University # ____________________name____________________

King Saud University
College of Science
Department of Physics and Astronomy

15

2^{nd} term 1435-1436	Physics 103	First mid term
Monday 10 /6/ 1436 H	30^{th} March 2015	7:00 – 8:30 PM

Submit only this first page to the Examiner/ Invigilator

Name	
University number	
Section/ Dr Name	

Write your answers for each question in CAPITAL LETTERS in the table given

Q. 1	Q. 2	Q. 3	Q. 4	Q. 5
c	a	b	d	d
Q. 6	Q. 7	Q. 8	Q. 9	Q. 10
A, e	e	b	e	d
Q. 11	Q. 12	Q. 13	Q. 14	Q. 15
c	b	b	e	e

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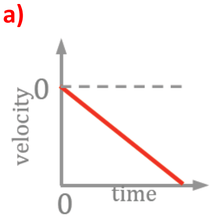
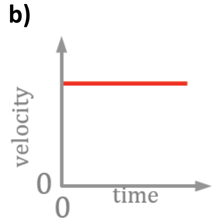
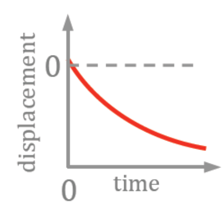
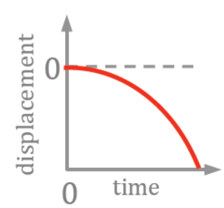
Take g = 9.8 ms^{-2} where ever needed

1	The dimension of $\frac{1}{2}\rho v^2$ (Where ρ is the density and v is the speed) is **a)** $M^{-1}L^5T^2$ **b)** $M\,L\,T^2$ **c)** $M\,L^{-1}T^{-2}$ **d)** $M\,L^2\,T^{-2}$ **e)** $M^{-1}\,L^3\,T^{-2}$
2	A jet plane lands with a speed of 100 m/s and it comes to rest with constant de-acceleration -5.00 m/s^2. From the instant the plane touches the runway, the time interval needed before it can come to rest is **a)** 20 s **b)** 8 s **c)** 22 s **d)** 10 s **e)**none of the above
3	A basketball player jumps straight up, and spends 0.8 s in the air before coming back down to the ground. The total vertical distance travelled by the player is **a)** 3.2 m **b)** 1.6 m **c)** 6.4 m **d)** 4.5 m **e)** 2 m
4	A ball is thrown straight up in the air. At the highest point, the ball's **a)** velocity and acceleration are zero **b)**velocity is non-zero but its acceleration is zero **c)** velocity and acceleration are both nonzero **d)** acceleration is nonzero, but its velocity is zero **e)** none of the above
5	A rock is dropped from rest from the top of a very high rise building. Approximately how far does the rock travel in the first 7 seconds of its free-fall? **a)** 350 m **b)** 123 m **c)** 176 m **d)** 240 m **e)** 480 m
6	A mass is dropped from a height h above the ground, and freely falls under the influence of gravity. Which of the following graphs is correct? Consider the "up" direction to be positive. **a)**  **b)**  **c)**  **d)**  **e)** 
7	A hiker begins a trip by first walking 3.0 km to the west then walks 4.0 km in north direction, what is the magnitude and direction of his resultant displacement? **a)** 5 Km , 53.2° from the north to the west **b)** 7 Km , 53.2° from the east to the north **c)**25 Km, 63.8° from the east to the north **d)**7 Km,36.8° from the east to the north **e)** 5 Km , 53.1° from west to north
8.	The magnitude of the sum of two vectors **A** and **B** is maximum, **a)** when angle between vectors **A** and **B** is 45° **b** when vectors **A** and **B** are in the same direction **c)** when vectors **A** and **B** are in opposite direction **d)** Vectors **A** and **B** are perpendicular **e)** None of these
9	Example of two dimension motion is : **a)** A car moving on a straight high way **b)** An athlete running on a 100 m long straight runway **c)** Under no air resistance, a ball dropped from the top of building.

	d) A particle moving in a straight line on a frictionless horizontal surface. **e)** A bag dropped from an aircraft flying horizontally
10	The position of a particle is given by: $\mathbf{r} = 3t\mathbf{i} + 2t^2\mathbf{j}$ where t is in seconds and r is in meters. The magnitude of v(t) at t=7 sec is: **a)** 15.2 ms^{-1} **b)** 20. 22 ms^{-1} **c)** 16.22 ms^{-1} **d)** 28.16 ms^{-1} **e)** 12.37 ms^{-1}
11	A particle thrown upward moves in its parabolic path. At what point along its path are the velocity and acceleration vectors for the particle perpendicular to each other. **a)** The launching point **b)** the landing point **c)** the highest point **d)** depends on angle of projection **e)** no where
12	A projectile projected with velocity 30m/s so that the horizontal range is 60 m. (Take g =10 m/s^2). The angle of projection is: **a)** 15° **b)** 21° **c)** 32° **d)** 39° **e)** 45°
13	A football player kicks a ball at an angle of 30° with an initial speed of 60 m/s. Assume that the ball travels in a vertical plane, the time at which the ball reaches the highest point is: **a)** 2.7 s **b)** 3.1 s **c)** 3.6 s **d)** 4.0 s **e)** 2.0 s
14	The example, where the velocity is changing while the speed remains constant is **a)** uniform motion in straight line **b)** it is impossible **c)** Motion of object under free fall **d)** projectile motion **e)** uniform circular motion
15	A particle moves in a circular path of radius r with speed v. it then increases its speed to 3v while travelling along the same circular path. The centripetal acceleration of the particle has changed by a factor of **a)** 0.25 **b)** 0.5 **c)** 2 **d)** 4 **e)** 9

The end