

اسم الطالب/ة:	الرقم الجامعي:	اسم المدرس:
---------------------	----------------------	-------------------

Part I	Part II				Total
() $\times 4 =$	Q1	Q2	Q3	Q4	

Part I: Choose the correct answer:

15 $\times$ 4=60 pts

- 1) Consider $\mathbf{A} = 2\mathbf{i}$ and $\mathbf{B} = -4\mathbf{k}$, the cross product $\mathbf{A} \times \mathbf{B}$ is given by
a) $2\mathbf{i} - 4\mathbf{j}$ b) 8 c) $8\mathbf{j}$ d) $-8\mathbf{j}$

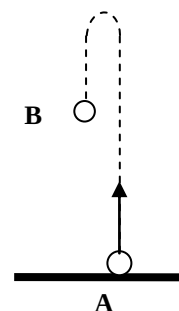
- 2) Referring to the previous problem, the angle between $\mathbf{A}$ and $\mathbf{B}$ is
a) π b) $\pi / 2$ c) 2π d) I need more information

- 3) For any two vectors $\mathbf{A}$ and $\mathbf{B}$, which of the following is **incorrect**
a) $\mathbf{A} \cdot \mathbf{B} = \mathbf{B} \cdot \mathbf{A}$ b) $\mathbf{A} + \mathbf{B} = \mathbf{B} + \mathbf{A}$ c) $\mathbf{A} \times \mathbf{B} = \mathbf{B} \times \mathbf{A}$ d) $\mathbf{A} - \mathbf{B} = -\mathbf{B} + \mathbf{A}$

- 4) A particle travels 5m east within 7sec and then 10m north within 8sec. The displacement of the particle is given by
a) $35\mathbf{i} + 80\mathbf{j}$ m b) 115m c) 15m d) $5\mathbf{i} + 10\mathbf{j}$ m

- 5) Referring to the previous problem, the average velocity of the particle is
a) $\frac{5}{7}\mathbf{i} + \frac{10}{8}\mathbf{j}$ m/s b) $\mathbf{i}$ c) $\frac{1}{3}\mathbf{i} + \frac{2}{3}\mathbf{j}$ m/s d) $\mathbf{j}$ m/s

- 6) A ball is thrown vertically upward from the ground with initial speed of 12 m/s. It reaches point B in its way down with a speed of 6 m/s. The time of flight from A to B is
a) 1.8 s b) 0.6 s c) 2.4 s d) 1.2 s

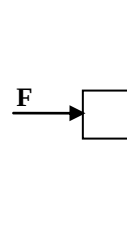


- 7) Referring to the previous problem,, the acceleration of the ball at the highest point is
a) zero b) 9.8 m/s^2 down c) 9.8 m/s^2 up d) depends on the initial velocity

- 8) Referring to problem 6, the distance traveled by the ball is given by the distance from
 a) point B and the highest point b) point A and the highest point
 c) the shortest distance from A to B d) non of these

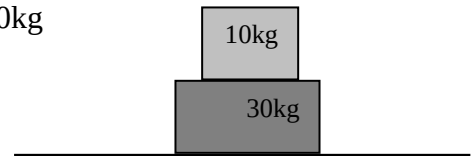
- 9) A particle accelerates uniformly from rest to a speed 10m/s in 2sec. The acceleration of the particle is
 a) 10 m/s^2 b) 5 m/s^2 c) 0 d) non of these

- 10) A horizontal force **F** pushes a block against a smooth vertical wall as shown.
 a) The block will not move b) The block will move down
 c) The block will move up d) I need more information



- 11) When the acceleration of a body is zero, we can conclude that
 a) the velocity varies with time b) there is no frictional force
 c) the net force is zero d) the body is at rest

- 12) In the figure shown, the normal force acting on the 30kg block by the surface is (g is the acceleration of gravity)
 a) $10g$ b) $20g$
 c) $30g$ d) $40g$



- 13) Action and reaction
 a) have different magnitudes b) have the same direction
 c) act on the same body d) act on different bodies

- 14) A projectile is thrown horizontally with a speed of 10m/s. The y-component of its velocity after one second is
 a) -9.8 m/s b) 0 c) 10 m/sec d) -19.8 m/s

- 15) At the maximum height of a projectile motion,
 a) the velocity is zero
 b) the x-component of the velocity is zero
 c) the horizontal distance traveled is called the range.
 d) the velocity is horizontal

Part II: Solve the following problems:

10×4=40 pts

Q1)

Three vectors are given by $\mathbf{A} = 2\mathbf{i} - \mathbf{j}$, $\mathbf{B} = 3\mathbf{j} + \mathbf{k}$, and $\mathbf{C} = \mathbf{i} - 2\mathbf{j} + 3\mathbf{k}$.

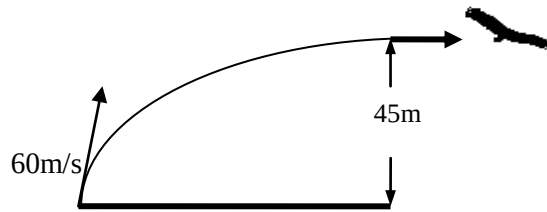
Find $\mathbf{B} \cdot (\mathbf{A} - \mathbf{C})$.

Q2)

The position of a particle varies with time according to $x = 3t^2 - 4t$ with x in m and t in sec. Find **the average acceleration** during the interval $t = 0$ to $t = 1$ sec and **the instantaneous acceleration** at $t=2$ sec.

Q3)

A stone is projected with a speed of 60 m/s towards a bird. The stone hits the bird horizontally at a point that is 45 m above the point of projection. Find **the horizontal distance** between the bird and the point of projection.



Q4)

A 5 kg block rests on a rough surface ($\mu_s=0.5$, $\mu_k=0.3$). A 20 N force at an angle of 30° above the horizontal is applied to the block. Calculate **the frictional force** acting on the body.

