College of Sciences
Department of
Physics and Astronomy

كلية العلوم
قسم الفيزياء والفلك

جامعة الملك سعود
King Saud University

# First Midterm Exam

| Wednesday, Safar 8, 1440 | PHYS 109 | Academic year 1439-40 H |
|---|---|---|
| 8:15 – 9:45 am | General Physics | First Semester |

| Student's Name | | اسم الطالبة |
|---|---|---|
| ID number | | الرقم الجامعي |
| Section No. | | رقم الشعبة |
| Classroom No. | | رقم قاعة الاختبار |
| Teacher's Name | | اسم أستاذة المقرر |
| Roll Number | | رقم التحضير |

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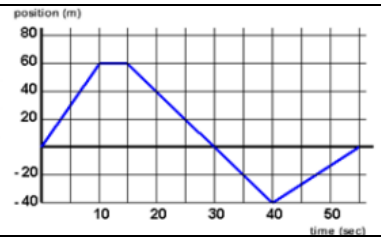
Instructions:

- **Switch off your mobile and place it under your seat.**
- **Please do not forget to write your name in this page.**
- **Write the answers at the right of each question.**

Assume:

$g = 9.8\ m.s^{-2}$

$G = 6.673 \times 10^{-11} Nm^2/kg^2$

| No. | Question | Answer |
|---|---|---|
| 1 | An object with an intial velocity of 12 m/s accelerates at a rate of 1.32 m/s$^2$. The final velocity of this object after 25 seconds is :<br>A) 10 m/s  B) 45 m/s  C) 22 m/s  D) 25 m/s  E) 30 m/s | B |
| 2 | If we ignore air resistance, we usually say that the horizontal component of acceleration of a projectile is:<br>A) variable  B) equal to the vertical component of acceleration  C) 0  D) constant  E) not of the above | C |
| 3 | A ball is thrown from the origin at an angle of 40° to the horizontal with an initial speed of 8.5 m/s. The *x* and *y* components of the ball's position 2.0 second later are:<br>A) 10.6 m/s, 5.6 m/s<br>B) 13 m/s, -8.7 m/s<br>C) 32.6 m/s, 27.3 m/s<br>D) 42.5 m/s, -42.5m/s<br>E) 17 m/s. 17m/s | B |
| 4 | What is the average velocity from 30 to 40 seconds?<br>A) - 4 m/s<br>B) -30 m/s<br>C) -40 m/s<br>D) 10 m/s<br>E) 4 m/s<br>  | A |
| 5 | Which one of the following quantities is a scalar?<br>A)displacement  B) velocity  C) acceleration  D) force  E) speed | E |
| 6 | A force is applied to 4 kg box which make 10 m/s change in the velocity of the box in 5 s. The applied force is equal to:<br>A) 50 N  B) 40 N  C) 8 N  D) 5 N  E) 3 N | C |
| 7 | The acceleration of gravity on the surface of Mars is 3.62 m/s$^2$, and the mass of Mars is $6.40\times10^{23}$ kg. The radius of Mars is:<br>A) 3.43 Mm  B) 3.43 μm  C) 3.43 mm  D) 3.43 km  E) 3.43 m | A |
| 8 | A 6 kg box is resting on an inclined surface 30° above the horizontal. If the coefficient of static friction of the surface is 0.55, the minimum force needed for it to start to move is:<br>A) 39.4 N  B) 58.8 N  C) 28.0 N  D) 33.3 N  E) 50.3 N | C |
| 9 | Suppose that a box is accelerating at 3 m/s$^2$. If the net force acting on it is doubled and its mass is halved, then the new acceleration of the box is:<br>A) 5 m/s$^2$<br>B) 4 m/s$^2$<br>C) 20 m/s$^2$<br>D) 12 m/s$^2$<br>E) 0 m/s$^2$ | D |

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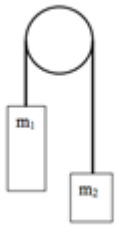
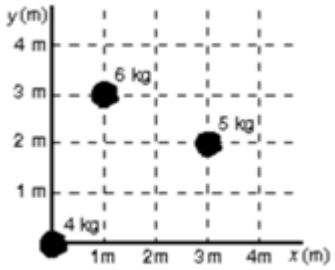
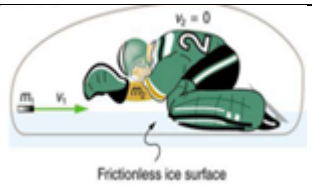
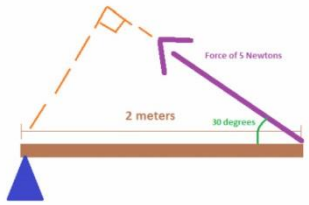
| **10** | Two masses $m_1$ = 2.00 kg and $m_2$ =3.00 kg are connected by a light cord and hung from a frictionless pulley of negligible mass as shown. The acceleration of the two masses in m/s$^2$ is approximately: | | | |   | B |
| | A) 0.16 | B) 1.96 | C) 2.50 | D) 3.50 | E) 4.40 | |
| **11** | The $x$ and $y$ coordinate in meter of three particles system of respective masses $m_1$=4 kg , $m_2$= 5 kg, and $m_3$=6 kg are shown in the figure, the center of mass of the system are: | | | |   | **D** |
| | A) $x$= 1.25 m, $y$ = 0.5 m<br>B) $x$ = 1.0 m, $y$ = 0.5 m<br>C) $x$ = 0.5 m, $y$ = 0.5 m<br>D) $x$ = 1.4 m, $y$ = 1.9 m<br>E) $x$ =1.0 m, $y$ = 1.3 m | | | | | |
| **12** | A 70.0 kg ice hockey goalie, originally at rest, catches a 0.150 kg hockey puck slapped at him at a velocity of 35.0 m/s. The recoil velocity of the hockey goalie and puck in m/s is: | | | |   | **B** |
| | A) 11.7×10$^{-2}$ | B) 7.48 ×10$^{-2}$ | C) 24.5 ×10$^{-2}$ | D) 75 ×10$^{-2}$ | E) 105.5 ×10$^{-2}$ | |
| **13** | A 3 N force is applied at an angle of 30 degrees at the end of the 2.0 meter lever, the magnitude of the torque in N.m is: | | | |   | C |
| | A) 0 | B) 6 | C) 3 | D) 5 | E) 1.5 | |
| **14** | An object rotating at speeds of 3.6 m/s on a circle of radius 7 m has an angular momentum of 3.75 kg.m$^2$/s with respect to the center of the circle. The object mass is: | | | | | C |
| | A) 90 g<br>B) 110 g<br>C) 149 g<br>D) 290 g<br>E) 310 g | | | | | |

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| **15** | The statement that does not correctly describe an object in translational equilibrium is:<br><br>A) the net forces acting on the object equals zero<br>B) it is experiencing zero overall acceleration<br>C) it is moving at a constant velocity<br>D) The net force acting on the object is constant<br>E) none of the above | **D** |