

UNIVERSITY OF UYO, DEPARTMENT OF PHYSICS,
2019/2020 FIRST SEMESTER EXAMINATION
PHY 111⁰ (GENERAL PHYSICS I) TIME ALLOWED: 75 mins
INSTRUCTION: attempt all questions

Reg. No.: Dept.: sex: ... Sign:

1. Mathematically, area expansivity β is (a) $\beta = 2\alpha$ (b) $\beta = \alpha^2$ (c) $\beta = \alpha^3$ (d) $\beta = 3\alpha$
2. Thermal stress has the same unit as (a) Young modulus (b) compressive strain (c) extension (d) tensile strain
3. Cubic expansivity is three times (a) linear expansivity (b) area expansivity (c) volume expansivity (d) none of the above
4. If linear expansivity of a material is 0.00012C^{-1} . What is the area expansivity of that material? (a) 0.00024C^{-1} (b) 0.0036C^{-1} (c) 0.0004C^{-1} (d) 0.00034C^{-1}
5. The fractional increase in volume per unit rise of temperature is referred to as (a) volume expansivity (b) area expansivity (c) linear expansivity (d) pressure expansivity
6. The proportionality constant in Hooke's law is called (A) force constant (B) strain (C) stress (D) extension
7.denotes the resulting effect of applied force on a body. (A) tensile strain (B) tensile stress (C) elasticity (D) extension
8. Which of the following is incorrect? (A) Pressure decreases with depth of liquid (B) Pressure in different liquids at the same depth varies directly with density. (C) Pressure at any point in a liquid acts equally in all directions. (D) Pressure at any point at the same depth within the same liquid is the same.
9. A mercury thread has 12 cm and 20 cm at ice and steam points. Find its temperature when the mercury thread is 18 cm long. (A) 75.0°C (B) 46.2°C (C) 53.3°C (D) 61.5°C
10. A wire has a force constant of 80 N/m. when stretched by the application of a certain force it produces an extension of 15 cm, calculate the work done in stretching the wire. (A) 0.9 J (B) 12 J (C) 6 J (D) 40 J
11. The three ways in which heat can be transferred are (A) conduction, convection, radiation (B) electrical, mechanical, chemical (C) fire, light, gas (D) stirrer, glass rod, heater.
12. A block of copper of mass 0.5 kg at an initial temperature of 77°C is placed in water. When thermal equilibrium is attained, the temperature of the mixture is 35°C . How much heat is lost by the copper block? Take the specific heat capacity of copper as $400\text{Jkg}^{-1}\text{K}^{-1}$. (A) 8400J (B) 3360J (C) 4200J (D) 5040J.
13. In the determination of specific heat capacity by electrical method, one of these apparatus is used to lag the aluminium (solid) to reduce heat loss to the surrounding (A) felt (B) glass rod (C) thermometer (D) heater.
14. The quantity of heat required to raise the temperature of a body by 1 kelvin is (A) heat capacity (B) specific heat capacity (C) black body (D) evaporation.
15. The S. I. Unit of mass is (A) kg (B) J (C) JKg^{-1} (D) $\text{JKg}^{-1}\text{K}^{-1}$.

Bros Jay

16. Newton's 3rd law refers to action and reaction forces, the force always occur in pairs and _____. (a) act on same object (b) act right angles (c) never act on same object (d) move a body

17. Mass and weight (a) both have same units (b) both measure inertia (c) both have different units (d) represent gravity

18. _____ deals with motion of bodies with reference to the force (a) mechanics (b) electromagnetism (c) Dynamics (d) motion

19. _____ initiated the study of dynamics (a) Newton's (b) Faraday (c) Galileo (d) Boyle's

M=5kg, velocity = 10m/s and time = 5s, what is acceleration (a) 5m/s (b) 6m/s (c) 2m/s (d) 10m/s

20. For a cone in unstable equilibrium, the centre of gravity is if displaced by a small force applied on it. (A) lowered (B) increased (C) varied (D) unchanged.

21. is responsible for acceleration in rotational motion. (A) torque (B) force (C) work (D) speed.

22. The angular position of a point on the rim of a rotating wheel is given by: $\theta = 3 + 5t^2 + 3t^3$. What is the point's angular velocity at t = 2.0s? (A) 56rad/s (B) 20rad/s (C) 8rad/s (D) 10rad/s

23. An example of a torque on a body is when a football is being kicked (A) obliquely (B) linearly (C) forcefully (D) vertically

24. A force $F = -2i + 3j$ N acts at the point x=4m, y=5m. The torque about the origin as pivot is...? (A) +22Nm (B) -20Nm (C) +45Nm (D) -30Nm

25. The unit of viscosity is: (a) $\text{Kgm}^{-1}\text{s}^{-1}$ (b) Kgm^{-1} (c) Kgs^{-2} (d) Kgs^{-1}

26. Using the fundamental quantities M, L and T, derive the dimension of pressure gradient: (a) $\text{ML}^{-2}\text{T}^{-2}$ (b) MLT^{-2} (c) MLT (d) ML^{-2}T^2

27. Write the dimension of the coefficient of attenuation: (a) dimensionless (b) ML^{-1} (c) LT^{-2} (d) L^{-2}

28. What is the dimension of impulse of a force? (a) MLT^{-1} (b) MLT^{-2} (c) MLT (d) $\text{ML}^{-1}\text{T}^{-1}$

29. Given the equation $F = M^x a^y$, where F = force, M = mass, and a = linear acceleration, use dimensional analysis to find the value of x

(a) 1 (b) 0 (c) 2 (d) -1

30. $i \cdot i = j \cdot j = k \cdot k$ is. (A) vector (B) unity (C) unit vector (D) perpendicular

Use this to answer questions 32 - 35. $a = i + j - 3k$, $b = 3i + 3j + k$

31. $a + b$ (A) $2i + 5j + 2k$ (B) $4i + 5j - 2k$ (C) $4i + 5j + 2k$ (D) $3i - j + k$

32. $a - b$ (A) $2i + j + 4k$ (B) $-2i - j - 4k$ (C) $4i + 5j - 2k$ (D) $4i - 5j + 2k$

33. $a + 2b$ (A) $3i + 8j - 7k$ (B) $5i + 7j - 5k$ (C) $4i + 5j - 2k$ (D) $7i + 8j - k$

34. $b \cdot a$ (A) -6 (B) 6 (C) -4 (D) 4

UNIVERSITY OF UYO, DEPARTMENT OF PHYSICS,
2019/2020 FIRST SEMESTER EXAMINATION
PHY 111C (GENERAL PHYSICS I) TIME ALLOWED: 75 mins
INSTRUCTION: attempt all questions

Reg. No.: Dept.: sex: ... Sign:

1. Which of these is correct for ideal gas (a) $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ (b) $\frac{P_1}{T_2} = \frac{P_2}{T_1}$ (c) $P_1T_1 = P_2T_2$ (d) $\frac{P_1}{T_1} = \frac{P_2}{T_2}$
2. The increase in size or volume of a given mass of substance with change in temperature is called (a) thermal expansion (b) electrical effect (c) gravitational reaction (d) heat capacity
3. Another name for area expansivity is (a) superficial expansivity (b) cubic expansivity (c) linear expansivity (d) area expansivity
4. Another name for volume expansivity is (a) cubic expansivity (b) area expansivity (c) linear expansivity (d) volume increase
5. Two types of volume expansivity in liquid are (a) apparent cubic expansivity and real cubic expansivity (b) real cubic expansivity and absolute expansivity (c) apparent cubic expansivity and thermal expansivity (d) none of the above
6. relates hydrostatic pressure to volume strain. (A) Bulk modulus (B) Shear modulus (C) compressibility (D) axial modulus
7. denotes the force exerted on a body. (A) tensile stress (B) tensile strain (C) elasticity (D) extension
8. The most suitable thermometer for measuring temperature between -200°C and 1200°C is (A) platinum resistance (B) mercury-in-glass (C) thermocouple (D) optical pyrometer
9. A mercury thread has 10 cm and 25 cm at ice and steam points. Find its temperature when the mercury thread is 18 cm long. (A) 53.0°C (B) 46.2°C (C) 75.0°C (D) 61.5°C
10. A force of 15 N is required to stretch a catapult by 20 cm. calculate the force constant of the rubber of which this catapult is made. (A) 75 N/m (B) 0.75 N/m (C) 0.9 J (D) 300 N/m
11. Among the three ways in which heat can be transferred, one of them does not require a material medium. This is (A) convection (B) conduction (C) radiation (D) thermodynamic.
12. A block of copper is heated to an initial temperature and later placed in 0.2 kg of water at 30°C . When thermal equilibrium is attained, the temperature of the mixture is 35°C . How much heat is absorbed by the water? Take the specific heat capacity of water as $4200\text{Jkg}^{-1}\text{K}^{-1}$. (A) 8400J (B) 3360J (C) 4200J (D) 5040J.
13. In the determination of specific heat capacity by method of mixtures, one of these apparatus is used to measure the temperature of the heated object whose specific heat capacity is to be determined (A) heater (B) glass rod (C) thermometer (D) felt.
14. The three phases of matter are (A) evaporation, plasma, ice (B) conduction, convection, radiation (C) solid, liquid, gas (D) mass, weight, space.
15. The S. I. Unit of heat capacity is (A) kg (B) J (C) JKg^{-1} (D) $\text{JKg}^{-1}\text{K}^{-1}$.

Bw3 Jay

16. Acceleration = 2m/s^2 , vel = 10m/s and time = 5s what is F? (a) 5N (b) 20N (c) 10N (d) 2N

17. When $\Delta f = T \sin \theta$ the situation is known as _____ (a) centrifugal acc (b) centripetal (c) centripetal acc (d) centrifugal

18. Centripetal force is given as _____ (a) mv/r (b) mv^2/a (c) mv^2/r (d) mv^2/t

19. In the absence of net force a moving object will (a) slow down (b) stop immediately (c) move with constant speed (d) turn left

20. When a cat sleeps on a table the net force is on _____ (a) directed downward (b) directed upward (c) Zero (d) horizontal

21. For a cone in a neutral equilibrium, the height of the centre of gravity and the potential energy is? (A) unchanged (B) lowered (C) raised (D) balanced

22. The angular position of a point on a rotating wheel is given by: $\theta = 4 + 8t^2 + 4t^3$. Calculate its angular acceleration at $t = 2.0\text{s}$? (A) 64 rad/s^2 (B) 8 rad/s^2 (C) 12 rad/s^2 (D) 38 rad/s^2

23. A body whose parts have fixed position relative to each other is called? (A) rigid (B) rotational (C) microscopic (D) fluid

24. A force $F = 4i + j\text{ N}$ acts at the point $x=0$ and $y=2\text{m}$. The torque about the origin as pivot is....?

(A) -8Nm (B) $+4\text{Nm}$ (C) -3Nm (D) $+6\text{Nm}$

25. is regarded as translational inertia. (A) mass (B) density (C) pressure (D) weight

26. A particle has an average velocity of 103km/h^{-1} . How far does it travel in the time interval of 1 minute?

(a) 1.8km (b) 2.3km (c) 18m (d) 3.2m

27. A car travels with a certain average velocity in 30 seconds, and covers 900m . Find the average velocity.

(a) 30ms^{-1} (b) 60ms^{-1} (c) 27000ms^{-1} (d) 27km

28. The equation of a displacement - time curve of a particle is given by $x = 10t^2$. Find the instantaneous velocity at $t = 5\text{s}$: (a) 100m/s (b) 40m/s (c) 50m/s (d) 2m/s

29. Find the average acceleration of a car which accelerates from 0km/h to 180km/h in 10s : (a) 5ms^{-2} (b) 18ms^{-2} (c) 1800km (d) 170ms^{-1}

30. An electron enters a region with a speed of $5 \times 10^6\text{m/s}$ and is slowed down at the rate of $1.25 \times 10^{14}\text{m/s}^2$. How far does the electron travel? (a) 0.1m (b) 0.8m (c) 1.8m (d) 2.0m

31. $i \cdot i = j \cdot j = k \cdot k$ is. (A) perpendicular (B) unit vector (C) unity (D) vector
Use this to answer questions 32 - 35. $a = 2i - j + 4k$, $b = i + 2j + 3k$

32. $b + a$ (A) $3i - j + 7k$ (B) $3i + j + 7k$ (C) $i + j + k$ (D) $-i + j + 7k$

33. $b - a$ (A) $2i + 2j + 8k$ (B) $i - j + 5k$ (C) $5i + 11k$ (D) $3i + j + 7k$

34. $2a + b$ (A) $4i - k$ (B) $4i - j + k$ (C) $-4i + j - k$ (D) $2i - j + k$

35. $b \cdot a$ (A) -6 (B) 6 (C) 12 (D) 4

UNIVERSITY OF UYO, DEPARTMENT OF PHYSICS,
2019/2020 FIRST SEMESTER EXAMINATION
PHY 111^A (GENERAL PHYSICS I) TIME ALLOWED: 75 mins

Reg. No.: BROS JAY INSTRUCTION: attempt all questions
Dept.: 08091700608 sex: ... Sign:

1. In Boyle's law, which variable is constant (a) temperature (b) pressure (c) mass (d) energy
2. In the study of gases, the following three variables are required (a) volume, pressure and temperature (b) density, volume and mass (c) volume, temperature and heat capacity (d) pressure, temperature and latent heat
3. In Charles law, the volume of a given mass of gas is proportional to (a) temperature (b) mass (c) energy (d) liquid
4. Which of these is correct for pressure law (a) $\frac{P_1}{T_1} = \frac{P_2}{T_2}$ (b) $P_1 P_2 = T_1 T_2$ (c) $\frac{P_1}{T_2} = \frac{P_2}{T_1}$ (d) $P_1 T_1 = P_2 T_2$ Ans: $\frac{P_1}{P_2} = \frac{T_1}{T_2}$
5. The fractional increase of length per unit rise of temperature is called (a) linear expansivity (b) area expansivity (c) cubic expansivity (d) none of the above
6. Pressure in different liquids at the same depth varies directly with (A) density (B) temperature (C) volume (D) all of the above
7. The unit of coefficient of surface tension is (A) N/m (B) N (C) N/cm (D) m
8. The use of thermometer to measure temperature relies on what law? (A) Zeroth law (B) pressure law (C) thermometric law (D) general gas law
9. A mercury thread has 12 cm and 25 cm at ice and steam points. Find its temperature when the mercury thread is 18 cm long. (A) 46.2°C (B) 75.0°C (C) 53.3°C (D) 61.5°C
10. A wire has a force constant of 90 N/m. when stretched by the application of a certain force it produces an extension of 20 cm, calculate the work done in stretching the wire. (A) 1.8 J (B) 18 J (C) 9 J (D) 45 J
11. The transfer of heat from one end of a rod to the other end without relative movement of the particles of the rod is (A) convection (B) conduction (C) radiation (D) thermodynamic.
12. A block of copper of mass 0.2 kg at an initial temperature of 77°C is placed in water. When thermal equilibrium is attained, the temperature of the mixture is 35°C . How much heat is lost by the copper block? Take the specific heat capacity of copper as $400\text{J Kg}^{-1}\text{K}^{-1}$. (A) 8400J (B) 3360J (C) 5040J.
13. In the determination of specific heat capacity by method of mixtures, one of these apparatus is used to support the thread holding the object whose specific heat capacity is to be determined (A) heater (B) glass rod (C) thermometer (D) felt.
14. The quantity of heat required to raise the temperature of a unit mass of the substance by 1 kelvin is (A) heat capacity (B) specific heat capacity (C) black body (D) evaporation.
15. The S. I. Unit of heat is (A) kg (B) J (C) JKg^{-1} (D) $\text{JKg}^{-1}\text{K}^{-1}$.
16. Force that gives opposite effect to centripetal is known as (a) Gravitational force (b) net force (c) centrifugal force (d) reluctant force
17. Momentum is (a) Mass x Acc (b) mass X time (c) mass x vel (d) mass/acc

- * 18. Impulse is (a) mass x time (b) Force x acc (c) force x time (d) force x vel
- * 19. Inelastic collision (a) momentum and time conserved (b) momentum and vel conserved (c) momentum and K.E conserved (d) momentum conserved. Total Energy
20. When F move its point of application through distance _____ (a) velocity (b) displacement (c) work done (d) distance
21. For a cone in a stable equilibrium, the potential energy is with a slight displacement as the centre of gravity is raised. (A) increased (B) reduced (C) varied (D) constant.
22. The angular position of a point on a rotating wheel is given by: $\theta = 3 + 10t^2 + 7t^3$. What is the point's angular position at $t = 1.0 \text{ s}$? (A) 20 rad (B) 4 rad (C) 13 rad (D) 7 rad
23. When a body is rigid, it is regarded as a particle located in its centre of (A) mass (B) inertia (C) moment (D) motion
24. Moment of inertia in rotational motion is analogous to in linear motion. (A) mass (B) torque (C) weight (D) force
25. A force $F = 6i + 2j \text{ N}$ acts at the point $x=0$ and $y=5\text{m}$. The torque about the origin as pivot is...? (A) -30Nm (B) +15Nm (C) -10Nm (D) +60Nm
26. Which of the following is the correct dimension of work? (a) ML^2T^{-2} (b) MLT^{-2} (c) $ML^{-2}T^{-2}$ (d) MLT
27. Which of the following equations is dimensionally correct? (a) $v = u + at$ (b) $v = u + st$ (c) $\dot{v} = a + t$ (d) $v = ut + a$
28. The dimension of force of gravity is: (a) MLT^{-2} (b) MLG (c) ML^2G^{-1} (d) MLT^{-1}
29. What is the S.I. unit of the impulse of a force? (a) N - S (b) N (c) Kg (d) S (Cds)
30. If $s = at^2 + bt + c$ where s is distance, and t is time, what will be the correct unit of a? LT^{-2}
31. i. $i \neq j$. $j = k$ is. (A) unity (B) vector (C) unit vector (D) perpendicular
Use this to answer questions 32 - 35. $a = i + j - 2k$, $b = 2i - 2j + 3k$
32. $a + b$ (A) $3i - 3j + k$ (B) $3i + j + k$ (C) $i + j + k$ (D) $i + j + 5k$
33. $b - a$ (A) $3i - j + k$ (B) $-i + 3j - 5k$ (C) $-i - j - k$ (D) $i + j + k$ $\Rightarrow i - 3j - k$
34. $2a + b$ (A) $4i - k$ (B) $4i - j + k$ (C) $-4i + j - k$ (D) $2i - j + k$
35. $b \cdot a$ (A) -6 (B) 6 (C) 2 (D) 4



DEPARTMENT OF PHYSICS,
2016/2017 FIRST SEMESTER EXAMINATION
PHY 111** (GENERAL PHYSICS I) TIME ALLOWED: 1 $\frac{1}{2}$ hrs.
INSTRUCTION: Circle the correct answer in Section 1.

In Section 2, answer all questions and show workings where necessary.

NAME: Isaac Ben

Reg. No. Dept: Sex:

SECTION 1

1. The branch of science which is concerned with heat and temperature and their relation to energy and is? (A) Electricity (B) Thermodynamics (C) Dynamics (D) Kinematics.
2. The process in which there is no exchange of heat with the surrounding is? (A) Adiabatic process (B) Isothermal process (C) Isochoric process (D) Isobaric process.
3. A body said to be weightless when (A) Resultant force equals the weight of the body due to gravity (B) Resultant force equals the reaction on the body (C) Weight of the body due to gravity equals the normal reaction on the body (D) Resultant force equals zero.
4. Calculate the heat added to a system if at atmosphere pressure, water of volume 1cm^3 changes to static volume 1000cm^3 (Hint: $P = 1.013 \times 10^5\text{N/m}^2$). (A) 1012J (B) 101.2J (C) 10.12J (D) 1.012J
5. Objects at rest is said to be in (A) static equilibrium (B) dynamic equilibrium (C) neutral equilibrium (D) none of the above.
6. When a body is moving with uniform velocity, it is said to be in (A) dynamic equilibrium (B) neutral equilibrium (C) unstable equilibrium (D) none of the above.
7. The force that opposes motion is known as (A) friction (B) gravity (C) centre of mass (D) momentum.
8. The unit for impulse is (A) Ns (B) N (C) s (D) Kg.
9. A body is said to be ----- if it regains its original shape and size after undergoing a deformation (a) ductile (b) elastic (c) brittle (d) mobile
10. The following are examples of circular motion except (a) planetary orbit (b) vibrating spring (c) gramophone (d) car cornering
11. Materials which do not undergo considerable elongation before reaching elastic limit and break soon after reaching elastic limit are called (a) ductile materials (b) brittle materials (c) plastic materials (d) elastic materials
12. What will be the value of 120 rev/min in rad/s? (a) $2\pi\text{ rad/s}$ (b) $4\pi\text{ rad/s}$ (c) $\frac{2\pi}{3}\text{ rad/s}$ (d) $\pi\text{ rad/s}$
13. ----- is the quantity of energy transferred from one object to another because of difference in temperature. (a) Specific heat capacity (b) latent heat (c) heat
14. ----- is the unit for specific heat capacity. (a) $\text{JKG}^{-1}\text{K}^{-1}$ (b) JKgK^{-1} (c) $\text{JKg}^{-1}\text{K}^{-1}$
15. Temperature at which solid changes into liquid is known as ----- (a) Phase point (b) temperature (c) melting point
16. Heat required to change a unit mass of solid to liquid at its melting point is ----- (a) Latent Heat of Vaporization (b) Latent heat of Fusion
17. Which of the following units is equivalent to Kgms^{-1} ? (a) Ns^{-1} (b) Nms (c) Ns (d) Js^{-1}
18. Which of the following has the same unit as the moment of force? (a) Force (b) Power (c) Work (d) Momentum
19. A certain vector is given by $3\mathbf{i} + 4\mathbf{j} + 7\mathbf{k}$. The angle, in degrees, it makes with the Z-axis is (a) 35.5° (b) 37° (c) 29.77° (d) 8.6°
20. Which of the following completely define a vector quantity? (a) 5m N (b) 10m (c) 7s (d) 6m/s

$$f = 114 \text{ KJ/m/s}$$

$$\sin \theta = \frac{8.6}{114}$$

$$1\text{rev} = 2\pi \sim 1 \text{ rev}/\text{pi}$$

$$F = ma$$

$$q = \frac{F}{m} = \frac{3}{1} = 3 \text{ m/s}$$

2. A 15kg bullet travelling at 30m/s strikes and is absorbed by a 75kg object which is at rest. common speed with which the two objects move off after collision.

$$m_1 = 15 \text{ kg}, m_2 = 75 \text{ kg}$$

$$v_1 = 30 \text{ m/s}, v_2 = ?$$

By law of conservation of linear momentum

$$mv = m_1v_1 + m_2v_2$$

$$= 15(30) + 75(v_2)$$

$$= \frac{450}{450} + \frac{75v_2}{450} = 6 \text{ m/s}$$

$$P_i = (15)(30) \text{ before collision} = 450 \text{ N}$$

$$P_f = (90 \text{ kg})v \text{ But } P_i = P_f = 450 = 90$$

$$v = \frac{450}{90} = \underline{\underline{5 \text{ m/s}}}$$

3. Find the time for one revolution of the circle of a conical pendulum if the string that is 80 cm in angle of 30° with the vertical. Given $A.R.F. T_{rev.} = 2\pi, l = 80 \text{ cm} = 0.8 \text{ m}, \theta = 30^\circ$

$$T = 2\pi \sqrt{\frac{l \cos \theta}{g}} = 2\pi \frac{0.8 \cos 30^\circ}{9.8} \times 0.29727$$

$$T = \frac{13.0799}{7} = \underline{\underline{1.87 \text{ sec.}}}$$

4. A bomber is flying at a constant horizontal velocity 1000ms at an elevation of 25km towards directly above its target, at what time would the bomb reach the target.

$$U_x = 600 \text{ m/s}, M = 25 \text{ km}, T = ?$$

$$H = U_x t + \frac{1}{2} g t^2$$

$$h = U_x t + \frac{1}{2} g t^2$$

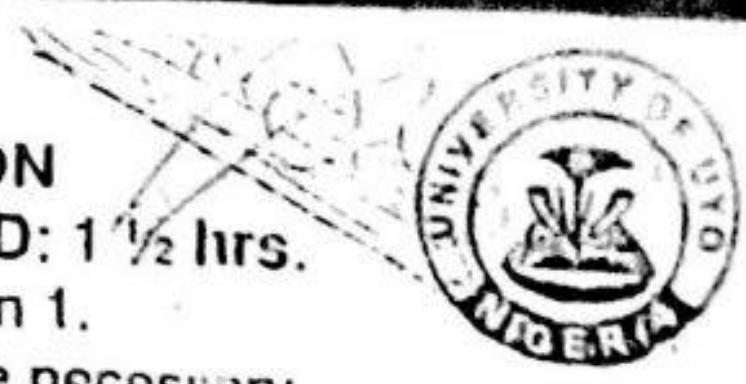
5. If the formula of a physical quantity is expressed as "MAD", where M is mass, A is acceleration, D is distance. What is the dimension of the quantity?

$$M = \text{mass} = \text{kg}, A = \text{acceleration} = \text{m/s}^2, \text{ & } D = \text{Distance} = \text{m}$$

$$\text{Hence } n = 1 \quad \text{kg m s}^{-2} \text{ m} = \text{kg m}^{2-\frac{1}{2}} \cdot \text{ & dimension} = \underline{\underline{ML^{-\frac{1}{2}}}}$$



DEPARTMENT OF PHYSICS,
2016/2017 FIRST SEMESTER EXAMINATION
PHY 111****(GENERAL PHYSICS I) TIME ALLOWED: 1 1/2 hrs.



INSTRUCTION: Circle the correct answer in section 1.

In section 2, answer all questions and show workings where necessary.

NAME: Isaac Ben Reg. No. Dept: Sex:

SECTION 1

1. The measure of disorder and randomness of a system is?
(A) Enthalpy (B) Entropy (C) Heat (D) Temperature.
2. If the molar heat capacity at constant pressure (C_p) is $10.3 \text{ Jmol}^{-1}\text{K}^{-1}$ and molar heat capacity at constant volume (C_v) is $2.1 \text{ Jmol}^{-1}\text{K}^{-1}$, the universal gas constant (R) is
(A) $8.2 \text{ Jmol}^{-1}\text{K}^{-1}$ (B) $12.4 \text{ Jmol}^{-1}\text{K}^{-1}$ (C) $4.9 \text{ Jmol}^{-1}\text{K}^{-1}$ (D) $0.2 \text{ Jmol}^{-1}\text{K}^{-1}$.
3. A body of mass 2kg undergoes a constant horizontal acceleration of 2m/s^2 . Calculate the resultant horizontal force acting on the body. (A) 2N (B) 4N (C) zero (D) None of the above
4. The tendency of a body to remain in its state of rest or uniform motion is called
(A) Law of Inertia (B) Newton's laws of motion (C) Inertia of the body (D) Impulse.
5. The point on the system that moves as if the mass of the system were concentrated at that point is called --
(A) centre of mass of the system (B) point of acceleration (C) centre of pressure (D) momentum point of action.
6. The law of conservation of linear momentum state that (A) $M_1U_1+M_2U_2=M_1V_1+M_2V_2$ (B) $M_1U_1=M_2V_1$ (C) $M_1U_1+M_2V_2=M_1+M_2$ (D) none of the above.
7. Mathematically, Newton's second law of motion is (A) $F=ma$ (B) $F=mv$ (C) $F=mv^2$ (D) $F=m^2r^2$.
8. The unit of Force is (A) N (B) Nm^2 (C) Kgm^2 (D) Js.
9. _____ is defined as the force acting perpendicularly on a unit area (a) density (b) pressure (c) surface tension (d) capillarity
10. In the study of elasticity, the term _____ denotes the resulting effect of the applied force. (a) tensile stress (b) tensile strain (c) original length (d) extension
11. The following are types of oscillation except (a) forced oscillation (b) undamped oscillation (c) free oscillation (d) damped oscillation
12. What will be the value of 20 rev/min in rad/s? (a) $\pi \text{ rad/s}$ (b) $2\pi/3 \text{ rad/s}$ (c) $4\pi \text{ rad/s}$ (d) $\pi \text{ rad/s}$
13. What is the displacement of $X=3t+2t^2$ when the time interval is $t=2$ to $t=4\text{s}$. (a) 3.0m (b) 30km (c) 30m
14. The position of a particle given by $X=3-2t+3t^2\text{m}$ at what time is the particle at rest. (a) 0.03sec (b) 0.1sec (c) 0.3sec
15. A ball thrown up with initial velocity of 18ms^{-1} at what time does the ball reach the maximum height. (a) 1.89s (b) 2.5s (c) 1.8s
16. Temperature at which liquid changes into a solid is(a) melting point (b) latent heat of fusion (c) freezing point
17. Which of the following physical quantities is a basic quantity? (a) Weight (b) Volume (c) Temperature (d) Speed
18. The following are examples of vector quantities except (a) Weight (b) Force (c) Pressure (d) Acceleration
19. The Work done in moving a body along the distance $r = 3i + 2j - 5k$ If the applied force $F = 2i - j - 3k$ is (a) 19 J (b) 12 J (c) 18 J (d) 21 J
20. If at least one component of a vector is a positive number, the vector cannot..... (a) be zero (b) have any negative component (c) have 2 dimensions (d) have 3 dimensions

$$W_{\text{line}} = \vec{F} \times \vec{S} = (2i - j - 3k) \cdot (3i + 2j - 5k)$$

$$120 \times 2\pi (2 \text{ rad/s})^2 \text{ rad/s}^2 \text{ rad/s}$$

$$(2 \times 3)i^2 + (2 \times 2)ij - (1 \times 2)ik - (1 \times 3)ji - (1 \times 2)j^2 + (1 \times 5)jk - 3(s)ki - (5 \times 2)kj + (3 \times 5)k^2$$

- ② A bullet of mass 12Kg travelling at 100m/s strikes and is absorbed by a 85kg object which Find the common speed with which the two objects move off after collision.

$$P_i = (12)(100) + (85)(0) = 1200 \text{ N s} \quad \text{By Conservation}$$

P_f mass increased 97kg $P_f = (97\text{kg})v$

$$P_i = P_f = 1200 = (97\text{kg})v \quad v = \frac{1200}{97} = 12.34 \text{ m/s}$$

3. Find the time for one revolution of the circle of a conical pendulum if the string that is 100cm in angle of 35° with the vertical

Given that $l = 100\text{cm}$, $\theta = 35^\circ$

$$1 \text{ rev.} = 2\pi$$

$$T = 2\pi \sqrt{\frac{l \cos \theta}{g}} = 2 \times \frac{2\pi}{7} \times \sqrt{\frac{1 \times 0.835}{9.8}} \approx 6.28 \text{ s}$$

$$T = 6.28 \text{ s} \times \sqrt{0.083586} = 1.825 \text{ sec}$$

4. If 0.8kg aluminum at a temperature of 200°C is dropped into an insulated beaker containing water at temperature of 10°C . what is its final temperature. (Specific Heat Capacity Al= 0.89×10^3)

Mass of Al = 0.8kg , $c_f = 200^\circ\text{C}$ & $c_w = 0.899 \times 10^3$

$$\text{Find } Q = mc\Delta T = 0.8 \times 0.899 \times 10^3 (200 - T_f)$$

5. A boy is pulled 22m in the direction of angle 60° to the horizontal with a constant force 10N. Calc work done.

Force here = $F \cos \theta$ but $F \times S = \text{work done}$ where $S = 22\text{m}$

$$\text{Work done} = FD \cos 60^\circ \times 22 = 110 \text{ J}$$

$$\text{Work done} = F \times S \cos \theta$$

$$10 \times 22 \times \frac{1}{2} = 110 \text{ J}$$

$$\sin 30^\circ = \cos 60^\circ$$

DEPARTMENT OF PHYSICS,
2016/2017 FIRST SEMESTER EXAMINATION
PHY 111 (GENERAL PHYSICS I) TIME ALLOWED: 1 1/2 hrs

INSTRUCTION: Circle the correct answer in section 1.

In Section 2, answer all questions and show workings where necessary.

NAME:..... Samuel - Bebe....., Reg. No.Dept:..... Sex:.....

SECTION 1

F R

1. The process in which temperature remains constant during heat transfer involving a gas is
(A) Adiabatic process (B) Isothermal process (C) Isochoric process (D) Isobaric process.
2. One of these is concerned with the relationship between changes in the motion of objects and the action which caused these changes (A) Electricity (B) Thermodynamics (C) Dynamics (D) Kinematics
3. What will be the resultant force on the body of mass 0.4kg when it moves with a uniform velocity of 6m/s
(A) 4N (B) 0.4N (C) Zero (D) None of the Above.
4. A boy weighing 20N stands in an elevator; calculate the resultant force acting on him as the elevator moves upwards if the boy's apparent weight (N) is 50N. (A) 70N (B) 50N (C) 30N (D) 15N
5. The value of the coefficient of restitution for elastic collision is (A) 1 (B) 0 (C) 2 (D) none of the above.
6. The value of the coefficient of restitution for inelastic collision is
(A) 0 (B) 2 (C) 1 (D) none of the above.
7. For uniform system, the centre of mass is at the
(A) mid-point (B) end point (C) starting point (D) none of the above.
8. For elastic collision, momentum and ----- are conserved
(A) Kinetic energy (B) potential energy (C) repulsive energy (D) sound energy.
9. ----- is the property which enables a body deformed by applied force to return to its original size and shape when the force is removed. (a) stress (b) elasticity (c) strain (d) Young's Modulus
10. The following are types of motion except (a) linear motion (b) dynamic motion (c) circular motion (d) harmonic motion
11. Materials which undergo considerable elongation before reaching elastic limit and pass through plastic stage before breaking are called (a) brittle materials (b) ductile materials (c) elastic materials (d) plastic materials
12. What will be the value of 60 rev/min in rad/s? (a) 4π rad/s (b) 2π rad/s (c) π rad/s (d) $\frac{2\pi}{3}$ rad/s
13. ----- is the direction of projection make with the horizontal plane through the point of projectile.
(a) 45 degree (b) 90 degree (c) projectile angle
14. Angle of elevation is also known as ----- (a) Elevator (b) Depression angle (c) Angle of projectile
15. The max horizontal distance covered by a projectile is known as ----- (a) Displacement (b) distance (c) Range
16. Range is maximum when $\sin 2\theta$ is equal to ----- (a) 0.5 (b) 2.0 (c) 1
17. Which of the following are derived quantities? I. Viscosity II. Pressure III. Area IV. Impulse (a) I & III (b) II, III and IV (c) I, II, III & IV (d) I, II and IV
18. The work done when a perpendicular force is applied to a body in a horizontal motion is (a) 10J (b) 90J (c) zero (d) Maximum
19. Hydrogen may be liquefied at -235 degree Celsius under a pressure of 20 atm. The temperature on the degree Fahrenheit scale is -391 (b) -260 (c) 430 (d) -235
20. A component of a vector islarger than the magnitude of the vector (a) never (b) always (c) often (d) sometimes

1 rev = 2π rad for rev/ min

SECTION 2

1. A body of mass 3kg moving with a speed 5m/s is suddenly hit by another body direction, thereby changing the speed of the former body to 10m/s. What is the impulsive force?

$$F = \frac{m(v-u)}{t} \quad F.t = m_1 u_1 - m_2 u_2$$

SAS

$$F.t = m(v-u) = 3(10-5)$$

= 15 Ns

$$F.t = m(v-u) \\ 15 = (10-5) \\ 3 \times 5 = 15 \text{ Ns}$$

2. 10kg bullet travelling at 35m/s strikes and is absorbed by a 80kg object which is common speed with which the two objects move off after collision.

$$m_1 = 10 \text{ kg}, v_1 = 35 \text{ m/s}, m_2 = 80 \text{ kg}, v_2 = ?$$

Total change of momentum is ≈ 0 Speed with which the two objects move off after Collision $10 \times 35 = 80 \text{ v}$.

$$v = \frac{350}{80} = \underline{\underline{4.375 \text{ m/s}}}$$

3. Find the time for one revolution of the circle of a conical pendulum if the string that is at an angle of 35° with the vertical.

Given that $l = 100 \text{ cm long}$

given that $\theta_{\text{rev.}} = 2\pi, \theta = 35^\circ$

$$T = 2\pi \sqrt{\frac{l \cos \theta}{g}} = 2 \times \frac{22}{7} \sqrt{\frac{1 \times \cos 35}{9.8}} = 6.285 \times 0.28$$

$T = 1.82 \text{ sec.}$

4. If 0.2kg of aluminum at a temperature of 350°C is dropped into an insulated beaker containing water at a temperature of 20°C . what is its final temperature. (Specific Heat Capacity Al: 900 J/kg°C)

5. If a physical quantity is defined as the surface force per unit Length along the direction of the surface. What is the dimension of the quantity?

A: Physical quantity be X

$$X = \frac{F}{L} = \frac{N}{m^{-1}} = \frac{kg \cdot m^{-2} \cdot m^1}{m \cdot s^{-1} \cdot s^{-2}}$$



UNIVERSITY OF UYO
DEPARTMENT OF PHYSICS,

2016/2017 FIRST SEMESTER EXAMINATION

PHY 111*** (GENERAL PHYSICS I) TIME ALLOWED: 1 1/2 hrs.

INSTRUCTION: Circle the correct answer in Section 1.

In Section 2, answer all questions and show workings where necessary.

NAME: Emeche Ben Reg. No. Dept:

SECTION 1

1. The statement of the first law of thermodynamics can be expressed mathematically as
(A) $dQ = dU + dW$ (B) $dQ = dW + dU$ (C) $dU = dQ + dW$ (D) $dW = dU + dQ$.
2. The way of reducing the effect of frictional force in machinery is
(A) Vulcanizing (B) Ball bearing (C) Lubrication (D) Grazing.
3. What is the weight of a 50kg astronaut on the moon if the acceleration due to gravity is 1.7 m/s^2 .
(A) 85 kg (B) 500kg (C) 50 kg (D) None of the above
4. A revolver of mass 3kg releases a bullet of mass 2kg at a speed of 60m/s. The revolver's speed of recoil
(A) 40m/s (B) 90m/s (C) 300m/s (D) 60m/s.
5. Impulse is defined as (A) force x time (B) force/time (C) force x area (D) pressure x time.
6. To every action there is equal and opposite reaction. This is (A) Newton's third law of motion (B) Newton's second law of motion (C) Faraday's law of induction (D) Ampere's law.
7. Momentum is defined as (A) mass x velocity (B) mass x acceleration (C) force x distance (D) none of the above.
8. The rate of change of momentum is (A) force (B) mass (C) velocity (D) pressure.
9. The fractional increase in volume per unit increase in pressure is termed (a) bulk modulus (b) compressibility (c) Young's modulus (d) shear modulus
10. In the study of elasticity, the term----- is used to denote the force exerted on a body (a) strain (b) tensile stress (c) Hooke's law (d) extension.
11. The following are examples of simple harmonic motion except (a) vibrating spiral spring (b) planet (c) simple pendulum (d) compound pendulum
12. What will be the value of 30 rev/min in rad/s? (a) $\frac{2\pi}{3}$ rad/s (b) π rad/s (c) 2π rad/s (d) 4π rad/s
13. The amount of heat a substance absorbed during phase change without change in temperature is known as (a) Heat (b) Temperature (c) Latent Heat
14. ----- is the study of motion of body in one or two dimensions.
(a) Projectile (b) Free-fall (c) Kinematics
15. A man covers the first journey at 4 ms^{-1} and the second journey at 10 ms^{-1} . What is the average velocity?
(a) 4.8 ms^{-1} (b) 6.5 ms^{-1} (c) 5.7 ms^{-1}
16. A cyclist with constant acceleration accelerates from rest at 2.0 ms^{-1} in 5s, what is its acceleration.
(a) 0.04 ms^{-2} (b) 0.5 ms^{-2} (c) 0.4 ms^{-2}
17. The dimension for the unit of power is? (a) Js (b) MT (c) ML^2T^{-3} (d) ML^3T^{-2}
18. The equation $V^2 = U^2 + 2ax$ is dimensionally correct if each term has a dimension of -----? (a) L^2T^2 (b) L^2T^{-2} (c) ML^2T^2
19. For which of the following vectors is the magnitude of the vector equal to one of the components of the vector. (a) $E = +5k$ (b) $A = 2i + 5j$ (c) $B = -3j$ (d) $F = -4i$.
20. The temperature of a room is 77 degree Fahrenheit. What would it be in Celsius scale?
(a) 25 degrees (b) 30 degrees (c) 15 degrees (d) 35 degrees

SECTION 2

1. Compute the increase in internal energy if the heat input is 2200J and the external work done by the system is 100J.

Given heat input = 2200J, work done by the engine = 100J
 work output? $100 = \frac{\text{heat output}}{\text{heat input}}$

$$\text{heat output} = 100 \times 2200 = 22000$$

$$\text{internal energy} = 19.8 \times 22000 = 435600 \text{ J}$$

2. A 7kg bullet travelling at 100m/s strikes and is absorbed by a 65kg object which is at rest. Find the common speed with which the two objects move off after collision.

$$U_i = 100 \text{ m/s} \quad U_f = 0$$

$$\text{Given - Mass } M_1 = 7 \text{ kg}, M_2 = 65 \text{ kg}$$

The mass of the system increases after collision by $7 \text{ kg} + 65 \text{ kg} = 72 \text{ kg}$ so that

$$P_f = (72 \text{ kg})V \quad \text{But } P_i = P_f = 700 \text{ N.s} = (72 \text{ kg})V \therefore V = \frac{700 \text{ N.s}}{72 \text{ kg}} = 9.7 \text{ m/s}$$

3. Find the radius of the circle of a conical pendulum if the string that is 80 cm makes an angle of 30° with the vertical.

$$\text{Given - Mass } r = ?, l = 80 \text{ cm} = \frac{80}{100} = 0.8 \text{ m}, \theta = 30^\circ$$

$$\text{But } r = l \sin \theta = 0.8 \times \sin 30^\circ = 0.8 \times 0.5 =$$

NAME: Saaq Ben

Reg. No.....Dept.....Sex.....

SECTION 1

1. The process in which temperature remains constant during heat transfer involving a gas is
(A) Adiabatic process (B) Isothermal process (C) Isochoric process (D) Isobaric process.
2. One of these is concerned with the relationship between changes in the motion of objects and the actions which caused these changes (A) Electricity (B) Thermodynamics (C) Dynamics (D) Kinematics.
3. What will be the resultant force on the body of mass 0.4kg when it moves with a uniform velocity of 6m/s.
(A) 4N (B) 0.4N (C) Zero (D) None of the Above.
4. A boy weighing 20N stands in an elevator; calculate the resultant force acting on him as the elevator moves upward if the boy's apparent weight (N) is 50N. (A) 70N (B) 50N (C) 30N (D) 15N
5. The value of the coefficient of restitution for elastic collision is (A) 1 (B) 0 (C) 2 (D) none of the above.
6. The value of the coefficient of restitution for inelastic collision is
(A) 0 (B) 2 (C) 1 (D) none of the above.
7. For uniform system, the centre of mass is at the
(A) mid-point (B) end point (C) starting point (D) none of the above.
8. For elastic collision, momentum and ----- are conserved
(A) kinetic energy (B) potential energy (C) repulsive energy (D) sound energy.
9. ----- is the property which enables a body deformed by applied force to return to its original size and shape when the force is removed. (a) stress (b) elasticity (c) strain (d) Young's Modulus
10. The following are types of motion except (a) linear motion (b) dynamic motion (c) circular motion (d) harmonic motion
11. Materials which undergo considerable elongation before reaching elastic limit and pass through plastic stage before breaking are called (a) brittle materials (b) ductile materials (c) elastic materials (d) plastic materials
12. What will be the value of 60 rev/min in rad/s? (a) 4π rad/s (b) 2π rad/s (c) π rad/s (d) $\frac{2\pi}{3}$ rad/s
13. ----- is the direction of projection make with the horizontal plane through the point of projectile.
(a) 45 degree (b) 90 degree (c) projectile angle
14. Angle of elevation is also known as ----- (a) Elevator (b) Depression angle (c) Angle of projectile
15. The max horizontal distance covered by a projectile is known as ----- (a) Displacement (b)
distance (c) Range
16. Range is maximum when $\sin 2\theta$ is equal to ----- (a) 0.5 (b) 2.0 (c) 1
17. Which of the following are derived quantities? I. Viscosity II. Pressure III. Area IV. Impulse (a) I & III (b) II, III and IV (c) I, II, III & IV (d) I, II and IV
18. The work done when a perpendicular force is applied to a body in a horizontal motion is (a) 10J (b) 90J (c)
19. Hydrogen may be liquefied at -235 degree Celsius under a pressure of 20 atm. The temperature on the degree Fahrenheit scale is -391 (b) -260 (c) 430 (d) -235
20. A component of a vector is larger than the magnitude of the vector (a) never (b) always (c) often (d) sometimes

79 (-5)

$\textcircled{4} \quad = \sin 2\theta = \sin^2 \theta + \cos^2 \theta$
 $= \sin^2 \theta + 2 \cos \theta \sin \theta = \sin \theta$
 $\rightarrow 2 = \tan \theta$

1. An object of mass 3kg is acted upon by two horizontal forces of 6N and 3N in the opposite directions. Calculate the acceleration produced by the system.
2. A 15kg bullet travelling at 30m/s strikes and is absorbed by a 75kg object which is at rest. Find the common speed with which the two objects move off after collision.
3. Find the time for one revolution of the circle of a conical pendulum if the string that is 80 cm makes an angle of 30° C with the vertical.
4. A bomber is flying at a constant horizontal velocity 1000ms at an elevation of 25km towards the point directly above its target, at what time would the bomb reach the target.
5. If the formula of a physical quantity is expressed as "MAD", where M is mass, A is acceleration and D is distance. What is the dimension of the quantity?



UNIVERSITY OF UYO

DEPARTMENT OF PHYSICS,

PHY 111** (GENERAL PHYSICS I) 2016/2017 FIRST SEMESTER EXAMINATION

TIME ALLOWED: 1 1/2 hrs.



INSTRUCTION: Circle the correct answer in Section 1.

In Section 2, answer all questions and show workings where necessary.

NAME: Isaac Ben

Reg. No.....Dept:..... Sex:.....

SECTION 1

1. The branch of science which is concerned with heat and temperature and their relation to energy and work is? (A) Electricity (B) Thermodynamics (C) Dynamics (D) Kinematics.
2. The process in which there is no exchange of heat with the surrounding is? (A) Adiabatic process (B) Isothermal process (C) Isochoric process (D) Isobaric process.
3. A body said to be weightless when (A) Resultant force equals the weight of the body due to gravity (B) Resultant force equals the normal reaction on the body (C) Weight of the body due to gravity equals the normal reaction on the body (D) Resultant force equals zero.
4. Calculate the heat added to a system if at atmosphere pressure, water of volume 1cm^3 changes to steam of volume 1000cm^3 (Hint: $P = 1.013 \times 10^5\text{N/m}^2$). (A) 1012J (B) 101.2J (C) 10.12J (D) 1.012J
5. Objects at rest is said to be in (A) static equilibrium (B) dynamic equilibrium (C) neutral equilibrium (D) none of the above.
6. When a body is moving with uniform velocity, it is said to be in (A) dynamic equilibrium (B) neutral equilibrium (C) unstable equilibrium (D) none of the above.
7. The force that opposes motion is known as (A) friction (B) gravity (C) centre of mass (D) momentum.
8. The unit for impulse is (A) Ns (B) N (C) s (D) Kg.
9. A body is said to be ----- if it regains its original shape and size after undergoing a deformation (a) ductile (b) elastic (c) brittle (d) mobile
10. The following are examples of circular motion except (a) planetary orbit (b) vibrating spring (c) gramophone (d) car cornering
11. Materials which do not undergo considerable elongation before reaching elastic limit and break soon after elastic limit are called (a) ductile materials (b) brittle materials (c) plastic materials (d) elastic materials
12. What will be the value of 120 rev/min in rad/s? (a) $2\pi \text{ rad/s}$ (b) $4\pi \text{ rad/s}$ (c) $\frac{2\pi}{3} \text{ rad/s}$ (d) $\pi \text{ rad/s}$
13. ----- is the quantity of energy transferred from one object to another because of different in temperature. (a) Specific heat capacity (b) latent heat (c) heat
14. ----- is the unit for specific heat capacity. (a) JKG^{-1}K (b) JKgK^{-1} (c) $\text{JKg}^{-1}\text{k}^{-1}$
15. Temperature at which solid changes into liquid is known as ----- (a) Phase point (b) temperature (c) melting point
16. Heat required to change a unit mass of solid to liquid at its melting point is ----- (a) Latent Heat (b) Latent heat of Vaporization (c) Latent heat of Fusion
17. Which of the following units is equivalent to Kgms^{-1} (a) Ns^{-1} (b) Nms (c) Ns (d) Js^{-1}
18. Which of the following has the same unit as the moment of force? (a) Force (b) Power (c) Work (d) Momentum
19. A certain vector is given by $3\mathbf{i} + 4\mathbf{j} + 7\mathbf{k}$. The angle, in degrees, it makes with the Z-axis is (a) 35.5 (b) 37.42 (c) 29.77 (d) 8.6
20. Which of the following completely define a vector quantity? (a) 5m N (b) 10m (c) 7s (d) 6

NTUEN TALENT ANTHONY (NTA)

 N, Ma
 m, m/s
 $\text{m/s, kg m}^{-1}\text{s}^{-1}$

- SEC-A**
1. A body of mass 3kg moving with a speed 5m/s is suddenly hit by another body moving in the opposite direction, thereby changing the speed of the former body to 10m/s. What is the impulse received by the first body?
 2. 10kg bullet travelling at 35m/s strikes and is absorbed by a 80kg object which is at rest. Find the common speed with which the two objects move off after collision.
 3. Find the time for one revolution of the circle of a conical pendulum if the string that is 100 cm long makes an angle of 35° with the vertical.
 4. If 0.2kg of aluminum at a temperature of 350°C is dropped into an insulated beaker containing water at a temperature of 20°C . what is its final temperature .(Specific Heat Capacity Al=0.89)
 5. If a physical quantity is defined as the surface force per unit Length along the direction parallel to the surface. What is the dimension of the quantity?
Ans: Force = N/m^2 Surface = m^{-1}



UNIVERSITY OF UYO
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NAME: Sage Ben Reg. No. Dept: Sex:

SECTION 1

1. The statement of the first law of thermodynamics can be expressed mathematically as
(A) $dQ = dU - dW$ (B) $dQ = dW + dU$ (C) $dU = dQ + dW$ (D) $dW = dU + dQ$.
2. The way of reducing the effect of frictional force in machinery is
(A) Vulcanizing (B) Ball baring (C) Lubrication (D) Grazing.
3. What is the weight of a 50kg astronaut on the moon if the acceleration due to gravity is 1.7 m/s^2 .
(A) 85 kg (B) 500kg (C) 50 kg (D) None of the above
4. A revolver of mass 3kg releases a bullet of mass 2kg at a speed of 60m/s. The revolver's speed of recoil
(A) 40m/s (B) 90m/s (C) 300m/s (D) 60m/s.
5. Impulse is defined as (A) force x time (B) force/time (C) force x area (D) pressure x time.
6. To every action there is equal and opposite reaction. This is (A) Newton's third law of motion (B) Newt second law of motion (C) Faraday's law of induction (D) Ampere' law.
7. Momentum is defined as (A) mass x velocity (B) mass x acceleration (C) force x distance (D) none o above.
8. The rate of change of momentum is (A) force (B) mass (C) velocity (D) pressure.
9. The fractional increase in volume per unit increase in pressure is termed (a) bulk modulus compressibility (c) Young's modulus (d) shear modulus
10. In the study of elasticity, the term----- is used to denote the force exerted on a body (a) te strain (b) tensile stress (c) Hooke's law (d) extension
11. The following are examples of simple harmonic motion except (a) vibrating spiral spring (b) planetary (c) simple pendulum (d) compound pendulum
12. What will be the value of 30 rev/min in rad/s? (a) $\frac{2\pi}{3}$ rad/s (b) π rad/s (c) 2π rad/s (d) 4π rad/
13. The amount of heat a substance absorbed during phase change without change in temperature is known ----- (a) Heat (b) Temperature (c) Latent Heat
14. -----is the study of motion of body in one or two dimensions.
(a) Projectile (b) Free-fall (c) Kinematics
15. A man covers the first journey at 4 ms^{-1} and the second journey at 10 ms^{-1} . what is the average velocity
 4.8 ms^{-1} (b) 6.5 ms^{-1} (c) 5.7 ms^{-1}
16. A cyclist with constant acceleration accelerates from rest at 2.0 ms^{-2} in 5s, what is its acceleration.
(a) 0.04 ms^{-2} (b) 0.5 ms^{-2} (c) 0.4 ms^{-2}
17. The dimension for the unit of power is? (a) Js (b) MT (c) ML^2T^{-3} (d) ML^3T^{-2}
18. The equation $V^2 = U^2 + 2ax$ is dimensionally correct if each term has a dimension of -----? (a) L^2T^2 (b) L
(c) L^2T^{-2} (d) ML^2T^{-2}
19. For which of the following vectors is the magnitude of the vector equal to one of the components of the vector. (a) $E = +5k$ (b) $A = 2i + 5j$ (c) $B = -3j$ (d) $F = -4i$.
20. The temperature of a room is 77 degree Fahrenheit. What would it be in Celsius scale?
(a) 25 degrees (b) 30 degrees (c) 15 degrees (d) 35 degrees

SECTION 2

1. Compute the increase in internal energy if the heat input is 2200J and the external work done by system is 190J.
2. 7kg bullet travelling at 100m/s strikes and is absorbed by a 65kg object which is at rest. Find the common speed with which the two objects move off after collision.
3. Find the radius of the circle of a conical pendulum if the string that is 80 cm makes an angle of 30° with the vertical.
4. The velocity of a particle is described by equation $V=2Ct + 3Dt^2$ where $C=0.1\text{ms}^{-1}$ and $D=0.02\text{ms}^{-2}$. Calculate the change in velocity during interval of $t=3\text{s}$ to $t=6\text{s}$.
5. A force of 400N is directed along an angle of 30° to the direction of motion of a body. Determine the work done by this force if the body is moved through a distance of 5m.

$$\text{Work done} = \text{Force} \times \text{distance}$$

$$W = F \cos \theta d$$

$$W = 400 \cos 30 \times 5$$

$$= 346.410245$$



DEPARTMENT OF PHYSICS,
2016/2017 FIRST SEMESTER EXAMINATION
PHY 111****(GENERAL PHYSICS I) TIME ALLOWED: 1 1/2 hrs.
INSTRUCTION: Circle the correct answer in section 1.
In section 2, answer all questions and show workings where necessary.

NAME:

Isaac Ben

Reg. No.....

Sex:.....

SECTION 1

1. The measure of disorder and randomness of a system is?
(A) Enthalpy (B) Entropy (C) Heat (D) Temperature.
2. If the molar heat capacity at constant pressure (C_p) is $10.3 \text{ Jmol}^{-1}\text{K}^{-1}$ and molar heat capacity at constant volume (C_v) is $2.1 \text{ Jmol}^{-1}\text{K}^{-1}$, the universal gas constant (R) is
(A) $8.2 \text{ Jmol}^{-1}\text{K}^{-1}$ (B) $12.4 \text{ Jmol}^{-1}\text{K}^{-1}$ (C) $4.9 \text{ Jmol}^{-1}\text{K}^{-1}$ (D) $0.2 \text{ Jmol}^{-1}\text{K}^{-1}$.
3. A body of mass 2kg undergoes a constant horizontal acceleration of 2m/s^2 . Calculate the resultant horizontal force acting on the body. (A) 2N (B) 4N (C) zero (D) None of the above
4. The tendency of a body to remain in its state of rest or uniform motion is called
(A) Law of Inertia (B) Newton's laws of motion (C) Inertia of the body (D) Impulse.
5. The point on the system that moves as if the mass of the system were concentrated at that point is called --
(A) centre of mass of the system (B) point of acceleration (C) centre of pressure (D) momentum point of action.
6. The law of conservation of linear momentum state that (A) $M_1U_1+M_2U_2=M_1V_1+M_2V_2$ (B) $M_1U_1=M_2V_1$, (C) $M_1U_1+M_2V_2=M_1+M_2$ (D) none of the above.
7. Mathematically, Newton's second law of motion is (A) $F=ma$ (B) $F=mv$ (C) $F=mv^2$ (D) $F=m^2r^2$.
8. The unit of Force is (A) N (B) Nm^2 (C) Kgm^2 (D) Js.
9. _____ is defined as the force acting perpendicularly on a unit area (a) density (b) pressure (c) surface tension (d) capillarity
10. In the study of elasticity, the term _____ denotes the resulting effect of the applied force. (a) tensile stress (b) tensile strain (c) original length (d) extension
11. The following are types of oscillation except (a) forced oscillation (b) undamped oscillation (c) free oscillation (d) damped oscillation
12. What will be the value of 20 rev/min in rad/s? (a) $\pi \text{ rad/s}$ (b) $2\pi/3 \text{ rad/s}$ (c) $4\pi \text{ rad/s}$ (d) $\pi \text{ rad/s}$
13. What is the displacement of $X=3t + 2t^2$ when the time interval is $t=2$ to $t=4\text{s}$. (a) 3.0m (b) 30km (c) 30m
14. The position of a particles given by $X=3-2t+3t^2\text{m}$ at what time is the particle at rest. (a) 0.03sec (b) 0.4sec (c) 0.3sec
15. A ball thrown up with initial velocity of 18ms^{-1} at what time does the ball reached the maximum height. (a) 1.89s (b) 2.5s (c) 1.8s
16. Temperature at which liquid changes into a solid is(a) melting point (b) latent heat of fusion (c) freezing point
17. Which of the following physical quantities is a basic quantity? (a) Weight (b) Volume (c) Temperature (d) Speed
18. The following are examples of vector quantities except (a) Weight (b) Force (c) Pressure (d) Acceleration
19. The Work done in moving a body along the distance $r = 3i + 2j - 5k$ if the applied force $F = 2i - j - 3k$ is (a) 19 J (b) 12 J (c) 18 J (d) 21 J
20. If at least one component of a vector is a positive number, the vector cannot..... (a) be zero (b) have any negative component (c) have 2 dimensions (d) have 3 dimensions

SECTION 2

1. Sketch a PV-diagram to show the variation between pressure and volume for isothermal and adiabatic gas expansion.
2. A bullet of mass 12Kg travelling at 100m/s strikes and is absorbed by a 85kg object which is at rest. Find the common speed with which the two objects move off after collision.
3. Find the time for one revolution of the circle of a conical pendulum if the string that is 100 cm makes an angle of 35°C with the vertical
4. If 0.8kg aluminum at a temperature of 200°C is dropped into an insulated beaker containing 0.5kg water at temperature of 10°C . what is its final temperature. (Specific Heat Capacity Al= 0.899×10^3)

NTUEN TALENT ANTHONY (NTA)

5. A boy is pulled 22m in the direction of angle 60° to the horizontal with a constant force 10N. Calculate work done.

University of Uyo
Department of Physics
First Semester Examination 2021/2022 session
General physics I (PHY 111) Time: 75 mins.

Name: Reg. No.:

Sex: ... Department: Sign:

Instructions: Answer ALL Questions. Mark X the box corresponding to the correct answer.

- Pressure decreases as volume in Boyle's law. (a) decreases (b) same (c) increases (d) none of the above
- In Charles' law, increase in volume causes an in temperature. (a) Decrease (b) double (c) constant (d) increase
- Which of these is correct for pressure law (a) $\frac{P_1}{T_1} = \frac{P_2}{T_2}$ (b) $P_1 P_2 = T_1 T_2$ (c) $\frac{P_1}{T_2} = \frac{P_2}{T_1}$ (d) $P_1 T_1 = P_2 T_2$.
- The fractional increase of length per unit rise of temperature is called (a) area expansivity (b) linear expansivity (c) cubic expansivity (d) none of the above.
- Calculate the pressure experienced by a diver at the depth of 40 m of sea water. Density of sea water is 999.7 kg/m³. A. 399.9 Nm⁻² B. 39.99 Nm⁻² C. 24.99 Nm⁻² D. 249.75 Nm⁻²
- The best thermometer for measuring temperature between -30 to 500 °C is A. Mercury-in-glass B. platinum resistance C. thermocouple D. optical pyrometer
- A linear spring has a spring constant 21.2 N/m. What force is required to increase its length by 1.2 cm? A. 2.54 N B. 0.025 N C. 0.25 N D. 1.00 N
-is the fractional increase in volume per unit increase in pressure. A. strain B. compressibility C. Bulk modulus D. shear modulus
- The transfer of heat from one end of a rod to the other end without relative movement of the particles of the rod is (A) radiation (B) conduction (C) convection (D) thermodynamic.
- A block of copper of mass 0.2 kg at an initial temperature of 77°C is placed in water. When thermal equilibrium is attained, the temperature of the mixture is 35°C. How much heat is lost by the copper block? Take the specific heat capacity of copper as 400Jkg⁻¹K⁻¹. (A) 5040J (B) 3360J (C) 8400J
- In the determination of specific heat capacity by method of mixtures, one of these apparatus is used to support the thread holding the object whose specific heat capacity is to be determined (A) heater (B) glass rod (C) thermometer (D) felt.
- The dimension for work done is (a) ML^2T^{-2} (b) MLT^{-2} (c) MLT^{-1} (d) MT^{-2}
- A body is projected at an angle of 30° to the horizontal with initial velocity of 10 m/s. Calculate the time to reach the maximum height. Take ($g = 10ms^{-2}$) (a) 1.0 s (b) 0.5s (c) 6s (d) 11s
- The slope of distance time graph gives (a) Acceleration (b) Instantaneous acceleration (c) Velocity (d) Instantaneous velocity.
- When a body is rigid, it is regarded as a particle located in its.....
- A. Stable Equilibrium B. Centre of Gravity C. Axis of Rotation D. Rotational Inertia
- Find the angular momentum due to daily rotation of the earth about its axis. Data: $M_e=6\times 10^{24}$ Kg, $R_e=6.4 \times 10^6$ m, $\omega=1/86400$ rps. A. 8.2×10^{39} J.s B. 10.4×10^{39} J.s C. 6.4×10^{39} J.s D. 7.1×10^{39} J.s

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17. A uniform circular disc of radius 0.5 m and mass 5 kg rotates about its axis at 10rps. Determine the torque required to bring it to rest in 2s. A. 33 N.m B. 2.8 N.m C. 44 N.m D. -22.77 N.m

18. A body of mass 5kg drawn at a constant speed through a distance 6m along the horizontal with constant magnitude 10N and 30° with the horizontal. What is the work done?

- (A) 52MN (B) 62.1j (C) 52j (D) -52j

19. A body of mass 10kg drawn at a constant speed through a distance 5m along horizontal with magnitude 10N and 30° to the horizontal. What is work-done

- (A) -7.0j (B) 7.0j (C) 43.3j (D) -43.0j

20. Determine the work done by friction in moving a body along a horizontal plane with a magnitude of 10N at a 6m distance (A) 52j (B) -52N (C) 52j (D) -52W

20. A man weighs 45 N stands in a lift that accelerated at 5 m/s^2 from ground floor to the fifth floor.

Determine his apparent weight during the motion take $g = 10 \text{ m/s}^2$. (a) 78 (b) 67.5 (c) 50 (d) 55

21. The resultant force on him as the lift goes up (a) 22.5 (b) 55 (c) 45 (d) 33.5

22. k , k will be ----- in magnitude (a) directional (b) imaginary (c) unity (d) positional

TEST

1. Which of these is correct for area expansivity β (a) $A_2 = (1 + 2\alpha\theta)$ (b) $A_2 = A_1(1 + 2\alpha\theta)$ (c) $A_2 = 2A + \alpha\theta$ (d) $A_2 = A_1(A + 3\alpha\theta)$.

2.denotes the force exerted on a body. A. tensile stress B. tensile strain C. elasticity D. extension

3. The three phases of matter are (A) evaporation, plasma, ice (B) conduction, convection, radiation (C) solid, liquid, gas (D) mass, weight, space,

4. The S. I. Unit of heat capacity is (A) JK^{-1} (B) J (C) kg (D) $\text{JKg}^{-1}\text{K}^{-1}$.

5. Using dimensional analysis, which of the following is the correct unit for force.
(a) Kgms^{-2} (b) $\text{Kgm}^2\text{s}^{-2}$ (c) $\text{Kgm}^2\text{s}^{-2}$ (d) Kgm/s

6. (18) Convert 144km/hr to m/s (a) 20 m/s (b) 40m/s (c) 35 m/s (d) 25 m/s

7. Find the kinetic energy of a thin ring of mass 2.7Kg & radius 8cm rotating about an axis through its centre and perpendicular to the plane of the ring at 1.5rps. A. 0.37J B. 2.8J C. 8.6J D. 0.763J

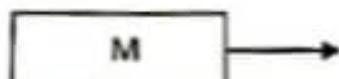
8. A watch has a second hand which is 2.0 cm long. Determine the speed of the tip of the second hand relative to the watch. A. $2.1 \times 10^{-3} \text{ m/s}$ B. $5.25 \times 10^{-3} \text{ m/s}$ C. $9.2 \times 10^{-5} \text{ m/s}$ D. $7.1 \times 10^{-3} \text{ m/s}$

9. Which of these is a non-renewable energy (A) solar (B) hydro (C) wind (D) coal

10. An ideal machine is one with the efficiency of (A) 100% (B) 80% (C) 50% (D) 0%

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17. A disk of 20cm radius has rotational inertia, 0.04kg.m^2 . Find the angular acceleration if 30N force is applied tangentially to the disk periphery. A. 150 rad/s^2 B. 125 rad/s^2 C. 50 rad/s^2 D. 15 rad/s^2



18. A block of mass m is pulled over a distance d by an applied force F which is directed parallel to the displacement. How much work is done on the block by the force F . (A) mFd (B) Zero (C) $-Fd$ (D) Fd
19. A block of mass m is moved over a distance applied force F is directed perpendicular to the displacement of the block. How much work is done on the block by the force
(A) mFd (B) Zero (C) Fd (D) $-Fd$
20. A container with a mass of 5kg is lifted to a height of 8m. How much work is done by the gravitational force?
(A) -400J (B) 400J (C) 50J (D) -50J
21. A man weighs 55 N stands in a lift that accelerated at 4 m/s^2 from ground floor to the fifth floor. Determine his apparent weight during the motion take $g = 10\text{m/s}^2$. (a) 78 (b) 69 (c) 40 (d) 77
22. The resultant force on him as the lift goes up (a) 33 (b) 55 (c) 22 (d) 77
23. I. I will be ----- in magnitude (a) directional (b) unity (c) dimensionless (d) positional

TEST

- The variable that is constant in Boyle's law is (a) Pressure (b) temperature (c) mass (d) energy.
- The unit of coefficient of surface tension is A. m B. N C. N/cm D. N/m
- The quantity of heat required to raise the temperature of a unit mass of the substance by 1 kelvin is (A) heat capacity (B) specific heat capacity (C) black body (D) evaporation.
- The S. I. Unit of heat is (A) J (B) kg (C) JKg^{-1} (D) $\text{JKg}^{-1}\text{K}^{-1}$.
- An object comes to rest after being in motion for some time if (a) Its final velocity is zero (b) Its initial velocity is zero (c) Its final velocity equals twice the initial velocity (d) none of the above.
- (14) What happens when an object moves at constant velocity? (a) Its final velocity is less than its initial velocity (b) Its acceleration is zero (c) Initial velocity is zero (d) Final velocity is zero.
- Given that $I = \frac{2}{5}Mr^2$ for a sphere with axis through its centre. Find the moment of inertia, I for an axis tangent to the sphere. A. $\frac{7}{5}Mr^2$ B. $\frac{3}{5}Mr^2$ C. $\frac{1}{12}Mr^2$ D. $\frac{3}{10}Mr^2$
- Find the moment of inertia for a heavy wheel of radius 20 cm mounted on a horizontal axle if a rope wrapped around its rim is pulled straight downward with a constant force of 50N at 5 rad/s^2 . A. 20.20 Kg.m^2 B. 22.40 Kg.m^2 C. 18.20 Kg.m^2 D. 2.00 Kg.m^2
- What happened to the kinetic energy of a moving object if the net work done is positive
(A) K.E increases (B) K.E remain same (C) K.E is zero (D) K.E decreases
- A container with a mass of 5kg is lifted to a height of 8m and then returned back to the ground level. How much work is done by gravitational force? (A) -400J (B) -400J (C) -50J (D) Zero

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