$ =

A) Zero **B)** 1 **C)** $\hat{i}\cdot\hat{i}$ **D)** $\hat{i}\cdot\hat{k}$

30. The **right-hand rule** (قاعدة اليد اليمنى) is used to find

A) The cross product of two vectors
B) The direction of third vector produced from cross product
C) The magnitude of third vector produced from cross product
D) The angle between the vectors in the cross product

31. A particle moves in the positive $x-$direction with increasing speed

A) its velocity is +ve and acceleration is -ve
B) its velocity is -ve and acceleration is +ve
C) its velocity and acceleration are both +ve
D) its velocity is +ve and acceleration is zero

32. In which situation of the following the velocity is in negative $x-$direction

A) x = -2 t^2-2 **B)** x = 3 t^3-5 **C)** x = -2 t^{-2}+1 **D)** x = -5+5 t

33. Let $\vec{C}=\vec{A}\times\vec{B}$ and ϕ is the angle between $\vec{A}$ and $\vec{B}$, which of the following is **true**?

A) The angle between $\vec{C}$ and $\vec{A}$ = 0^0
B) The magnitude of $\vec{C}=AB\cos\phi$
C) $\vec{A}\times\vec{B}=-\vec{B}\times\vec{A}$
D) $-\vec{C}=\vec{A}$

Answer Key

1. B
2. C
3. A
4. C
5. C
6. A
7. B
8. A
9. A
10. A
11. C
12. A
13. A
14. A
15. A
16. D
17. A
18. D
19. A
20. B
21. A
22. B
23. A
24. C
25. C
26. A
27. A
28. A
29. A
30. B
31. C
32. A
33. C