KITH & KIN INTERNATIONAL COLLEGE

*7/11 Kaoli Olusanya Street, Owode Ibeshe, Ikorodu, Lagos State.*

THIRF TERM EXAMINATION 2024/2025 ACADEMIC SESSION

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| **NAME** |  |
| **SUBJECT** | **PHYSICS** | **CLASS** | **SSS 1** | **DURATION** | **2 Hours** |

**SECTION A**

**OBJECTIVE TEST [50 Marks]**

**Instruction:** *This Paper consists of two (2) Sections A and B. Section A is Objective Test of fifty (50) marks questions and Section B is Theory questions consisting of eight (8) questions to answer any other four (4) questions. (Take g = 10m/s*



1. A circuit is set up as shown in the diagram above. When the key is closed, the ammeter reading will be

A. 6A

B. 4A

 C. 2A

D. 1A

2. Which of the following statements about Archimedes' principle is correct? The upthrust on a body is a measure of the

A. mass of fluid displaced

B. weight of the body

C. volume of the body

D. weight of the fluid displaced

1. A car travelling with a uniform velocity of 30ms-1 along a horizontal road overcomes a constant frictional force of 600N. Calculate the power of the engine of the car

A. 18kW

B. 20kW

C. 180kW

D. 200kW

4. Which of the following factors does not affect the electric resistance of wire?

A. length

B. mass

C. temperature

 D. cross-sectional area

6. An object of mass 0.25kg moves at a height h above the ground with a speed of 4ms-1, if its mechanical energy at this height is 12 J, determine the value of h. [g = 10ms-1]

A. 0.8m

B. 4.0m

C. 4.8m

D. 5.6m

7.What is the density of a fuel of relative density 0.72? [Density of water = 1000kg m-3]

A. 72 kgm-3

B. 720 kgm-3

C. 7200 kgm-3

D. 72000 kgm-3

8. A body accelerates uniformly from rest at 2ms−2. Calculate its velocity when it has travelled a distance of 9m.

A. 3.0ms−1

B. 4.5ms−1

C. 6.0ms−1

D. 18.0ms−1

9.Which of the following is the dimension for impulse?

A. MLT−1

B. MLT−2

C. MLT

D. ML

10.A body weighing 14N in air is partially immersed in water. If the mass of water displaced in the process is 200g, calculate the upthrust on the body. [g=10m/s2m/s2]

A. 2.0N

B. 3.0N

C. 3.5N

D. 7.0N

8

11.Which of the following processes is not a surface phenomenon?

A. Condensation

B. Evaporation

C. Photo Emission

D. Thermionic Emission

13.A body can undergo the following types of motion except

A. random

B. rotational

C. translational

D. relative

14. The energy stored in a spring of stiffness constant k = 2000Nm−1 when extended 4cm is

A. 0.16J

B. 1.60J

C. 16.00J

D. 160.00J

15.The maximum density of water occurs at a temperature of

A. 0°C

B. 4°C

C. 37°C

D. 273°C

16. The force per unit charge experienced at a point in a field is the

A. gravitational field strength

B. electric potential

C. electric field intensity

D. magnetic field strength

16.Which of the following objects is not a conductor of electricity?

A. The Earth

B. Human body

C. Iron rod

D. Dry wood

17.Which of the following statements about static friction is correct? It

A. is independent of the nature of the surface in contact

B. depends on the area of surface in contact

C. depends on the relative motion between the surface in contact

D. depends on the weight of the moving body41



18.In the circuit diagram above, E is a battery of negligible internal resistance. If its emf is 9.0V. Calculate the current in the circuit ``

A. 1.8A

B. 1.0A

C. 0.8A

D. 0.3A

19.Which of the following is not an evidence of the particle nature of matter?

A. Diffusion

B. Brownian motion

C. Diffraction

D. Crystal structure



Use the diagram above to question 20.and 21

20. Calculate the current, I.

A. 0.60A

B. 0.97A

C. 1.03A

D. 5.00A

21. Determine the potential difference. V across the parallel resistors

A. 2.0V

B. 2.3V

C. 3.0V

D. 0.7V

22.The internationally agreed system of units (SI) for physical measurement are

A. Ib,ft,sec

B. g,m,sec

C. kg,m,sec

D. cm, g, sec

23. To determine the weight of an object you could

A. use a beam balance

B. use a spring balance

C. find the force necessary to give it a certain acceleration

D. use none of these methods

24.. Which of the following physical quantities is NOT a vector?

A. Velocity

 B. Work

C. Force

 D. Electric field intensity

25. Which of the following is NOT a fundamental S.I. unit?

A. Metre

B. Ampere

 C. Kelvin

D. Radian

26. A hot metal ball is suspended in the open air. As it cools it loses heat by

 A. conduction only

B. convection only

C. radiation only

 D. conduction and convection

27. The mode of heat transfer which does not requires material medium is

A. Conduction

B. Radiation

 C. Convection

D. Propagation (1986:Q1)

28. The vacuum in the Thermos flask helps to reduce heat

transfer by

A. Convection and radiation

B. Convection and conduction

C. Conduction and radiation

D. Radiation only.

29. When heat is applied to one end of a metal rod, the molecules at the other end soon begin to vibrate with greater amplitude than before because heat has been transferred by

A. Radiation

B. Convection

C. Conduction

D. Evaporation

30. Which of the following statements are correct?

I. Land and sea breezes are natural convection currents.

II.Convection may occur in liquids or gases but not in solids.

III. The vacuum in thermos flask prevents heat loss due to convection only.

A. I and II only

B. II and III only

C. I and III only

D. I, II and III.

31. A room is heated by means of a charcoal fire. An occupant of the room standing away from the fire is warmed mainly by

A. Convection

B. Radiation

C. Conduction

D. Reflection

(1991:Q22)

32. Water shows anomalous behaviour

A. Below 0°C

B. Between 0°C and 4°C

C. At exactly 4°C

D. Between 4°C and 100°C

33. The expansion of solids can be considered a disadvantages

in the

A. Balance wheel of a watch

B. Fitting of wheels on rims

 C. Fire alarm

D. Thermostat.

34. The length of a side of a metallic cube at 200C is 5.0cm. Given that the linear expansivity of the metal is 4.0 x 10 kFind the volume of the cube at 120°C.

A. 126.50cm³

B. 126.25cm³

C. 126.00cm³

D. 125.00cm³

35. A brass rod is 2m long at a certain temperature. What is the length for a temperature rise of 100K, if the expansivity of brass is 18 x 10 K?

A. 2.0036m

B. 2.0018m

C. 2.1800m

D. 2.0360m

37. A bridge made of steel is 60°m long. What is the daily variation in its length if the night-time and day-time temperatures are 10°C and 35°C respectively? The linear expansivity of steel is

0.000012C.

A. 0.18cm

B. 1.80cm

C. 18.00cm

 D. 1800cm

39. The thermometric property of the thermocouple is that its

A. e.m.f. changes with temperature

B. Resistance changes with temperature

C. Volume changes with temperature

D. Pressure changes with resistance.

40. A metal rod 800mm long is heated from 10°C to 95°C. If it expands by 1.36mm, the linear expansivity of the metal is

A. 2.0 x 10k

 B. 2.0 x 10k

 C. 5.0 x 10

 D. 2.0 x 10 K

41. The melting point of naphthalene is 78°C. What is this Temperature in Kelvin?

A. 100 K

B. 8.351K

C. 378K

D. 444K

42. A parachute attains a terminal velocity when

A. Its density is equal to the density of air

B. The viscous force of the air and the upthrust completely counteract its weight.

C. It expands as a result of reduced external pressure

 D. The viscous force of the is equal to the sum of the weight and upthrust.

43. I. The frictional force is independent of the area of the surfaces in contact,

 II The frictional force depends on the nature of the surfaces in contact

 III The frictional force depends on the speed sliding

 IV The frictional force is directly proportional to the normal reaction Which combination

 of the above is true of sliding friction?

A. I, II and IV B. I,

II and III

C. I, III and IV

D. II, III and IV.

44. Water does not drop through an open umbrella of silk

material unless the inside of the umbrella is touched. This

is due to

A. capillarity

B. osmotic

C. viscosity

D. surface tension

 45. As the pressure of a fluid increases, its viscosity

A. decreases

B. remains constant

C. increases then decreases

D. increases

46. A 80kg box is pushed along a road with a force of 500N.If the box moves with a uniform velocity, the coefficient static friction between the box and the road is

A.0.8

B.0.4

C.1.0

D.0.6

47. Counting of currency notes with moist fingers is based on the principles of

A. diffusion.

 B. cohesion.

 C. adhesion

D. viscosity.

48.. A motorcycle of mass 100 kg moves round in a circle of radius 10m with a velocity of 5ms-1. Find the coefficient of friction between the road and the tyres.

 A. 25.00.

B. 2.50.

 C. 0.50.

D. 0.25. [g=10ms²]

49. An object of mass 80kg is pulled on a horizontal rough ground by a force of 500N. Find the coefficient of static friction.

A. 0.8.

 B. 0.4.

C. 1.0.

 D. 0.6.

50. A spring of length 25 cm is extended to 30 cm by a load of 150N attached to one of its ends. What is the energy stored

in the spring?

 A. 3750 J

 B. 2500 J

C. 3.75 J

 D. 2.50 J

C. 0.25m D. 0.05m

51.A load of 5N gives an extension of 0.56cm in a wire which obeys Hooke's law. What is the extension caused by a load of 20N?

A. 1.12cm

B. 2.14cm

C. 2.24cm

D. 2.52cm

52. The surfaces of conveyor belts are made rough so as to

A. prevent the load form slipping

B. make them stronger.

C. enable them to carry more load

 D. protect them while carrying loads.

53. Which of the following could be effectively used to reduce

friction?

A. Water B. Petrol

C. Kerosene

D. Grease

54. A load is pulled at a uniform speed along a horizontal floor by a rope at 45° to floor. If the force in the rope is 1500N, what is the frictional force on the load?

A. 1 524N

 B. 1 350N

C. 1 260N

D. 1 061N

55.An object of mass 20kg slides down an inclined plane at an angle of 30° to the horizontal. The coefficient of static friction is

A. 0.2

B. 0.3

C. 0.5

D. 0.6. [g=10ms²]

56. The coefficient of friction between two perfectly smooth surface is

A. infinity.

 B. one.

C. half.

 D. zero.

57. When the temperature of a liquid is increased, its surface tension

A. decreases

B. increases

C. remains constant

D. increases then decreases

58. The friction which exists between two layers of liquid in relative motion is called

A. capillary

 B. surface

C. tension

D. viscosity

59. The values of x, y and z respectively in the expression MxLyTz for the universal gravitational constant G are

A. 2, -3, -2.

B. -1, 3, -2.

 C. -1, 2, -3

 D. -2, -1, 3

60. I. Diameter of a small ball bearing.

 II. Thickness of a piece of paper.

 III. Diameter of a measuring cylinder.

 IV. Length of a piece of wire.

Which of the above can be measured using a micrometer screw gauge?

A. I, II and IV only

 B. I and II only

C. II and III only

D. III and IV only

**SECTION B. (40 Marks)**

***Answer question any four (4) questions from all***

1. List three phenomena which can be explained by the molecular theory of matter.

 **WAEC 2017**4

b.A spiral spring has a length of 14cm when a force of 4N is hung on it. A force of 6N extends the spring by 4cm. Calculate the unstretched length of the spring

 **WAEC 2017**5

 c.State two factors on which surface tension depends.

ii How can mosquito larvae be made to sink in stagnant water?


d.The resistance of the voltmeter in the circuit diagram illustrated above is 800ΩΩ, Calculate the voltmeter reading.


2.A battery of negligible internal resistance is connected to a set of resistors as illustrated in the circuit diagram above. Determine the equivalent resistance of the circuit.

b.A wire gradually stretched by loading it until it snaps. Sketch a load-extension graph for the wire

(c) Indicate on the graph the

(i) elastic limit (E);

(ii) yield point (Y);

(iii) breaking point (B)



d. From the image above

Find the

1. current in each resistors
2. lost volts



3.Use the diagram above to answer following questions

1. Calculate the current I
2. Determine the potential difference, V across the parallel resistors

3b.A train travelling with a uniform speed of 10 ms-1 accelerates to 20 ms-1 in 5s. If it maintains this speed for 5s before being brought to rest in another 5s, calculate the

1. acceleration
2. the total distance covered

(4marks)

4. A car starts from rest and accelerates uniformly until it reaches a velocity of 30 m/s after 5s. It travels with uniform velocity for 15s and is then brought to rest in 10s. Represent this graphically and determine the

1. acceleration of the car
2. retardation
3. displacement after 5s
4. total displacement .(8marks)

5. Given MxLyTz is the dimension of pressure, what are the values of x, y and z? (2marks)

b.Use dimension analysis to prove if the formula K.E = $\frac{1}{2}mv^{2}$ is correct (3marks)

c.An object of weight 150 N moves with a speed of 4.5 m/s in a circular Path of radius 3 m. Calculate its centripetal acceleration and the magnitude of the centripetal force. [Take g = 10 m/s2](3marks)

6. Steel bars, each of length 3.0 m at 22 oC, are to be used for constructing a rail line. If the linear expansivity of steel is 1.0 x 10-5oC, what is the safety gap that must be left between successive bars if the highest temperature expected is 40 oC? *WAEC/WASCE, 1992* 2$\frac{1}{2}marks$

1b**.** An aluminium rod of length 1.8 *m* at 10 oC is heated to produce a difference in length of 0.007 *m*. Calculate the temperature to which is heated. (Linear expansivity of aluminium = 2.3 x 10-5*K-1*)

 *WAEC/SSCE, 2016*  2$\frac{1}{2}marks $

1c. A metal sheet of area 100 *cm2* was heated through 70 oC. Calculate its new area if the linear expansivity of the metal is 0.000017$K^{-1}$. *WAEC/SSCE 2012*  2$\frac{1}{2}marks $

1d. Explain the statement the linear expansivity of brass is 2.0 x 10-5K-1.

ii.Calculate the approximate cubic expansivity of brass *WAEC ( NOV) 2005/12b*  2$\frac{1}{2}marks$

7. State Archimedes’ principle (2marks)

b. The mass of a specific gravity bottle is 15.2g when it is empty. It is 24.8 g when filled with kerosene and 27.2 g when filled with distilled water. Calculate the relative density of kerosene.

[WAEC/SSCE, June 2011] (2marks)

c. A metal rod of density 7000 kgm-3 and cross-sectional area of 0.001257 m2 has a mass of 1.76 kg. Calculate its length (2marks)

d. What is terminal velocity? (2marks)

8. Explain upthrust (2marks)

 b. Explain how to determine the relative density of a liquid using Archimedes’ principle (2marks)

 c .A force, 10N drags a mass 10kg on a horizontal table with an acceleration of 0.2ms-2.If the acceleration due to gravity is 10ms-2.Calculate the coefficient of friction between the moving mass and the table. (UME,1998) (2marks)

d.Explain why a ship made of steel denser than water floats on water. (2marks)