**King Saud University**

**College of Science**

**Department of Physics and Astronomy**

**15**

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

***Submit only this first page to the Examiner/ Invigilator***

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| **Name** |  |
| **University number**  |  |
| **Section/ Dr Name** |  |

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

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| --- | --- | --- | --- | --- |
| **Q. 1** | **Q. 2** | **Q. 3** | **Q. 4** | **Q. 5** |
|  |  |  |  |  |
| **Q. 6** | **Q. 7** | **Q. 8** | **Q. 9** | **Q. 10** |
|  |  |  |  |  |
| **Q. 11** | **Q. 12** | **Q. 13** | **Q. 14** | **Q. 15** |
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**Take g = 9.8 ms-2 where ever needed**

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| --- | --- | --- | --- | --- | --- | --- |
| 1 | The dimension ofρv2 (Where ρ is the density and v is the speed)is

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| --- | --- | --- | --- | --- |
| **a)** M-1 L5 T2 | **b)** M L T2 | **c)** M L-1T-2 | **d)** M L2 T -2 | **e)** M-1 L3 T-2 |

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| 2 | A jet plane lands with a speed of 100 m/s and it comes to rest with constant de-acceleration -5.00 m/s2. From the instant the plane touches the runway, the time interval needed before it can come to rest is

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| **a)** 20 s  | **b)** 8 s  | **c)** 22 s  | **d)** 10 s  | **e)**none of the above |

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| 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

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| **a)** 3.2 m  | **b)** 1.6 m  | **c)** 6.4 m  | **d)** 4.5 m  | **e)** 2 m  |

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| 4 | A ball is thrown straight up in the air. At the highest point, the ball’s

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| --- | --- | --- | --- | --- |
| **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 |

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| 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?

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| --- | --- | --- | --- | --- |
| **a)** 350 m  | **b)** 123 m  | **c)** 176 m  | **d)** 240 m  | **e)** 480 m  |

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| 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.

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| --- | --- | --- | --- | --- |
| **a)**  | **b)**  | **c)**  | **d)**  | **e)**  |

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| 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?

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| --- | --- | --- | --- | --- |
| **a)** 5 Km , 53.2o  from the north to the west | **b)** 7 Km , 53.2o from the east to the north  | **c)**25 Km, 63.8o from the east to the north  | **d)**7 Km,36.8o from the east to the north  | **e)** 5 Km , 53.1o from west to north |

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| 8. | The magnitude of the sum of two vectors **A** and **B** is maximum,

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **a)** when angle bet**w**een vectors **A** and **B** is 45o | **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 |

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| 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: **r =** 3t**i +**2t2**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 |

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| 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.

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| **a)** The launching point  | **b)** the landing point  | **c)** the highest point  | **d)** depends on angle of projection  | **e)** no where |

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| 12 | A projectile projected with velocity 30m/s so that the horizontal range is 60 m. (Take g =10 m/s2). The angle of projection is:

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| --- | --- | --- | --- | --- |
| **a)** 15º  | **b)** 21º  | **c)** 32º | **d)** 39º | **e)** 45º |

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| 13 | A football player kicks a ball at an angle of 30º 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  |

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| 14 | The example, where the velocity is changing while the speed remains constant is

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| --- | --- | --- | --- | --- |
| **a)** uniform motion in straight line | **b)** it is impossible | **c)** Motion of object under free fall | **d)** projectile motion  | **e)** uniform circular motion |

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| 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 |

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**The end**

**Rough work**