KITH & KIN INTERNATIONAL COLLEGE

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FIRST TERM EXAMINATION 2025/2026 ACADEMIC SESSION

NAME					
SUBJECT	PHYSICS	CLASS	SSS 2	DURATION	2 Hours

This paper consists of Sections A and B. Section A is an Objective Test of fifty (50) questions and Section B is Theory questions consisting of Five (5) questions.

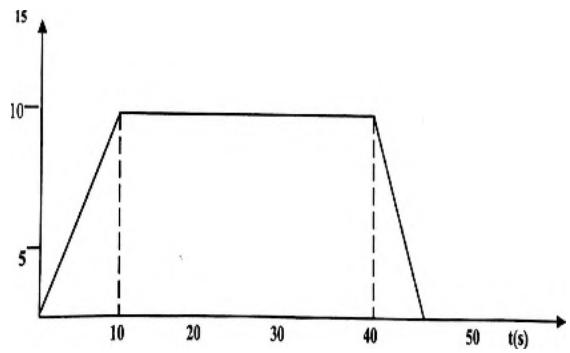
SECTION A
OBJECTIVE TEST
[50 Marks]

1) Calculate the distance between the points A (2, 3) and B (-5, 1)
   A. 7.3 units
   B. 10 units
   C. 7.6 units
   D. 9.5 units

2) Which of the following quantities is a vector?
   A. Momentum
   B. Volume.
   C. Speed.
   D. Energy

3) The following are derived units except
   A. kgm^{-3}
   B. N
   C. Ns
   D. kg

4) A palm fruit dropped to the ground from the top of a tree 45m tall. How long does it take to reach the ground? [g=10ms^{-2}]
   A. 9s
   B. 3s
   C. 6s
   D. 7.5s



5) The diagram above shows a velocity- time graph representing the motion of a car. Find the total distance covered during the acceleration and retardation periods of the motion.
   A. 75m
   B. 150m
   C. 300m
   D. 375m

6) When a body is thrown vertically upwards, its velocity at the maximum height is
   A. zero
   B. maximum
   C. half its initial velocity
   D. doubles its initial velocity

7) A small metal ball is thrown vertically upwards from the top of a tower with an initial velocity of 20ms^{-2}. If the ball took a total of 6 seconds to reach the ground level, determine the height of the tower.(g=10ms^{-2})
   A. 20m
   B. 60m
   C. 80m
   D. 120m

8) Two points on a velocity time graph have coordinates (5s, 10ms^{-1}) and (20s, 20ms^{-1}) an Calculate the mean acceleration between the two points.

A.0.67ms^{-2}
B. 0.83ms^{-2}
C. 1.50ms^{-2}
D.2.00ms^{-2}

9) A body accelerates uniformly from rest at 2 ms^{-2}. Calculate its velocity when it has travelled a distance of 9m
A. 4.5ms^{-1}
B. 3.0ms^{-1}
C. 18.0ms^{-1}
D. 6.0ms^{-1}

10) In free fall, a body of mass 1kg drops from a height of 125m from rest in 5s. How long will it take another body of mass 2kg to fall from rest from the same height?
[g=10ms^{-2}]
A. 5s
B. 10s
C. 12s
D.14s

11) A ball of mass 5.0kg hits a smooth vertical wall normally with a speed of 2ms^{-1} and rebounds with the same speed. Determine the impulse experienced by the ball.
A. 10 kgms^{-1}
B. 20 kgms^{-1}
C. 25 kgms^{-1}
D. 30kgms^{-1}

12) The change in volume when 450kg of ice is completely melted is?
(Density of ice = 900kgm^{-3},density of water = 1000kgm^{-3})
A. 0.05m^3
B. 0.45m^3
C. 4.50m^3
D. 0.50m^3

13) The diagram shows an object is being acted upon by two forces.

What is the size of the resultant force on the object?
A. 3.0 N
B. 9.0 N
C. 18.0 N
D. 2.0 N

14) Two forces whose resultant is 100N are at right angles to each other. If one of them makes an angle of 30° with the resultant, determine its magnitude.
A. 8.66N
B 50 0N
C. 57.7N
D. 86.60N

15) The density of 400cm^3 of palm oil was 0.9gcm^{-3} before frying. If the density of the oil was 0.6gcm^{-3} after frying, assuming no loss of oil due to spilling, what was its new volume?
A. 360cm^3
B. 600cm^3
C. 240cm^3
D. 800cm^3

16) The slope of a straight-line displacement -time graph indicate
A. distance travelled.
B. uniform velocity.
C. uniform acceleration.
D. acceleration at instant.

17)The two position of a body undergoing uniformly accelerated motion are (10s, 10m^{-1}) and (30s, 50 m^{-1}) on the velocity-time graph. Calculate the magnitude of the acceleration of the body.
A. 10.0ms^{-2}
B. 2.0ms^{-2}
C. 0.5ms^{-2}
D. 40.0ms^{-2}

18) A uniform metre rule is balanced on a fulcrum placed at the 35 cm mark by suspending a mass of 120 g at the 10 cm mark. Calculate the mass of the metre rule?
A. 129g
B. 60g
C. 80g
D. 200g

19) A body of weight 20N displaces 12N of the liquid in which it is immersed. What is the upthrust of the liquid on the body?
A. 5N
B. 12N
C. 25N

D. 32N

20) A body of mass l00g moving with a velocity of 10.0ms^{-1} collides with a wall. If after the collision, it moves with a velocity of 2.0ms^{-1} in the opposite direction, calculate the change in momentum.
A.0.8Ns
B. 1.2Ns
C. 12.0Ns
D. 80.0Ns

21) When taking a penalty kick, a footballer applies a force of 30.0N for a period of0.05s. If the mass of the ball is 0.075kg, calculate the speed with which the ball moves off.
A. 4.50ms^{-1}
B.20.0ms^{-1}
C.30.0ms^{-1}
D. 45.00ms^{-1}

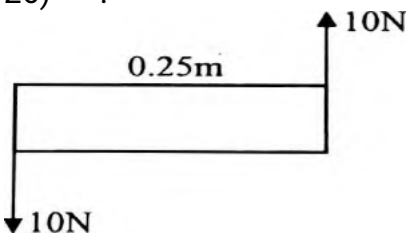
22) An object decelerates from 25.0ms^{-1} to 5.0ms^{-1} in a time of 4.0s. It has a mass of 540kg. What is the resultant force on the object?
A. 0.63N
B. 2700N
C. 250N
D. 4000N

23) A bullet fired at a wooden block of thickness 0.15m manages to penetrate theblock. If the mass of the bullet is 0.0025kg and the average resisting force of the wood is
7.5 x 10^{3}N, calculate the speed of the bullet just before it hits the wooden block.
A. 450ms^{-1}
B. 400ms^{-1}
C. 300ms^{-1}
D. 250ms^{-1}

24) A solid of weight 0.60N is totally immersed in oil and water respectively. If the upthrust in oil is 0.210N and the relative density of oil is 0.875, find the upthrust in water.
A. 0.600N
B. 0.360N
C. 0.240N
D. 0.180N

25) An 800kgcar moving at 72kmh^{-1} collides with a 1200kg car moving at 36kmh^{-1} in the same direction. If the cars stick together, calculate their common velocity.
A. 7ms^{-1}
B. 14ms^{-1}
C. 21ms^{-1}
D. 28ms^{-1}

26) .



In the figure above, calculate the magnitude of the couple.
A. 2.50Nm
B. 3.25Nm
C. 0.25Nm
D. 25Nm

27) A uniform rod PQ of length 1m and mass 2kg is pivoted at the end P. If a load of 14N is placed at the centre of the rod, find the force that should be applied vertically upwards at Q to maintain the rod in equilibrium horizontally. (g=10ms^{-2}).
A. 68N
B.17N
C. 20N
D. 7N

28) If a solid X floats in liquid P of relative density 2.0 and in liquid Q of relative density 1.5, it can be inferred that the
A. weight of P displaced is greater than that of Q
B. volume of P displaced is less than that of Q
C. volume of P displaced is greater than that of Q
D. weight of P displaced is less than that of Q

29) A bullet of mass m is fired from a gun of mass M with a velocity v. The recoil velocity of the gun is expressed as
A. $\frac{Mv}{m}$

B. $\frac{Mv}{m-M}$

C. $\frac{mv}{M}$

D. $\frac{mv}{M-m}$

30) A body of mass 4kg resting on a smooth horizontal plane is simultaneously acted
upon by two perpendicular forces 6N and 8N. Calculate the acceleration of the motion.
A. 2.52ms^{-2}
B. 3.0ms^{-2}
C. 4.0ms^{-2}
D. 4.5ms^{-2}

31) An object is projected with a velocity of 100ms^{-1}from the ground level at an angle θ to the vertical. If the total time of flight of the projectile is 10s, calculate θ. (g=l0ms^{-2})
A.80^{o}
B.60°
C. 50^{o}
D. 66^{o}

32) An object is projected with a velocity of 100ms^{-1} at an angle of 60^{o} to the vertical. Calculate the time taken by the object to reach the highest point. (Take g=10ms^{-2}).
A. 4s
B. 7s
C. 9s
D. *5s.*

33) In a school compound, a girl walks 40 m due east from the laboratory to the staff room to submit her report. Then she turns and walk 30 m due north to her classroom. Determine the magnitude of her displacement from the laboratory?
A. 10 m
B. 35 m
C. 50 m
D. 70 m

34) A body starts from rest and moves with uniform acceleration of 6ms^{-2}. What distance
does it cover in the third second?
A.15m
B. 18m
C. 27m
D. 30m

35) A car starts from rest and covers a distance of 40 m in 10 s. Calculate the magnitude of its acceleration.
A. 0.25 ms^{-2}
B. 0.80 ms^{-2}
C. 3.20 ms^{-2}
D. 4.00 ms^{-2}

36) A rocket bums fuel at the rate of 10kgs^{-1}and ejects it with a velocity of5 × 10^{3}ms^{-1}. The thrust exerted by the gas on the rocket is
A. 2.5 × 10^{3} N
B. 5.0 × 10^{4} N
C. 5.0× 10^{3} N
D. 2.05 × 10^{2} N

37). A lead bullet of mass 0.05kg is fired with a velocity of 200ms^{-1} into a lead block of mass 0.95kg. Given that the lead block can move freely, the final K.E after impact is
A. 50J
B. 100J
C. 150J
D. 200J

38). A mass attached to a string is moving in a circular path. If the speed is doubled, the tension in the string will be
A. doubled
B.four time as great
C. halved
D. one-fourth as much

39) A particle in circular motion performs 30 oscillations in 6 seconds. Its angular velocity is?
A. 5π rads $^{-1}$
B. 10πrads $^{-1}$
C. 6rads $^{-1}$
D. 5rads^{-1}

40) A particle of mass 10^{-2}kg is fixed to the tip of a fan blade which rotates with angular velocity of 100 rads^{-1}. If the radius of the blade is 0.2m, the centripetal force is:

A. 2N
B. 20N
C.200N
D. 400N

41) An engine of a car of power 80kW moves on a rough road with a velocity of$32ms^{-1}$. The force required to bring it to rest is
A. 2.56×10^6N
B. 2.50×10^3N
C. $2.30 \times I0^6$N
D. 2.80×10^3N
.

42) The driver in a motor car, of which the total mass is 800kg and which is travelling at $20ms^{-1}$, suddenly observes a stationary dog in his path 50m ahead. If the car brakes can exert a force of 2000N, what will most likely happen?
A. The car will be able to stop immediately the driver notices the dog.
B. The car will stop 30m after hitting the dog.
C. The car will stop 20m in front of the dog.
D. The driver will quickly reverse the car.

43) A force of 16N applied to a 40kg block that is at rest on a smooth, horizontal surface. What is the velocity of the block at t = 5 seconds?
A. $4ms^{-1}$
B. $20ms^{-1}$
C. $50ms^{-1}$
D. $80ms^{-1}$

44) A constant force of magnitude F acts on an object of mass 0.04kg initially at rest at a point O. If the speed of the object when it has moved 50m from O is $500ms^{-1}$.What is the value of F?
A. 0.4N
B. 100.0N
C. 250.0N
D. 1000.0N

45) A body of mass 100g moving with a velocity of $10.0ms^{-1}$ collides with a wall. If after the collision, it moves with a velocity of $2.0ms^{-1}$ in the opposite direction, calculate the change in momentum.
A. 0.8Ns

46) A plane inclined at an angle of 30° to the horizontal has an efficiency of 60%.The force parallel to the plane required to push a load of 120N uniformly up the plane is
A. 60N
B. 100N
C. 120N
D. 200N

47) A machine whose efficiency is 60% has a velocity ratio of 5. If a force of 500N is applied to lift a load P, what is the magnitude of P?
A. 750N
B. 1500N
C. 500N
D. 2000N

B 4.0Ns
C.12Ns
D 80Ns

48) An object of mass 2kg moves with a uniform speed of 10ms for 5s along a straight path. Determine the magnitude of its acceleration.
A. $2ms^{-1}$
B. $3ms^{-1}$
C. $4ms^{-1}$
D. $6ms^{-1}$

49) Which of the following equation for the efficiency of a machine is correct?

A. Efficiency = $\frac{\text{velocity ratio}}{\text{mechanical advantage}} \times 100$

B. Efficiency = $\frac{\text{input}}{\text{ouput}} \times 100$

C. Efficiency = $\frac{\text{load distance}}{\text{effort distance}} \times 100$

D. Efficiency= $\frac{\text{mechanical advantage}}{\text{velocity ratio}} \times 100$

50) A plane inclined at an angle of 30° to the horizontal has an efficiency of 60%.
A. 60N
B. 100N
C. 120N
D.200N

SECTION B:THEORY
[Total Marks: 40 Marks]

*(1) Answer **Four (4) questions** from this section.*
*(2) Question no. 1 is **compulsory**.*
(3) Show all your workings clearly

1 (a) A particle is projected at an angle of 30° to the horizontal with a speed of 250ms^{-1}. Calculate the;
(i) Total time of flight of the particle
(ii) Speed of the particle at its maximum height (g = 10ms^{-2}) ***WAEC 2007*** ***(4 marks)***
(b) A car starts from rest and accelerates uniformly for 5s until it attains a velocity of 30ms^{-1}.It then travels with uniform velocity for 15s before decelerating uniformly to rest in 10s. Sketch a graph of the motion. ***(3 marks)***
(c) Using the graph above in 1(b), calculate the
(i) acceleration during the first 5s,
(ii) deceleration during the last 10s,
(iii) total distance covered throughout the motion. ***NECO 2009*** ***(3 marks)***

2 (a) A projectile is released with a speed u at an angle θ to te horizontal. With the aid of a diagram, show that the time of flight is equal to $\frac{2U\sin\theta}{g}$, where g is the acceleration of free fall. ***WAEC 2013 (2 marks)***
(b) Distinguish between mass and weight. ***(2 marks)***
A particle moving in a straight line with uniform deceleration has a velocity of 40m/s at a point P, 20ms^{-1} at a point Q and comes to rest at a point R where QR=50m.
(c) Calculate the:
(i) distance PQ;
(ii) time taken to cover PQ;
(iii) time taken to cover PR. ***WAEC,1990*** ***(6 marks)***

3 (a) Explain with the aid of a diagram what is meant by the moment of a force about a point. *(2 marks)*

(b) A uniform meter rule of mass 90g is pivoted at the 40cm mark. If the rule is in equilibrium with an unknown mass m placed at the 10cm mark and a 72g mass at the 70cm mark, determine m.

WAEC 2000 *(4 marks)*

(c) A block of volume $3 \times 10^{-5}\ m^3$ and density $2.5 \times 10^3\ kgm^{-3}$ is suspended from a spring balance with $\frac{2}{3}$ of its volume immersed in a liquid of density $900kgm^3$.

Determine the reading of the spring balance. ($g = 10\ ms^{-2}$) *WAEC 2006* *(4 marks)*

4 (a) Derive from Newton's law the relationship between force, mass and acceleration. *(2 marks)*

(b) A bullet of mass 120g is fired horizontally into a fixed wooden block with a speed of $20ms^{-1}$ .If the bullet is brought to rest in the block in 0.1s by a constant resistance, calculate the

(i) magnitude of the resistance

(ii) distance moved by the bullet in the wood. *(4 marks)*

(c) A body of mass 4.0kg moving with a speed of $2.5ms^{-1}$ collides with a stationary body of mass 0.2kg. If the two bodies stick together after collision, calculate the magnitude of the velocity with which they move. *NECO 2009* *(4 marks)*

5 (a) Draw and label a diagram of a pulley system with velocity ratio of 5. *(2 marks)*

(b) Show that the efficiency ε, the force ratio M.A and velocity ratio V.R of a machine are related by the equation $\varepsilon = \frac{M.A}{V.R} \times 100\%$ *WAEC 2006* *(2 marks)*

(c) A mass m attached to a light spiral spring is caused to perform simple harmonic motion of frequency,$f = \frac{1}{2\pi}\sqrt{\frac{K}{m}}$, where K is the force constant of the spring. If m = 0.30kg, $K = 30Nm^{-1}$and the maximum displacement of the mass from the equilibrium position is 0.015m, calculate the maximum

(i) kinetic energy of the system;

(iii) tension in the spring during the motion. [$g = 10ms^{-2}$,$\pi = 3.142$] *WAEC 2005* *(8 marks)*