Prince Sultan University

Deanship of Educational Services
Department of Mathematics
and General Sciences

COURSE DETAILS:

Physics I	**PHY105**	**MAJOR EXAM I**
Semester:	Second Semester - Term 182	
Date:	Thursday February 21, 2019	
Time Allowed:	60 minutes	

STUDENT DETAILS:

Student Name:	
Student ID Number:	
Section:	Circle section number: 142 148 145
Instructor's Name:	Circle the name: Dr. Hazem Abu-Farsakh Dr. Muaffaq Nofal

INSTRUCTIONS:

- You may use a scientific calculator that does not have programming or graphing capabilities. NO borrowing calculators.
- NO talking or looking around during the examination.
- NO mobile phones. If your mobile is seen or heard, your exam will be taken immediately.
- Show all your work when required and be organized.
- You may use the back of the pages for extra space, but be sure to indicate that on the page with the problem.
- Assume the magnitude of the acceleration of gravity on Earth $\boldsymbol{g = 9.8\ m/s^2}$

GRADING:

	Part 1	**Part 2 - Q1**	**Part 2 - Q2**			**Total**
Mark						
Full Mark	**9**	**3**	**3**			**15**

Part 1 (9 marks): Indicate the answer choice that best completes the statement or answers the question

Q1. An object initially moving at 12.0 m/s started to decelerate at the rate of 0.03 m/s^2. What is the object's displacement in 2.00×10^2 seconds? Express your answer using the appropriate number of significant figures.

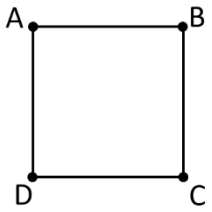
a) 1800 m
b) 1.8×10^3
c) 1.80×10^3 m
d) 2×10^3 m

Q2. If the position x of an object depends on time t according to the following relation $x^2 = 5b^2t^2 - ct$, where b and c are constants. What should be the units of b?

a) m^2/s
b) m/s^2
c) $\mathrm{m}^2/\mathrm{s}^2$
d) m/s

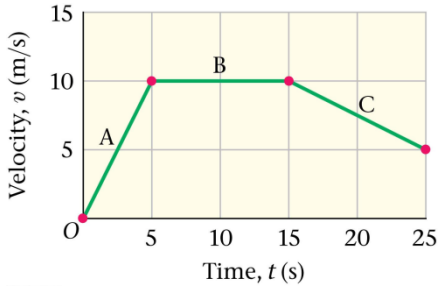
Q3. An object moves from point A to point C on the shown square in 1 minute. If the side length of the square is 20 m, what is the magnitude of its average velocity?

a) 0.67 m/s
b) 0.47m/s
c) 0.33 m/s
d) 0.58 m/s



Q4. Using the velocity versus time graph for a moving object shown, what is the object's displacement during the first 10 seconds of its motion?

a) 100 m
b) 50 m
c) 125 m
d) 75 m



Q5. Starting from rest a car accelerates at 2 m/s^2 for 4 seconds, then it coasts at constant velocity for 3 seconds, and then it decelerates at 1 m/s^2 until it stops completely. What is the car's displacement during the complete trip?

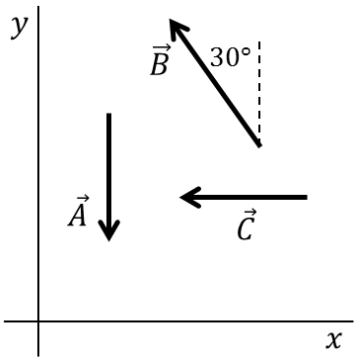
a) 72 m
b) 24 m
c) 56 m
d) 40 m

Q6. A stone thrown vertically upwards reaches the highest point in its path in 4.49 seconds. What its velocity 7 seconds after it was thrown?

a) 24.6 m/s down
b) 44 m/s up
c) 68 m/s down
d) 68 m/s up

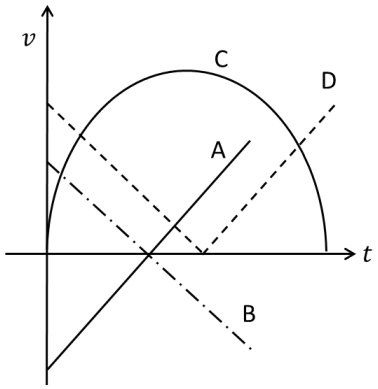
Q7. Given the three vectors in the figure, where $A = 2$ m, $B = 3$ m, and $C = 1.5$ m, What is the vector $\vec{A} - \vec{B} + \vec{C}$?

a) $-4.6\,\hat{y}$ (m)
b) $3\hat{x} - 6.1\,\hat{y}$ (m)
c) $1.1\hat{x} - 3.1\,\hat{y}$ (m)
d) $4.1\hat{x} - 3.1\,\hat{y}$ (m)



Q8. You toss a ball straight up in the air and catch it again. Right after it leaves your hand and before you catch it, which of the curves represents the v versus t graph for this motion? (Assume your positive y-axis is pointing up).

a) Curve A
b) Curve B
c) Curve C
d) Curve D



Q9. A dragonfly initially moving with a velocity of $\overrightarrow{v_0} = 2\,\hat{x} - \hat{y}$ (m/s) starts to accelerate with an acceleration of $\vec{a} = -0.5\,\hat{x} + \hat{y}$ (m/s^2). What will be its speed after 2 seconds?

a) 2 m/s
b) 1 m/s
c) 1.41 m/s
d) 0.71 m/s

Part 2 (6 marks): Solve the following TWO questions in the provided space and show your work.

Q1. Two cars initially at rest. Car B is located 50 m east to car A. Car A started to move East with acceleration of 3 m/s^2 and at the same time car B started to move in the same direction with an acceleration of 2 m/s^2.

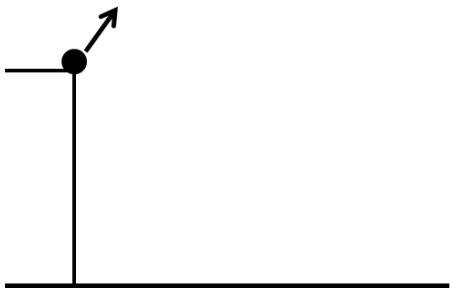
a) How long it takes the two cars to meet?

b) Where will the two cars meet relative to the initial position of car A?

c) What will be the separation between the two cars 20 seconds after they started to move assuming they continue to move with the same acceleration?

Q2. A ball is kicked from the top of a 50 m high building with an initial speed of 29 m/s directed 30 degrees above the horizontal. Assuming air resistance is negligible:

a) How far from the base of the building will the ball strike the ground



b) What is its speed and direction of motion just before it strikes the ground

c) What is the maximum height it reaches from the ground

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