KITH & KIN INTERNATIONAL COLLEGE

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

FIRST TERM EXAMINATION 2025/2026 ACADEMIC SESSION

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NAME			
SUBJECT: PHYSICS	CLASS: SS3	DURATION: 2HOURS 30MIN	

Each question is followed by **four** options lettered A to D. Find out the correct option for **each** question and shade **in pencil** on your answer sheet, the answer space which bears the same letter as the option you have chosen. Give only one answer to **each** question. Think carefully before you shade the answer spaces; erase completely any answer(s) you wish to change. Do all rough work on this question paper

50marks

1. The force experienced by a current-carrying conductor moving in a magnetic field is employed in the working of the
I moving coil ammeter
II Electric bell
III Electric motor
A. I and II only
B. II and III only
C. I and III only
D. I, II and III only

2. The breaking up of an atomic nucleus into two fragments of nearly equal sizes is known as
A. Nuclear fusion
B. Nuclear Fission
C. Thermonuclear reaction
D. Natural radioactivity

3. A 500KV is applied across an X-ray tube. Calculate the maximum velocity of the electron produced.
[M_e= 9.1 x 10^{-31}Kg, e = 1.6 x 10^{-19}C]
A. 4.2 x 10^8ms^{-1}
B. 1.8 x 10^8ms^{-1}
C. 4.2 x 10^5ms^{-1}
D. 1.8 x 10^5ms^{-1}

4. A radioactive substance of mass 768Kg has a half life of 3 years. After how many years does this substance leave only 6g undecayed?
A. 21
B. 18
C. 15
D. 12

5. An atom $^{234}_{91}$P emits a gamma radiation. The resultant nuclide is
A. $^{234}_{90}$Th
B. $^{234}_{89}$Ac
C. $^{230}_{90}$Th
D. $^{234}_{91}$Pa

6. If a gas is excited by high voltage to produce a discharge and the light is examined in a spectrometer
A. an explosion is observed
B. the rainbow colours are seen
C. an emission spectrum is observed
D. dark lines are observed

7. The number of protons in an

element increased by one after a radioactive decay. The element must have decayed by emitting
A. a beta particle
B. an alpha particles
C. a gamma ray
D. a neutron.

8. The correction sequence of energy transformations in the operation of an x-ray tube is
I. X-rays
II. Kinetic energy of thermo electrons
III. Potential energy of the target atoms.
IV Heat energy of the emitted electrons
A. IV, III, II, I
B. IV, II, III, I
C. II, IV, III, I
D. III, IV, II, I

9. In a nuclear reactor, chain reactions result from the release of
A. electrons
B. photons
C. neutrons
D. protons

10. There is always an uncertainty involved in any attempt measure the position and momentum of an element simultaneously. This statement is known as the
A. De Broglie's law
B. Heisenberg uncertainty principle
C. Franck-Hertz experimental law
D. Wave-particle paradox

11. Three capacitors each of capacitance 1.5µF are connected in series. The total capacitance in the circuit is
A. 2.0µF
B. 1.5µF
C. 0.6µF
D. 0.5µF

12. A direct current of 5A flows through a 0.2H inductor. Calculate the energy stored in the inductor
A. 0.5J
B. 1.0J
C. 2.5J
D. 5.0J

13. Both γ rays and X-rays
I. Can be produced by thermionic emission
II. Have low frequencies
III. Have short wavelength
Which of the statement above is/are correct?
A. I only
B. II only
C. III only
D. I and III only

14. When a radioactive substance undergoes a beta decay, its
A. mass number decreases by 1
B. atomic number decreases by 1
C. mass number increases by 1
D. atomic number increases by 1

15. Nuclear fission is preferred to nuclear fusion in the generation of electricity because
A. very high temperature is required for fusion
B. the raw materials for fusion are easily obtained
C. energy obtained from fusion is relatively smaller
D. the by-products of fusion are very dangerous

16. Compute the increase in length of 500m of copper wire when temperature changes from 12ºC to 32ºC. The linear expansivity of copper is 17×10^{-5} per ºC.
A. 0.017m
B. 0.17m
C. 1.7m
D. 170m

17. Which of the following is not the effect of heat?
A. Expansion
B. Contraction
C. Change of state
D. Change in properties

18. The relationship between area and cubical expansivity is
A. $\beta = 3\gamma$
B. $\gamma = 3/2\ \beta$
C. $\gamma = 2\beta$
D. $\gamma = 4\beta$

19. Temperature is a _____ quantity
A. scalar
B. vector
C. dimensional
D. energy

20. A room is heated by means of a charcoal fire. A man standing away from the fire is warmed by
A. conduction
B. reflection
C. radiation
D. convection

21. Which of the following surfaces will absorb radiant heat energy best?
A. White
B. Red
C. Yellow
D. Black

22. Good conductors are materials that allow
A. only heat to pass through it
B. only electric charges to pass through
C. either heat or electric charges to pass through it
D. heat to be readily absorbed

23. Which of the following materials would not be considered suitable for lagging?
A. Sand

B. Glass fibre
C. Paper
D. Cotton

24. When a large mass of air containing dust is cooled below its dew point one of the following is formed
A. Mist
B. Fog
C. Cloud
D. Snow

25. The inside of a thermo flask is coated with a silvery material so as to reduce heat loss by
A. conduction
B. radiation
C. convection
D. adsorption

26. The boiling point of a liquid depends on the following except the
A. nature of the liquid
B. external pressure
C. volume of the liquid
D. impurities present in the liquid

27. The saturation vapour pressure of a liquid depends on its
A. volume
B. temperature
C. mass
D. pressure

28. Which of the following is not a mechanical wave?
A. Wave propagated in stretch string
B. Radio-wave
C. Water waves
D. Sound waves

29. Which of the following statement is/are correct?
I. Pure water freezes at $0^{o}C$ under normal pressure
II. Water has its highest density at $4^{o}C$

III. The volume of a given amount of water at 0°C is less than its volume at 4°C.

A.   I only
B.   II only
C.   I and II only
D.   I and III only

30. A gas which obeys Charles' law exactly has a volume of 283cm^3 at 10°C. What is its volume at 30°C?

A. 142cm^3
B. 303cm^3
C. 566cm^3
D. 849cm^3

31. In a ripple tank experiment, a vibrating plate is used to generate ripples in the water. If the distance between two successive troughs is 3.5cm and the wave travels a distance of 31.5cm in 1.5s, calculate the frequency of the vibrator.

A. 3.0Hz
B. 6.0Hz
C. 12.0Hz
D. 73.5Hz

32. Which of the following is correct about light and sound waves?

A. Both of them are associated with energy transfer
B. Both of them need material media for propagation
C. They are both longitudinal wave
D. Both of them can be polarized

33. A gas occupies a certain volume at 27°C. At what temperature will its volume be three times the original volume assuming that its pressure remains constant?

A. 81°C
B. 62°C
C. 354°C
D. 627°C

34. Calculate the original heat required to convert 20g office at 0°C to water at 16°C (specific latent heat of fusion of ice = 336Jg^{-1}) (Specific heat capacity of water = 4.2Jg^{-1}K^{-1})

A. 1.34 x 10^{3}J
B. 8.06 x 10^{3}J
C. 6.70 x 10^{3}J
D. 7.06 x 10^{3}J

35. A tap supplies water at 30°C while another supplies water at 86°C. If a man wishes to bath with water at 44°C, calculate the ratio of mass of hot water to that of cold water required

A. 1:3
B. 3:1
C. 3:7
D. 7:3

36. 500g of water is heated so that is temperature rises from 30°C to 72°C in 7 minutes. Calculate the heat supplied per minute. (Specific heat capacity of water = 4200Jkg^{-1}K^{-1})

A. 9000J
B. 12600J
C. 21000J
D. 25200J

37. An electric kettle rated at 1500W boils away 0.3kg of a liquid at its boiling point in 300s. Calculate the specific latent heat of vaporization of the liquid.

A. 1.50 x 10^{6}JKg^{-1}
B. 1.35 x 10^6 JKg^{-1}
C. 1.50 x 10^5 JKg^{-1}
D. 4.50 x 10^{3}JKg^{-1}

38. A light wave travels from air into a medium of refractive index 1.54. If the wavelength of the light in air is 5.9 x 10^{-7}m, calculate its wavelength in the medium.

A. 2.5 x `10^{-7}m
B. 3.8 x 10^{-7}m

C. 4.6 x 10^{-7}m
D. 5.2 x 10^{-7}m

39. Which of the following are transverse wave?
I. Ripple on water.
II. Sound waves in air
III. Light waves from the sun
A. II only
B. I and II only
C. II and III only
D. I and III only

40. A note of frequency 2000Hz has a velocity of 400ms^{-1}. What is the wavelength of the note?
A. 800m
B. 200m
C. 0.2m
D. 5m

41. Light of one particular wavelength is
A. monochromatic
B. dichromatic
C. trichromatic
D. tetrachromatic

42. A transformer is required to give 200V from a 240V mains supply. If the primary coil has 600 turns, how many turns is the secondary coil.
A. 100
B. 120
C. 300
D. 500

43. The S.I unit of magnetic flux density is
A. Waber
B. Tesla
C. Henry
D. Farad

44. To minimize energy loss in a transformer we use
A. high resistance copper coil

B. low resistance copper coil
C. high capacitance
D. low P.D

45. What resistance must be placed in parallel with 12 ohms to reduce the combined resistance to 4 ohms?
A. 16 ohms
B. 8 ohms
C. 10 ohms
D. 2 ohms

46. The instrument use to detect current and voltage is
A. voltmeter
B. ammeter
C. galvanometer
D. voltammeter

47. Shunt in a connection with galvanometer will make the galvanometer behave as
A. ammeter
B. voltmeter
C. galvanometer
D. wheatstone bridge

48. The work function of a metal is 10.6 x 10^{-19}J. What is the threshold wavelength? (Plank's constant = 6.6 x 10^{-34}Js, speed of light in a vacuum, c = 3 x 10^8 m/s)
A. 1.5 x 10^{-6} m
B. 1.9 x 10^{-7} m
C. 2.6 x 10^{-7} m
D. 5.0 x 10^{-7} m

49. The r.m.s value of an A.C is 3A. What is the peak value of the current?
A. 16.0A
B. 8.4A
C. 4.2A
D. 3.0A

50. At what frequency would an inductor of inductance 0.8H have a reactance of 1200 ohms?

A. 239 Hz
C. 1500 Hz

B. 300 Hz
D. 800 Hz

SECTION B.   1 ½ hours
EASSY
PART 1
[15 marks]
Answer any **five** questions from this part.
All questions carry equal marks.

1a. Explain work done

1b. Calculate the work done is pulling a load of 10N through a distance of 100cm.

2. A body of mass 0.6kg is thrown vertically upward from the ground with a speed of 20m/s. Calculate its

i. Potential energy at the maximum height reached

ii. Kinetic energy just before it hit the ground

3a. Differentiate between interference and polarisation as applied to wave

3b. Mention two uses of Polaroid's.

4. Explain why a direct current is used instead of an alternating current in electroplating.

5a.What is meant by wave particle duality or wave-particle quality of matter?

5b. mention one physical phenomenon, in each case, that can explain in terms of the wave nature and particle nature of light.

6a. Explain diffusion

6b. State two application of plane polarized light

7. State the two laws of electromagnetic induction

8a. What is meant by the specific heat capacity of a copper is 400J/KgK

8b. An electric heater of 420W is used to heat a 50Kg mass of water from 25ºC to

boiling point. Calculate the total time used.

9. Explain why mercury is used as a thermometric liquid?

10a. List the effect of heat on a material

10b. State the laws of refraction.

PART II
[45 MARKS]
Answer any **three** questions from this part.
All questions carry equal marks

11a) The potential difference between two parallel plates of a capacitor placed 3.5cm apart is 5V. Calculate the magnitude of the electric field intensity between the two plates.
 NECO, 2000   [2marks]

11b). A student is at a height 4m above the ground during a thunderstorm. Given that the potential difference between the thunder cloud and the ground is 10^7V, find the electric field created by the storm.
                                                                              [2marks]

11c). A charge of 1.6×10^{-10}C is placed in a uniform electric field of intensity $2.0 \times 10^5 NC^{-1}$, what is the magnitude of the electric force exerted on the charge? WAEC, 1995
[2marks]

11d). The ratio of the linear expansivity of copper to that of iron is approximately 1.5. A specimen of iron and a specimen of copper expand by the same amount per unit rise in temperature. Find the ratio of their lengths.
2 marks

11e). Explain what is meant by acceleration of free fall due to gravity g.   [1 mark]

11f). State two reasons why g varies on the surface of the earth.   [1 mark]

11g) A stone is projected upwards at an angle of 30⁰ to the horizontal from the top of a tower of height 100m and it hits the ground at a point Q. if the initial velocity of projection is 100m/s, calculate the:

     i. Maximum height of the stone above the ground;

     ii. Time it takes to reach this height;

     iii. Time of flight;

     iv. Horizontal distance from the foot of the tower to the point Q

     Take g = 10m/s^2 [5 marks]

12a. Explain what is meant by the statement 'The capacitance of a parallel-plate capacitor is 2μF'
[2marks]
12b. State

i. Three factors on which its capacitance depends [1½ mark]

ii. Three uses of capacitors [1½ mark]

12c. Derive a formula for the energy W stored in a charge capacitor of capacitance C carrying a charge Q either plate. [3 marks]

12d. Two parallel-plate capacitance 2µF and 3µF are connected in parallel and the combinations is connected to a 50V D.C source. Draw the circuit diagram of the arrangement and determine the

i. Charge on either plate of each capacitor

ii. Potential difference across each capacitor

iii. Energy of the combined capacitor [7 marks]

13a. With the aid of a simple diagram, explain how a step down transformer works. [4 marks]

13bi. State three ways by which energy is lost in a transformer [3 marks]

ii. Mention how each of the losses in (bi) above can be minimized

13c. 95% efficient transformer is used to operate a lamp rated 60W, 220V from a 4400V A.C supply. Calculate the

i. Ratio of the number of turns in the primary coil to the number of turns in the secondary coil of the transformer

ii. Current taken from mains circuits. [8 marks]

14a. A 40µF capacitor is series with a 40ohms resistor is connected to a 100V, 50Hz A.C supply.

i. Draw a circuit diagram of the arrangement

ii. Calculate the:

a. Impedance in the circuit;

b. Current in the circuit

c. Potential difference across the capacitor [8 marks]

14b. A photo emissive surface has a threshold frequency of 4.02×10^{14}Hz. If the surface is illumined by light of frequency 5.0×10^{15} Hz, calculate the:

i. Threshold wavelength

ii. Work function

iii. Kinetic energy of the emitted photoelectrons [7 marks]

[$c = 3.0 \times 10^8$ m/s, $h = 6.63 \times 10^{-34}$ Js]

15a. What is wave motion? [1 mark]

15b. Distinguish between the following:

i. Progressive and stationary wave [2 marks]

ii. Transverse and longitudinal wave [2 marks]

15c. A progressive wave equation is represented by

Y = A sin 2π (0.15t − 0.1x)

Determine the i. Period

ii. Frequency

iii. Wavelength

iv. Velocity of the wave [10 marks]