

SOETAN - OLUWATOYIN - KAFI LAT.

BABCOCK UNIVERSITY, IILISHAN-REMO, OGUN STATE
 DEPARTMENT OF BASIC SCIENCES
 FIRST SEMESTER EXAMINATIONS

100 LEVEL

PHY101 - GENERAL PHYSICS I

2018/2019 SESSION

Name of Examiners: Kehinde D.O, Awe O and Opadele A.E

Instruction: Attempt ALL questions by circling the correct option.

Time: 2 Hrs

Show ALL WORKINGS where necessary in any space provided

Date: 10/12/2018

Useful Constants: $1\text{hp} = 746\text{W}$, $1\text{m} = 3.281 \text{ ft.}$, $g = 9.8 \text{ m/s}^2$, $1 \text{ yard} = 0.9144\text{m}$, $1 \text{ L} = 1000 \text{ cm}^3$, $1 \text{ in.} = 2.54 \text{ cm}$

Name: _____ Surname _____ First Name _____ Middle Name _____

Course of Study: _____ App. ID: _____ Mat. No: _____

1) The age of the earth is 1.3×10^{17} seconds. What is this age in years?

- a) 2.4×10^8 yrs b) 4.1×10^9 yrs c) 5.3×10^{12} yrs d) 6.8×10^7 yrs

2) What is the significance of the Greenwich Meridian?

Ans: _____

3) A parking lot is 134.3m long and 37.66m wide. What is the perimeter of the lot?

- a) 171.96m b) 344m c) 256.78m d) 97m

4) A warehouse is 20.0 yards long, 10.9 yards wide and 15.0 ft. high. What is its volume in SI units?

- a) 537 m^3 b) 763 m^3 c) 876 m^3 d) 833 m^3

5) Given two vectors $\vec{A} = 2.0\hat{i} + 3.0\hat{j} - 3.0\hat{k}$ and $\vec{B} = 3.0\hat{i} + 1.0\hat{j} - 3.0\hat{k}$. Find the magnitude of the vector difference $\vec{A} - \vec{B}$.

- a) $-1.0\hat{i} + 2.0\hat{j} - 6.0\hat{k}$ b) $-1.0\hat{i} + 1.0\hat{j}$ c) $-1.0\hat{i} + 2.0\hat{j}$ d) $1.0\hat{i} + 2.0\hat{j} - 0\hat{k}$

6) What is cross product of $4.0\hat{j}$ and $-2.0\hat{i}$?

- a) $8.0\hat{k}$ b) $-8.0\hat{k}$ c) 8 d) -8

7) An object moves such that its displacement varies with time as $x = 3.0 + 0.2t^4$ meters. Find its instantaneous velocity at time $t = 3\text{s}$?

- a) 21.6 m/s b) 19.2 m/s c) 17.3 m/s d) 23.8 m/s

8) A particle is projected such that its maximum range is 26.4m. What is the speed at which it is launched?

- a) 260.4 m/s b) 258.72 m/s c) 16.1 m/s d) 23.2 m/s

*9) What is the direction of the cosine vector $\vec{A} = 4\hat{i} + 5\hat{j} - 2\hat{k}$?

- a) $4/6.9, 5/6.9, 2/6.9$ b) $4/\sqrt{45}, 5/\sqrt{45}, -2/\sqrt{45}$ c) $4/5, 1, -2/5$ d) $\sqrt{45}/4, \sqrt{45}/5, -\sqrt{45}/2$

10) At the scene of an accident on a country road. Police find skid marks stretching for 50m tests on the road surface show that a skidding car decelerate at 6.5 m/s^2 , was the car skidded exceed the speed limit of 25m/s

- a) Yes b) No c) Only God can tell d) To be honest I don't know I was not there.

11) A crate with mass 32.5 kg initially at rest on a warehouse floor is acted on by a net horizontal force of 140N. What acceleration is produced? (Assume the floor is frictionless).
a) 4.31 m/s^2 b) 3.6 m/s^2 c) 7.2 m/s^2 d) 6.4 m/s^2

12) The angular momentum \vec{L} of a particle is given by the vector product of its position vector r and its linear momentum p . If $r = 2\hat{i} + 3\hat{j} + 5\hat{k}$ and $\vec{p} = 9\hat{i} + 10\hat{j} + 15\hat{k}$, find \vec{L} .
a) $5\hat{i} - 5\hat{j} + 7\hat{k}$ b) $5\hat{i} - 15\hat{j} + \hat{k}$ c) $-5\hat{i} + 15\hat{j} - 7\hat{k}$ d) $-5\hat{i} - 5\hat{j} + \hat{k}$

13) The first several digits of π are known to be $\pi = 3.14159265358979\dots$. What is π to five significant figures? Ans: _____

14) The imaginary line that circles the Earth midway between the north and south poles is called: _____

15) According to the label on a bottle of salad dressing, the volume of the contents is 0.473 litre (L). Express this volume in cubic inches.

- a) 288.86 in^3 b) 2.86 in^3 c) 28.86 in^3 d) 0.286 in^3

16) Are the dimensions for Moment and Work the same? (True/False): _____

17) The dimension for the coefficient of viscosity (η) for a viscous drag of force F between two layers of liquid $F = \eta A \frac{dv}{dx}$ is expressed as: _____
[A = Area, dv = velocity, dx = distance]

18) Given the two vectors $\vec{x} = 7\hat{i} + 2\hat{j} - \hat{k}$ and $\vec{y} = 5\hat{i} - 6\hat{j} + 9\hat{j}$. Find the magnitude of the vector $3\vec{x} - \vec{y}$?
a) 23.32 b) 233.32 c) 2.332 d) 33.23

19) Given vector $\vec{A} = 3\hat{i} + 4\hat{j} - 2\hat{k}$ and $\vec{B} = 2\hat{i} - 6\hat{j} + 3\hat{k}$, find $\vec{A} \times \vec{B}$
a) $-13\hat{j} - 26\hat{k}$ b) $24\hat{i} - 13\hat{j} - 26\hat{k}$ c) $24\hat{i} - 13\hat{j} + 26\hat{k}$ d) $3\hat{i} - 6\hat{j} + 3\hat{k}$

20) The position of Chamberlain as a function of time is given by $x = 4-5t^3$ meters. At time $t = 3\text{s}$. What will be the Chamberlain's acceleration?
a) -40 m/s^2 b) -50 m/s^2 c) -60 m/s^2 d) -90 m/s^2

21) Praise is moving with constant acceleration covers that the distance between two points 70.0 m apart in 7.00 s. His speed as he passes the second point is 15.0 m/s. Compute his speed at the first point?
a) 10 m/s b) 5 m/s c) 15 m/s d) 20 m/s

22) Einstein's famous equation is given as $E = mc^2$, where c is the speed of light in vacuum. Find E for an electron for which (to 3SF) mass of the electron = $9.11 \times 10^{-31} \text{ kg}$ and $c = 3.0 \times 10^8 \text{ m/s}$. The SI unit for E is the joule (J). Ans: _____

23) The dimension for Power is expressed as: _____

24) Mirabel skies 1.00km north and then 2.00km east on a Thursday evening. How far and in what direction is she from the starting point?
a) 3 km and 26.6° b) 2.24 km and 32.7° c) 1 km and 24.5° d) 2.24 km and 63.4°

25) Find the angle between the two vectors: $\bar{A} = 2\hat{i} + 3\hat{j} + \hat{k}$ and $\bar{B} = -4\hat{i} + 2\hat{j} - \hat{k}$ using dot product operation.

- a) -0.175° b) 1.75° c) 100.08° d) 68.91°

26) After an airplane takes off, it travels 10.4 km west, 8.7 km north. How far is it from the takeoff point?

- a) 13.6 km b) 21.2 km c) 30.2 km d) 31.2 km

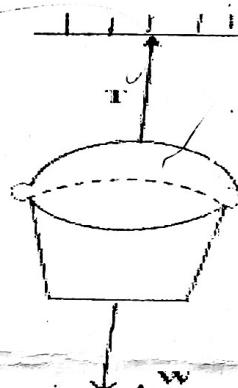
27) A stone is dropped from rest and falls freely. Find its position after 3.0 s?

- a) 4.9 m b) 9 m c) 44.1 m d) 24.3 m

28) A stone is projected with a speed 17.32 m/s at an angle 60° to the horizontal. Calculate the maximum height reached by the stone.

- a) 11.48 m b) 18.43 m c) 24.1 m d) 15.3 m

29) A bucket of mass 60.0 kg is hanged by a rope attached to a rigid support. What is the force that the rope exert on the bucket assuming that the mass of the rope is negligible?



- a) 420 N b) 588 N c) 242 N d) 782 N

30) A boy throws a stone that weighs 50.0 N with a net horizontal force of 100N. What is the magnitude of the horizontal acceleration of the ball?

- a) 19.6 m/s^2 b) 17.3 m/s^2 c) 15.3 m/s^2 d) 16.2 m/s^2

31) A body is being dragged through a distance 23m along a horizontal surface with a constant force of 1030N. If the kinetic friction between the surface and the body is 3000N. Find the work on the body.

- a) $-45 \times 10^3 \text{ J}$ b) $-35 \times 10^3 \text{ J}$ c) $-65 \times 10^3 \text{ J}$ d) $-84 \times 10^3 \text{ J}$

32) A constant force $\bar{F} = (25N)\hat{i} - (35N)\hat{j}$ is applied horizontally to a load against a blowing wind. If the load undergoes a displacement of $\bar{S} = -(8m)\hat{i} - (3.0m)\hat{j}$, how much work does the force applied do on the load?

- a) -200 J b) 105 J c) -95 J d) 75 J

33) How many joules of energy does a 150 Watt light bulb use per hour?

- a) $5.4 \times 10^5 \text{ J}$ b) $6.7 \times 10^4 \text{ J}$ c) $8.4 \times 10^2 \text{ J}$ d) $8.2 \times 10^3 \text{ J}$

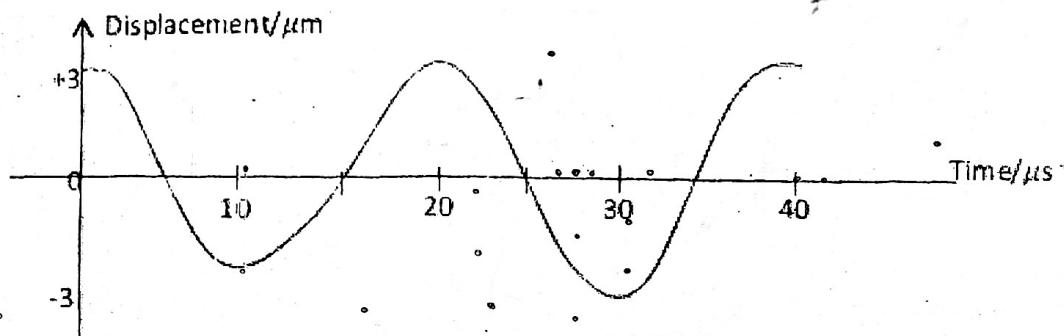
34) A variable force $F_x = (3x^2 - 4x)$ moves a particle from $x_1 = 1.0\text{m}$ to $x_2 = 4.0\text{m}$. Calculate the work done by the force.

- a) 36 J b) 33 J c) 34 J d) 35 J

$$\begin{aligned} & 4.0 - 1.0 = 3.0 \\ & \text{WORK done if force is } F_x \\ & F_x \times d_1 \times d_2 \\ & (3x^2 - 4x) \times \end{aligned}$$

- 35) A force of 4.7N is required to stretch a certain spring by 1.3 cm. How far must this spring be stretched for its potential energy to be 0.020J?
 a) 234 N/m b) 239 N/m c) 235 N/m d) 237 N/m

- 36) The S.I unit of Impulse is: _____



Use the graphical representation above to answer questions: 37-39

- 37) Calculate the frequency of the oscillation.
 a) 10 KHz b) 20 KHz c) 50 KHz d) 60 KHz

- 38) Find the amplitude of the oscillation.
 a) $1\mu m$ b) $2\mu m$ c) $3\mu m$ d) $4\mu m$

- 39) Determine the wavelength of the wave, if the simple harmonic motion of a particle in a medium through which the wave is moving is 6.0 kms^{-1} .
 a) 0.12 m b) 1.2 m c) 12.0 m d) 0.012 m

- 40) Find the Celsius temperature corresponding to 41.0°F
 a) 10°C b) 5°C c) 7°C d) 8°C

- 41) Find the Celsius temperature corresponding to -18.0°F
 a) -23°C b) -27.8°C c) -28.6°C d) -31.7°C

- 42) The three processes of heat transfer are: _____, _____ and _____

- 43) A Carnot engine takes 1590J of heat from a reservoir at 300K and discards some heat to a reservoir at 200K. What is the efficiency of the Carnot engines?
 a) 50% b) 33% c) 25% d) 56%

- 44) Which of the following is NOT a thermodynamic process? Ans: _____
 a) Adiabatic Process b) Sinusoidal Process c) Isobaric Process d) Isochoric Process

<<<<BEST WISHES>>>>

Babcock University, Iisahan-Remo, Ogun State
Department Of Basic Sciences Mid-Semester Examination
Physics 101-General Physics 1 2019/2020 Session 100 Level Mid Semester Test

Instruction: attempt all questions please circle the correct option or fill in the gaps total time 40 minutes
 The last question is theory show your workings at the back of your sheet Take g to be 10 m/s

Surname:	First name:	Middle name:	SCORE
Department:	APP ID:B		

1. list available frame of reference.....
2. At the scene of an accident on a country road. Police find skid marks stretching for 50m tests on the road surface show that a skidding car decelerate at 6.0 m/s^2 . Was the car which skidded exceed the speed limit of 25m/s on this road? (A) yes (B) no (C) only God can tell (D) to be honest I don't know I was not there.
3. Which of these Physical quantities is not a vector quantity? (A) Electric charge (B) Velocity (C) Force (D) momentum
4. Express 70 nm in Km
5. Use principle of dimension to find a and b if $a = v^a t^b$? (A) 1,2 (B) 1, 1 (C) 1, -1 (D) -1, 1
6. what is the position and velocity of an object at $t = 1$ second if the position of the moving object is expressed by $x = 3t - 4t^2 + t^3$ where x is in meter and t is in second
7. The acceleration of a body is given by $a = 8 + 6t$ at time $t = 1$ what is the position of the body
 (A) 5m (B) 14m (C) 11m (D) 12m
8. When will range be maximum?
 (A) when θ is maximum (B) when θ is minimum (C) when θ is 90° (D) when θ is 45°
9. convert 0.5radian to degree.....
10. A toy train travels around a circular track of radius 2.5m in a time of 40 second what is the speed of the toy train (A) 100 m/s (B) 16m/s (C) 0.063m/s (D) 0.39m/s
11. A pendulum bob 30cm long swings through a 15cm arc find the angle of swing in radian and in degree
12. The dimension of force is (A) LT^{-2} (B) MLT^{-1} (C) MLT^{-2} (D) MT^{-2} (E) MLT^{-3}
13. What is the dimension of power?
14. convert 720° to radian.....
15. Suppose the moon is moving in a circular path of radius 3.8×10^5 km about the earth when the period of revolution is 27.5 days calculate the acceleration of the moon.
 (A) $4.62 \times 10^{-3} \text{ m/s}^2$ (B) $7.56 \times 10^{-3} \text{ m/s}^2$ (C) $2.63 \times 10^{-3} \text{ m/s}^2$ (D) $5.57 \times 10^{-3} \text{ m/s}^2$ (E) $3.34 \times 10^{-3} \text{ m/s}^2$
- Vector $A = 3i + j - 2k$ and vector $B = 5i + j + 2k$ use this to answer following questions
16. What is the magnitude of vector A? (A) 6.9 (B) 5 (C) $\sqrt{14}$ (D) $\sqrt{45}$
17. What is $A \cdot B$? (A) 10 (B) 25 (C) 15 (D) 35
18. What is the angle between Vector A and B?
19. What is $A \times B$?

Part B: Theory answers the theory part at the back of your answer sheet. Take g to be 10 m/s

20. Odion Ighalo kicks a ball at speed of 40 m/s at an angle of 30 degrees
 - A. Find the position of the ball at horizontal and at vertical in time t equals 2seconds
 - B. Find the time taken to reach the maximum height and find the maximum height distance
 - C. What is the resultant velocity and its direction

Your Signature and Date		
-------------------------	--	--

Kewei
Babcock University, Iisahen Remo, Ogun State
Department Of Basic Sciences Mid-Semester Examination
Physics 101-General Physics 1
 2018/2019 Session

Instruction: attempt all questions please circle the correct option or fill in the gaps total time 40 minutes

Take g to be 10 m/s

Name	First name:	Middle name:	SCORE
Surname:		Department	MATRIC NUMBER

Vector $\mathbf{A} = 4\mathbf{i} + 5\mathbf{j} - 2\mathbf{k}$ and vector $\mathbf{B} = 5\mathbf{i} + 3\mathbf{j} + 10\mathbf{k}$ use this to answer question 1 to 5 and 15

1. What is the magnitude of vector \mathbf{A} ? (A) 6.9 (B) 5 (C) $\sqrt{48}$ (D) $\sqrt{45}$
2. What is $\mathbf{A} \cdot \mathbf{B}$? (A) 55 (B) 25 (C) 15 (D) 35
3. What is the angle between Vector \mathbf{A} and \mathbf{B} ?
56i - 80j - 13k
4. What is the direction cosine of vector \mathbf{A} ? (A) $4/6.9, 5/6.9, -2/6.9$ (B) $4/\sqrt{45}, 5/\sqrt{45}, -2/\sqrt{45}$ (C) $4/5, 1, -2/5$
5. What is $\mathbf{A} \times \mathbf{B}$?
56i - 80j - 13k
6. At the scene of an accident on a country road. Police find skid marks stretching for 50m tests on the road surface show that a skidding car decelerate at 6.5m/s^2 , was the car which skidded exceed the speed limit of 25m/s on this road? (A) yes (B) no (C) only God can tell (D) to be honest I don't know I was not there
7. What is the cross product of $6\mathbf{j}$ and $-2\mathbf{i}$
12i + 0j
8. the imaginary line that circle the earth midway between the north and the north and south poles is called.....
9. A particle is projected such that its maximum range is 26.4m what is the speed at the launched.
10. the age of the earth is 1.6×10^{19} seconds what is the age in years
11. According to the label on a bottle the volume of the content is 0.573 liter (L) using only the conversion 1 L = 1000 cm^3 and 1 in = 2.54cm express this volume in cubic inches.
12. $F = \eta A \left(\frac{dv}{dx} \right)$ F is force; A is area, what is the dimension and unit of η in the above equation
13. if $x = 3t^2 (2-4t^3)$ meters at $t=4$ what is the acceleration
14. Use principle of dimension to find p and q if $a = V^p t^q$? (A) 1,2 (B) 1,1 (C) 1,-1 (D) -1,1
- 15 what is $\mathbf{A} - 2\mathbf{B}$ from the above vector?

CLASS QUIZ

Take g to be 10 m/s Odion Ighalo kicks a ball at speed of 39 m/s at an angle of 55 degrees

1. find the velocity when t is 3seconds at vertical and horizontal 2marks
2. Find the position of the ball at horizontal and at vertical in time t equals 3seconds 2marks
3. Find the time taken to reach the maximum height and find the maximum height distance 2marks
4. What is the resultant velocity and its direction. 2marks
5. what is the total time of flight and range. 2marks

Student's Signature							
---------------------	--	--	--	--	--	--	--

⑥ Convert 30°C to F and 60°F to $^\circ\text{C}$