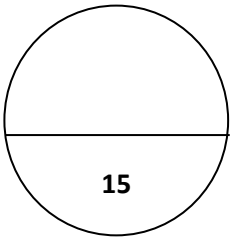
University * _____name_____

*King Saud University*
*College of Science*
*Department of Physics and Astronomy*

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| *1st term 1438-1439H* | *Physics 103* | *1st mid term* |
| *Thursday 6 /2/ 1439 H* | *26th October 2017* | *7:00 – 8:30 PM* |

**Submit all pages 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**

| Q. 1 | Q. 2 | Q. 3 | Q. 4 | Q. 5 |
|---|---|---|---|---|
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| **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** | A car goes on a certain road with an average speed of 40 km/h and returns along the same road with an average speed of 60 km/h. The average speed for the round trip is:<br>**A)** 53 km/h **B)** 48 km/h **C)** 42 km/h **D)** 32 km/h **E)** 24 km/h |
| **2** | A car is moving with a velocity of 72 km/h. If its velocity is reduced to 36 km/h after covering a distance of 200 m, its acceleration is:<br>**A)** - 1.5 m/s$^2$ **B)** - 2.5 m/s$^2$ **C)** - 3.2 m/s$^2$ **D)** - 0.75 m/s$^2$ **E)** - 0.5 m/s$^2$ |
| **3** | A rock is released from rest from the top of a very high cliff. How far does the rock travel in the first 7 seconds of its free-fall?<br>**A)** 330 m **B)** 132 m **C)** 240 m **D)** 314 m **E)** 397 m |
| **4** | A particle moves in the *xy* plane with a constant acceleration given by **a** = - 4**j** m/s$^2$. At $t$ = 0, its position and velocity are 10**i** m and (–2**i** + 8**j**) m/s, respectively. The distance from the origin to the particle at $t$ = 2 seconds is:<br>**A)** 12.8 m **B)** 8.2 m **C)** 5.1 m **D)** 2.3 m **E)** 10 m |
| **5** | A stone is thrown horizontally with velocity of 40 m/s from the top of a building. The stone strikes the ground at a point 120 m horizontally away from and below the point of throwing. The height of the building is:<br>**A)** 33 m **B)** 27 m **C)** 44 m **D)** 20 m **E)** 78 m |
| **6** | A car moving with a constant speed of 60 m/s completes one lap around a circular track in 50 s. The magnitude of the acceleration of the car is:<br>**A)** 6.3 m/s$^2$ **B)** 8.8 m/s$^2$ **C)** 3.4 m/s$^2$ **D)** 7.5 m/s$^2$ **E)** 9.4 m/s$^2$ |
| **7** | A car travels 20 km due north and then 35 km in a direction 60° west of north. The magnitude of displacement of the car is:<br>**A)** 48.2 km **B)** 40.9 km **C)** 56.3 km **D)** 36.7 km **E)** 11.8 km |
| **8** | If vector **A** = 2**i** + 6**j** and vector **B** = 4**i** -2**j**, then the magnitude of vector 2**A** + **B** is:<br>**A)** 32.1 **B)** 12.8 **C)** 14 **D)** 7.2 **E)** 22.2 |
| **9** | A cubic box with an edge of 1.5ft has a volume of:<br>**A)** 3.28× 10$^3$ m$^3$ **B)** 7.55×10$^2$ m$^3$ **C)** 9.55× 10$^{-2}$ m$^3$ **D)** 22.7× 10$^{-2}$ m$^3$ **E)** 44 × 10$^{-2}$ m$^3$<br>*(N.B. 1m = 3.28ft)* |
| **10** | In Einstein's equation E = mc$^2$, where m: mass, and c: speed of light. The dimensions of energy E is:<br>**A)** ML$^2$T$^{-1}$ **B)** MLT$^{-2}$ **C)** ML$^2$ **D)** ML$^2$T$^{-2}$ **E)** MLT$^{-1}$ |
| **11** | A ball is thrown upward. While the ball is in free fall, does its acceleration<br>**A)** decrease **B)** remain constant **C)** increase **D)** increase and then decrease **E)** decrease and then increase |
| **12** | Two boys (Ali & Omar) start at one end of a street, the origin, run to the other end, then head back. On the way back Ali is ahead of Omar. Which statement is correct about the distances run and the displacements from the origin?<br>**A)** Ali has run a greater distance, but his displacement is less than Omar's **B)** Omar has run a greater distance and his displacement is greater than Ali's. **C)** Ali has run a greater distance and his displacement is greater than Omar's. **D)** Omar has run a greater distance, but his displacement is less than Ali's **E)** Omar has run a shorter distance, and his displacement is less than Ali's |

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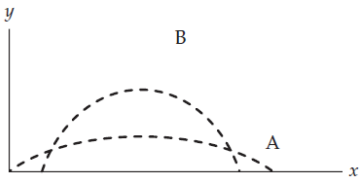
| **13** | If **A**+**B** = 0, the corresponding components of the two vectors **A** and **B** must be:<br>**A)** equal **B)** negative **C)** of opposite sign **D)** positive **E)** none of those |
| **14** | Which of the following can't possibly be accelerating?<br>**A)** an object moving with a constant speed **B)** an object moving along a circle **C)** an object moving along a curve **D)** an object moving with a constant velocity **E)** none of those |
| **15** | Two balls, projected at different launch angles with the same initial speed at different times so they don't collide, they have trajectories A and B, as shown in the figure. Which statement is correct:<br>  <br>**A)** Ball A has a greater acceleration than ball B. **B)** Ball B is in the air for a longer time than ball A. **C)** Ball A is in the air for a longer time than ball B. **D)** Ball B has a greater acceleration than ball A. **E)** None of those |

# The End