UNEB U.C.E PHYSICS (PAPER 1) 2009

Answer all questions from this section.

1. Which one of the following devices converts electrical energy to mechanical energy?

a. Thermopile

b. Battery

c. Dynamo

d. Motor

2. A razor blade floating on water sinks when a few drops of paraffin are added to the water because

a. Paraffin is denser than water

b. Surface tension of water increases

c. Surface tension of water reduces

d. Cohesion of water molecules increases

3. Which of the following is true about a periscope? If

a. Gives a laterally inverted image

b. Is used to observe an obscured object

c. Is used for viewing distant objects

d. Gives a magnified image of the object

4. An appliance that uses a current of 3A is connected to the mains by wires that can carry up to SA. The best fuse that can be used for the appliance is

a. 2A fuse

b. 3A fuse

c. 4A fuse

d. 5A fuse

5. In a cathode ray oscilloscope, the

a. Horizontal plates deflect the electron beam in the Y-direction

b. Electrons are accelerated towards the screen by the grid

c. Vacuum hinders the motion of the electrons

d. Electrons are emitted from heated anode

6. Find the source that would give a mass of 400g an acceleration of $8ms^{-2}$

a. 0.05N

b. 3.20N

c. 20.00N

d. 50.00N

7. A hollow glass sphere of mass 60g floats in water such that two-thirds of its volume is under water of density 1g cm^{-3} . find the volume in cm^3 of the sphere.

a. 20

b. 40

c. 60

d. 90

8. All electromagnetic waves

a. Highly penetrate matter

b. Produce ionization in gases

c. Cause heating effect when absorbed by matter

d. Do not require any material

9. When a steel rod is stroked using a bar magnet, the

(i) Rod attracts small steel pins

(ii) Rod will be charged

(iii) Magnetic dipoles will be aligned

a. (i) only

b. (i) and (ii) only

c. (ii) and (iii) only

d. (i) and (ii) only

10. The radium 222_{88} Ra nuclide has

a. 138 protons and 88 neutrons

b. 138 neutrons and 88 protons

c. 138 electrons and 88 neutrons

d. 138 protons and 88 electrons

11. An athlete who covers 80m in 10s is timed using the number of heart beat. If the heat beat of the person timing is 72 per minute, find the number of heat beat counted.

a. 7.2

b. 8.0

c. 12.0

d. 13.0

12. The fins of a car radiator are painted black because black bodies are

a. Transmitters of heat

b. Reflectors of heat

c. Absorbers of heat

d. Radiators of heat

13.Which one of the following wave patterns on a C.R.O represents sound of the highest pitch?

14. Two bulbs each rated 240V,25W are lit for 5 hours each day. If the cost of each unit is shs.200, find how much it costs to run the bulbs for 30 days.

a. Shs 1,500

b. Shs 12,000

c. Shs 60,000

d. Shs 1,500,000

15. When a body is raised above the ground its gravitational potential energy

a. Is raised

b. Is lowered

c. Remains constant

d. Changes to kinetic energy

16. Which of the following statements is true?

a. The temperature at which water freezes is -273^0c

b. The boiling point of water 373k

c. The value of the absolute zero is 0^0c

d. Evaporation is possible at a temperature of 0k

17.

Figure one represents lines on a sheet of writing paper observed through a convex lens. What is the magnification?

a. 0.50

b. 1.50

c. 2.00

d. 3.00

18.The direction of the force on a current carrying conductor in a magnetic field depends on

(i) Direction of current

(ii) Strength of the magnetic field

(iii) Direction of the magnetic field

a. (iii) only

b. (i) and (ii) only

c. (i) and (iii) only

d. (i), (ii) and (iii)

19. In an elastic collision,

a. Bodies move a common velocity

b. Kinetic energy is mot conserved

c. Kinetic energy is conserved

d. Bodies stick together

20. Find the final temperature of a gas when its pressure is doubled and volume is tripled, given that its initial temperature is T.

a. 1/6T

b. 6T

c. 3/2T

d. 2/3T

21.

Two plane mirrors M_1 and M_2 are inclined to each other at an angle of 70^0. If the ray AB incident on M_1 is reflected as shown in figure 2, find the angle of incident, i

a. 40^0

b. 50^0

c. 60^0

d. 70^0

22. An a.c generator can be modified to produce d.c. by

a. Increasing the number of coils

b. Increasing the number of turns in the coil

c. Using an electromagnet instead of a permanent magnet

d. Replacing the slip rings with a split ring

23.

Figure 3 shows a constant force, F acting on a mass placed on a rough surface. Which of the following statements about the mass is correct?

a. Acceleration is constant if F is equal to frictional force

b. Velocity is constant if F is greater than frictional force

c. Momentum is constant if F is equal to frictional force

d. It moves to the left if frictional force is greater than F

24. A concrete bridge develops a notch when overloaded because it is,

a. Stiff

b. Brittle

c. Elastic

d. Ductile

25. Three waves pass a post every minute in a lake. If the average distance between the waves is 15m, find the average speed of the waves.

a. $2700ms^{-1}$

b. $900ms^{-1}$

c. $300ms^{-1}$

d. $0.75ms^{-1}$

26.

In the circuit shown in the figure 4, the potential difference across

a. R_1 and R_2 are equal

b. R_2 and R_4 are equal

c. R_1 and R_4 are equal

d. R_3 and R_4 are equal

27. A car engine exerts a force of 500 N in moving 1000 m in 200 s. calculate the power developed by the engine.

a. 200 w

b. 500 w

c. 1000 w

d. 2500 w

28.

Figure 5 shows a transverse wave. What is its length?

a. 4 cm

b. 3 cm

c. 2 cm

d. 1 cm

29. Calculate the charge which flows through a 600# resistor when a p.d 0f 20V is applied for 30 s across its ends

a. 900 c

b. 600 c

c. 20 c

d. 4 c

30. Oil of volume $1.0x10^{2}cm^{3}$ is dropped on the surface of clean water. If it spreads to form a circle of radius 4 cm, find the diameter of a molecule of oil.

a. $1.99x10^{-4}cm$

b. $7.96x10^{-4}cm$

c. $1.26x10^{1}cm$

d. $5.03x10^{1cm}$

31.

Figure 6 shows two forces of 10N acting on a body. What is the value and direction of the force needed to resolve its original shape?

a. 2 N to the left

b. 18N to the left

c. 2N to the right

d. 18N to the right

32.A body which is accelerating

a. Experiences zero force

b. Decreases its velocity to zero

c. Travels with increasing velocity

d. Travels only in a straight line

33. Charge distribution on a conductor depends on.

a. The material out of which the conductor is made

b. Shape of conductor

c. Quantity of charge

d. Nature of the charge

34.A wheel barrow that is used to carry a load across a soft ground should have a

a. Narrow wheel because it exerts greater pressure on the ground

b. Narrow wheel because it exerts less pressure on the ground

c. Wide wheel because it exerts greater pressure on the ground

d. Wide wheel because it exerts less pressure on the ground

35.

Figure 7 shows a block of mass 0.5 kg pulled from rest a long a frictionless table by a steady force F and attained a speed of 8m s^{-1} in 2 s. find F

a. 0.125 N

b. 1N

c. 2 N

d. 4N

36. The low of electrostatic states that

a. Charges occur in pairs

b. Charges repel each other

c. Like charges attract each other

37. An element X has atomic mass of 228 and atomic number of 90. It emits a B-particle forming an element Y. the symbol for Y is

38.Figure 8 shows a spring balance supporting a block being lowered into a beaker containing water. When the block is immersed in water, the reading of the spring balance

a. Reduces

b. Increases

c. Becomes zero

d. Remains constant

39.When a mass is hanged from a spring balance and removed, the pointer on the spring balance does not return to the initial position because the

a. Spring was too short

b. Extension of the spring was proportional to the mass

c. Spring stretched to proportional limit

d. Spring extended beyond the elastic limit

40. A perfect blows a whistle and hears the echo from a wall after 1.1 s. if the speed of sound in air is $330m^{-1}$, calculate the distance of the wall from the perfect

a. 181.5m

b. 300.0 m

c. 363.0 m

d. 600.0 m

SECTION B (40 MARKS)

Answer all questions in this section. All working must be shown clearly in the spaces provided.

41.

(a) Figure 9 shows a step-down transformer. Name the coils marked

(i) A

(ii) B

(b) If the transformer is used to step down mains supply from 480 V to 24V and coil A has 800 turns, determine the number of turns in coil B.

42. Two steel balls A and B of masses 2 kg and 1 kg are released from rest at the same time from heights of 20 m and 5 m respectively. Find the difference in time taken for A and B to strike the ground

43. (a) what is meant by the term radioactivity?

(b)

The above equation shows three stages (i), (ii) and (iii) of radioactive series.

(i) Name the particles emitted at stage (ii) and stage (iii) of the series.

(ii) Which of the nuclei A, B, C and D are isotopes?

44(a)

Figure 10 shows a petrol engine. Name the parts labeled A, B, C, and D

(b)state what happens in the petrol engine during the power stroke.

45. A steel rod of cross-sectional area $32m^2$ is 4m long. When a force of $1.6x10^5N$ is applied to the rod, its length increases by 1 mm, calculate the $1.6x10^5N$ is applied to the rod, its length increases by 1mm, calculate the

(i). stress in the rod

(ii). Strain produced

46. (a)

A ray of white light is incident on a glass prism as shown in figure 11. Complete the diagram to show effect of the glass prism on the ray.

(b). find the critical angle for glass in air if the refractive index of the glass is 1.5.

47. (a) Define an ohm as a unit of resistance.

(b)

Figure 12 shows two cells E_1 and E_2 of e.m.fs 1.0 v and 1.5 v and internal resistances of 1.0# and 0.5# respectively connected in series with an 8.5 # respectively connected in series with an 8.5# resistor. Calculate the current flowing through the circuit.

48.

Figure 13 shows the diagram of an x-ray tube

(a). Name the part labeled F

(b) Why is the x-ray tube evacuated?

(c) What is the function of the part labeled F?

(d)State two precautions to be taken when using x-rays.

49. (a) what is meant by specific latent heat of vaporization?

(b)

Figure 14 represents a cooling curve of steam. State what takes place over regions.

(i) ST

(ii) UR

(c).why is a burn from steam more harmful than one due to boiling water?

50 (a) what is longitudinal wave?

(b).Figure 15 shows a sound wave produced from a tuning fork vibrating at 800 Hz. Calculate the velocity of the wave in the medium.

(c) state two factors which determine the velocity of sound in air.