UMMUL QURA HIGH SCHOOL
AROWONA BUS-STOP, AMULOKO-AKANRAN ROAD, IBADAN.
2020/2021 MOCK EXAMINATION

SUBJECT: Physics   DURATION : 3:00hrs

CLASS: SS 3   INSTRUCTION: Attempt section A and B

OBJECTIVES

1. The rising if *liquid* in an open ended glars tube of narrow bore
   A. Osmosis
   B. Adhesion
   C. Capillarity
   D. Surface tension

2. The total area under *force – velocity* time graph represents?
   A. Energy
   B. Momentum
   C. Power
   D. Pressure

   The use the information below to answer *questions 3 and 4*
   A body of mass 20g *projected* vertically upwards in vacuum returns to the point of *projection* after 1.2s { $g = 10ms^{-2}$}

3. Calculate the speed of projection
   A. $0.6 ms^{-1}$
   B. $1.2 ms^{-1}$
   C. $6.0 ms^{-1}$
   D. $12.0 ms^{-1}$

4. Determine the *potential energy* of the body at the maximum height of its motion
   A. 0.36J
   B. 0.72J
   C. 360J
   D. 720J

5. The maximum displacement on *either* side of the equilibrium position of an object in simple harmonic motion represents
   A. Period
   B. Amplitude
   C. Wave length
   D. Frequency

6. From Newton's *first law* of motion
   A. A body can only undergo translational motion
   B. Once a body remains at rest no force acts on it
   C. The net force acting on a body in uniform linear motion is zero
   D. A body's inertia is its weight

7. The *velocity ratio* of an inclined plane
   A. Increases with increase in angle of inclination
   B. Increase with decrease in the angle of inclination
   C. Decreases with decrease in the angle of inclination
   D. Is independent of the angle of inclination

8. Which of the following is *equivalent* to watt?
   A. $Kgms^{-2}$
   B. Kgm^2s^{-3}
   C. Kgm^2s^{-2}
   D. Kgm^2s^{-1}

9.

$F \longleftarrow$ [5kg] $\longrightarrow$ P= 40N
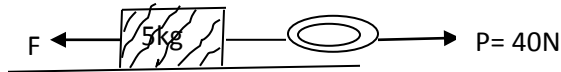
A block of wood of mass 5kg is pulled in a platform by a force of **40N** as illustrated in the diagram above. If the frictional force experienced by the block is **12N**, calculate the magnitude of the acceleration of the block.

A. 2.4 ms^{-2}

B. 5.6ms^{-2}

C. 8.0ms^{-2}

D. 10.4ms^2

10. The **thermopile** is a device for detecting

A. radioactive radiation

B. radiant energy

C. x-ray

D. the presence of electrons

11. The time of flight for a **projectile** motion is given by the expression

A. $\dfrac{U \sin\theta}{g}$

B. $\dfrac{U \sin\theta}{2g}$

C. $\dfrac{2U \sin\theta}{g}$

D. $\dfrac{U \sin 2\theta}{g}$

12. A body is dropped from the top of a tower. If it takes 4s for it to reach the ground, **calculate** the height of the tower ($g = 10$ms^{-2} ingnore air resistance)

A. 20m

B. 4m

C. 80m

D. 160m

13. Which of the following used to **determine** the relative density of an acid?

A. Hydrometer

B. Hypsometer

C. Manometer

D. Hygrometer

14. A metal ball of weight **W** falls through a column of glycerin of viscosity **V**. If the ball experiences velocity is attained, then

A. $W > U + V$

B. $W = V + U$

C. $W = U - V$

D. $W < U + V$

15. A simple pendulum makes **50 complete oscillations** in one minute. **Determine** its period of oscillation.

A. 0.04s

B. 0.83s

C. 1.20s

D. 50.00s

16. Which of the following substances is the **most** volatile at room temperature?

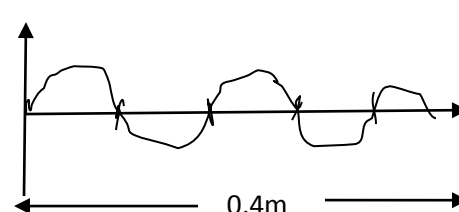A. Water

B. Diesel

C. Petrol

D. Kerosene

17. The derived **unit of pressure** can be expressed as

A. kgms^{-2}

B. kgm^{-1}s^{-2}

C. kgm^{-2}s^{-2}

D. kgm-1s^2

18. A bird flies at 10ms^{-1}for 3s, 15ms^{-1} for 3s and 20ms-1 for 4s. **Calculate** the bird's average speed.

A. 4.5 ms^{-1}

B. 15.0 ms^{-1}

C. 15.5 ms^{-1}

D. 51.7 ms^{-1}

19. The tendency for a stationary body to continue to remain at rest when a force is applied to it is **known** as
    A. Friction
    B. Impulse
    C. Inertia
    D. Momemtum

20. A resultant force of magnitude **15N** acts on a body of mass 250kg. **Calculate** the magnitude of the acceleration
    A. $0.06ms^{-2}$
    B. $3.75ms^{-2}$
    C. $16.67ms^{-2}$
    D. $60.00ms^{-2}$

21. A body is pulled through a distance of **500m** by a force of 20N. If the power developed is 0.4kw, **calculate** the time for which the force acts
    A. 250.0s
    B. 25.0s
    C. 2.5s
    D. 0.5s

22. A metal sheet of area $100cm^2$ was heated through 70^0C. **Calculate** its new area if the linear expansivity of the metal is $0.000017k^{-1}$
    A. $100.06cm^2$
    B. $100.12cm^2$
    C. $100.24cm^2$
    D. $100.36cm^2$

23. In the formation of sea breeze, wind blows **from**
    A. Sky to land
    B. Sea to sky
    C. Land to sea
    D. Sea to land

24. Which of the following **factors** decreases the rate of evaporation of a liquid?

A. Increase in pressure over the liquid
B. Lowering the boiling point
C. Decrease in humidity
D. Wind

25. When two waves are super imposed on each other, the following occurrence are possible **Except**
    A. Nodal lines
    B. Anti nodal lines
    C. Stationary waves
    D. Dispersion

26. Which of the following **properties** of waves is exclusive to transverse waves?
    A. Reflection
    B. Interference
    C. Diffraction
    D. Polarization

27. A screw-jack has the distance between its successive threads as **P** and the length of its tommy bar as **r**. Its velocity ratio is given by the expression
    A. $2\pi r^2/P$
    B. $2\pi r/P$
    C. $2\pi/P$
    D. $P/2\pi r$

28.

0.4m

The diagram above illustrate an **electromagnetic wave** travelling with speed $3.0 \times 10^8 ms^{-1}$. **Calculate** the wave length of the wave.

A. 0.05m
B. 0.15m
C. 0.16m

D. 0.40m

29. The temperature at which the water vapour in the air saturates the air and begins to condense is **known** as
    A. Dew point
    B. Critical point
    C. Boiling point
    D. Triple point

30. The chemical of state from solid to liquid **occurs**
    A. At constant temperature
    B. When temperature is lower than the boiling point
    C. When temperature is just near freezing point
    D. When temperature is equal to the boiling point

31. Which of the following **types** of **thermometer** can be used to measure a range of temperatures from -50^0C to 50^0C?
    I.   Clinical
    II.   Mercury-in –glass
    III.   III Alchohol-in-glass
    A. I only
    B. II only
    C. III only
    D. I and II only

32. A **transverse wave** can be distinguished from a longitudinal wave by
    A. Diffraction
    B. Reflection
    C. Refraction
    D. Polarization

33. The super-position of wave to **produce** maximum or zero effect at a point is **known** as
   A. Reflection
    B. Reflection
    C. Interference

D. Diffraction

34. The dimension of momentum are
    A. MLT
    B. $ML^{-1}T^{-1}$
    C. MLT^{-1}
    D. $ML^{-1}T^{-2}$

35. A student measures the **volume** of a liquid using a measuring cylinder. What else needs to be measured by the student in order to determine the density of the liquid?
    A. Depth of the liquid in the cylinder
    B. Mass of the cylinder
    C. Mass of the liquid
    D. Temperature of the liquid
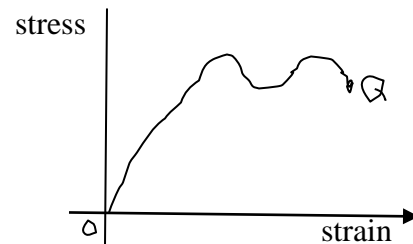
The diagram above represents the graph of stress against strain for an elastic wire. The point **Q** on the graph is the

A. Elastic limit
B. Breaking point
C. Yield point
D. Proportional limit

36. A ball dropped from the top of a tower. Due to air resistance, it

reaches terminal velocity. Which of the following statement(s) about its motion is/are *correct*?

    I.   The acceleration of the ball is zero

    II.   the net force on the ball is zero

    III.   the velocity of the ball increases

A. I only

B. I and II only

C. I and III only

D. I, II, and III

37. Which of the following *substances* lowers the surface tension of water?

A. Metal

B. Sand

C. Detergent

D. Paper

38.   F/N
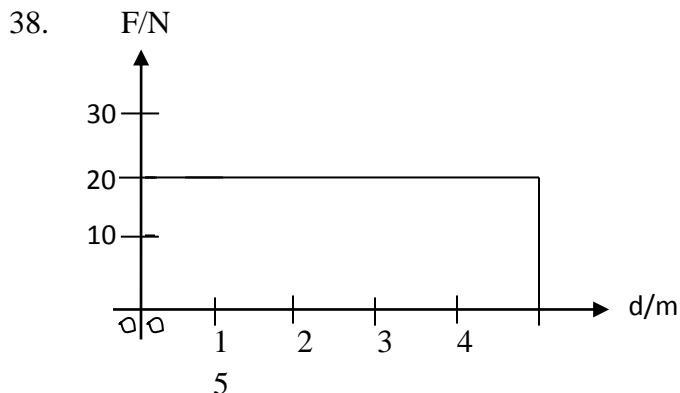


The diagram above illustrates a force – distance graph for the motion of a wooden block. *Determine* the work done on the block when moved through a distance of 5m.

A. 4J

B. 15J

C. 25J

D. 100J

39. The two positions of a body undergoing a *uniform accelerated*

motion are (10s, 10ms^{-1}) and (30s, 50ms^{-1}) on the velocity-time graph. *Calculate* the magnitude of the acceleration of the body.

A. 0.5ms^{-2}

B. 2.0ms^{-2}

C. 10.0ms^{-2}

D. 40.0ms^{-2}

40. At a birthday party, the celebrant pops a corked fruit wine. If the cork shoots out of the bottle at an angle of 40^0 to the horizontal and travels a horizontal distance of 4.50m in 1.25s, *calculate* the initial speed of the cork.

A. 4.2ms^{-1}

B. 4.7ms^{-1}

C. 5.6ms^{-1}

D. 7.1ms^{-1}

41. When a body is thrown *vertically* upward its velocity at the maximum *height* is

A. Maximum

B. Zero

C. Double its initial value

D. Half its initial value

42. The mouth piece of a telephone handset *converts*

A. Electrical energy to sound energy

B. Sound energy to electrical energy

C. Sound energy to radio wave

D. Radio wave to sound energy

43. *Four* identical trolleys are loaded with different masses and move along a straight road at the same speed. Which of the trolleys has the greatest inertia?

A.

B.

4Kg

C.

6Kg

D.

8Kg
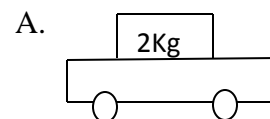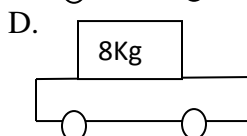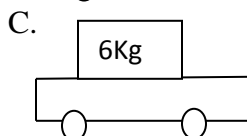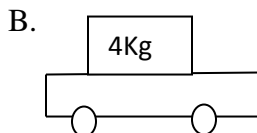
44. Which of the following statements correctly **defines** the following point of a liquid? the temperature at which the
   A. Saturated vapour pressure equals atmospheric pressure
   B. Molecules leave the liquid at a rate equal to the rate at which they return
   C. Molecule leave the liquid at a rate higher than that at which they return
   D. Molecules leave the liquid at a rate lower than the rate at which they return

45. An aluminium rod of length 1.8cm at 10^0C is heated to produce a difference in length of 0.007m. **Calculate** the temperature to which it is heated. (Linear expansivity of aluminium = 2.3 x 10^{-5}k-^{1}).
   A. 155^0C
   B. 160^0C
   C. 169^0C
   D. 179^0C

46. A **mercury-in-glass** thermometer reads 4cm at ice point and 29cm at stream point. **Calculate** the temperature when the mercury level is at 9cm.
   A. 13^0C

B. 20^0C
C. 33^0C
D. 38^0C

47. The continuous stirring in the method of mixtures to determine the specific **thermal capacity** of a substance ensures
   A. Continous dissipation of heat to the room
   B. Uniform distribution of thermal energy to all part of the mixture
   C. That thermal energy is confined to the miture
   D. That there is rapid heat exchange

48. Given that *V, F and* λ are the velocity, frequency and wavelength of a wave respectively, which of the following equation is **correct**?
   A. $V = f^2\lambda$
   B. $F = \frac{V}{\lambda}$
   C. $F = \frac{V}{\lambda^2}$
   D. $\Lambda = \frac{f}{v^2}$

49. Three letters are placed in front of a plane mirror as illustrated in the diagram below. The image informed is illustration by

JEL   Mirror

A. $\mathsf{J \in J}$

B. $\mathsf{J \exists L}$

C. $\mathsf{J \exists \top}$
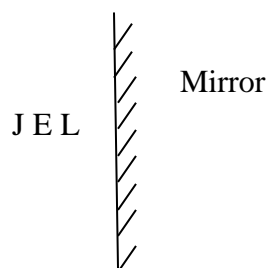
D. $\mathsf{\lceil \exists J}$

50. The distance between two successive twughs of a wave is 0.4m. If the frequency of the source is 823Hz, calculate the sspeed of the wave.

A. 165.0ms^{-1}
B. 330.0ms^{-1}
C. 412.0ms^{-1}
D. 825.0ms^{-1}

SECTION B: THEORY (PART I)

TIME ALLOWED:

Instruction: Answer *all* questions in this part

PART I

(1). State the *dimension* of

    (a) Impulse
    (b) Acceleration
    (c) Work

(2). A particle is projected horizontally at 15ms^{-1} a height of 20m. *Calculate* the horizontal distance covered by the particle just before hitting the ground. (g = 10ms^{-2})

(3). State *one* similarity between energy and power

(b). A resistance *thermometer* has a resistance of 25 Ω at 0^{0}C and 100Ω at 100^{0}C. *Calculate* the resistance when the temperature is 67^{0}C.

(4). Explain the *principle* of conservation of energy using a swinging pendulum.

(5). Define *surface tension*

(b). State *two* methods by which the surface tension of a liquid can be reduced

PART II

Instructions: Answer any *three* questions from this section

(6a)i. Mention *two* phenomena that is due to condensation of water vapour in the atmosphere

(ii). State *two* similarities between boiling and evaporation

(6b). Explain the energy *transformation* of a falling body

(6c). A block and tackle system of pulleys consisting of 5 pulleys is used to raise a load of 500N through a height of 12m. If the total **workdone** by the system is 7200J, **Calculate** the:

   i. Work done against friction
   ii. Efficiency of the system

7(a). What is the **potential difference**?

(b). A water heater is rated 1200W, 220V. Calculate:

   i. Its resistance

   ii. The cost of operating 5 water heaters for 5 hours (1Kwh = #34.00)

(c). Define **boiling point** of a liquid

(d). State **three** applications of expansion of metals.

(8). List **two** factors each that affect heat host by

   i. Radiation

   ii. Convection

(b). State **two** factors that determine the quantity of heat in a body.

(c). Explain the **statement**: the specific latent of vaporization of mercury is $2.72 \times 10^5 JK^{-1}K^{-1}$
.

(d). A jug of heat capacity $250JK^{-1}$ contains water at 28^0C. An electric heater of resistance 35Ω connected to a 220v source is used to raise the temperature of the water until it boils at 100^0C in 4minutes, after another 5minutes, 300g of water has evaporated, **assuming** no heat lost to the surrounding, **calculate** the:

   (i). Mass of water in the jug **before** heating

   (ii). Specific **latent heat** of vaporization of steam.

   [specific heat capacity of water = $4200JK^{-1}K^{-1}$]

(9a). List **two** uses of rockets

(b). Define the **principle** of conservation of linear momentum and state **one** example of it.

(c). A ball of mass 200g released from a height of 2.0m hits a horizontal floor and rebounds to a height of 1.8m. **Calculate** the impulse received by the floor. ($g = 10ms^{-2}$)

(d). A body of mass 20g performs a simple harmonic motion at a frequency of 5Hz. At a distance of 10cm from the mean position, its 200cms^{-1}, **calculate** its:

    i. Maximum **displacement** from the mean position

    ii. Maximum **velocity**

    iii.   Maximum **potential energy** (g = 10ms^{-2})

(10). Explain the term

    i. Specific latent heat of **vaporization**

    ii. Specific latent heat of **fusion**.

(b). List **uses** of the hydraulic press

(c) . Define **fundamental interval**

(d). A nursing mother prepared her baby's milk mixture at 85^{0}C, in a feeding bottle . In other to cool it to 40^{0}C, She immersed the bottle in an **aluminium** bowl of heat capacity 90JK^{-1} containing 500g water at 26^{0}C. If mass of the mixture is 300g, **calculate** the specific heat capacity of the mixture:

[Neglect the heat losses heat capacity of the bottle: specific heat capacity of the water = 4200JKg^{-1}k^{-1}].

(e). Name **two** ways through which the bottles losses heat.