535/1
GHS
PHYSICS
JULY

S.4 MOCK EXAMINATIONS 2014
PHYSICS PAPER 1
TIME: 2HRS 15 MINUTES

INSTRUCTIONS
ATTEMPT ALL QUESTIONS IN THIS PAPER.

Assume where necessary;

Acceleration due to gravity ,	$g =$	$10ms^{-2}$
Specific heat capacity of water ,c	=	$4200Jkg^{-1}K^{-1}$
Specific latent heat of vaporization	=	$2{,}260{,}000JK^{-1}$
Speed of sound in air	=	$330ms^{-1}$
Speed of light in air/vacuum	=	$3\times10^{8}ms^{-1}$
Specific latent heat of fusion of ice	=	$336{,}000JK^{-1}$

FOR EXAMINER'S USE ONLY

Q.41	Q.42	Q.43	Q.44	Q45	Q.46	Q.47	Q.48	Q.49	MCQ	TOTAL

SECTION A

1. Heat can travel through a vacuum by
   A. Conduction and convection.
   B. Convection and radiation.
   C. Convection only.
   D. Radiation only.

2. A stone is projected upwards with a velocity of $10ms^{-1}$.The time it takes to return to the ground is

   A. 1second B.10seconds C.2seconds D.5seconds.

3. Figure 1 below shows the penetrative paths of four different types of radiation . Which of the path indicates a beta particle?

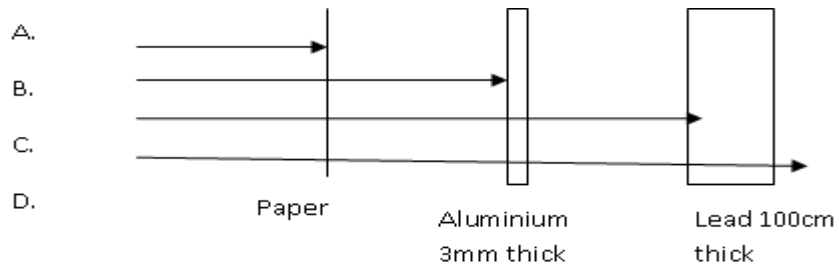


Figure 1

4. Which of the following properties always remains unchanged when light passes from glass into air?
   A. Direction B. Frequency C. Speed D. Wavelength

5. An illuminated object ,when placed at the principal focus of a converging lens will produce a
   A. converging beam of light.
   B. diverging beam of light.
   C. parallel beam of light.
   D. diffuse beam of light.

6. The outer casing of an electric kettle is connected to earth in order to prevent
   A. damage to the kettle.
   B. damage to the fuse.
   C. an electric shock to the user.
   D. heating of the wires inside.

7. The primary coil of a transformer carries a current of 2A at a voltage of 240V.If the transformer is 100% efficient and the secondary voltage is stepped down to 24V,the current in the secondary coil is

A. 48A B. 20A C. 2A D. 0.2 A

8. The absolute zero temperature of a gas is

A. 0^oC B. -273^OC C. $+273^oC$ D. 273K

9. Which of the following statements is not true;

A. The presence of an impurity such as salt in water lowers its freezing point.

B. An impurity raises the boiling point of water.

C. The boiling point of water raises when the pressure above it is raised.

D. When pressure is exerted on ice the melting point is raised.

10. Which of the following is the right order of operation a four stroke petrol engine showing how fuels are burnt;

A. Inlet stroke → Power stroke → Compression stroke → Exhaust stroke.

B. Inlet stroke → compression stroke → Power stroke → Exhaust stroke.

C. Power stroke → inlet stroke → compression stroke → exhaust stroke.

D. Power stroke → compression stroke → exhaust stroke → inlet stroke.

11. In order to confirm whether a piece of metal is a magnet or not ,that metal is

A. attracted iron fillings B. attracted a known magnet

C. repelled a by known magnet. D. deflected a magnetic campus.

12. The half –life of a radioactive substance is 2minutes.After 8 minutes the activity will have fallen to a fraction of its initial value. The fraction is

A. $\frac{1}{4}$ B. $\frac{1}{8}$ C. $\frac{1}{16}$ D. $\frac{1}{32}$

13. The colour of the live wire insulation in our homes is

A. Blue B. Brown C. Green D. Pink

14. The reaction force exerted on the floor of a lift accelerating upward at $2ms^{-2}$ is 4800N.If inside the lift there are four men of equal mass ,find the mass of each man in kg;

A. 150kg B. 100kg C. 80 kg D. 120kg

15. Which of the following devices converts electrical energy to heat energy?

A. electric kettle B. photo cell

C. battery D. thermocouple

16. Which of the following is not a vector quantity?

A. current B. magnetic field C. Pressure D. Heat capacity

17. Which of the following is the best ferromagnetic material?

A. Silver B. Aluminium C. Cobalt D. Ebonite

18. The refractive index of water is $\frac{4}{3}$.Calculate the speed of light in water.

A. $2.5\times10^{8}\,ms^{-1}$ B. $3\times10^{8}\,ms^{-1}$ C. $4\times10^{8}\,ms^{-1}$ D. $\frac{4}{3}\times10^{8}\,ms^{-1}$

19. An electric bulb is labelled 60W,240V.Caculate the resistance of the filament used in the bulb .

A. 4Ω B. 0.25Ω C. 960Ω D. 15Ω

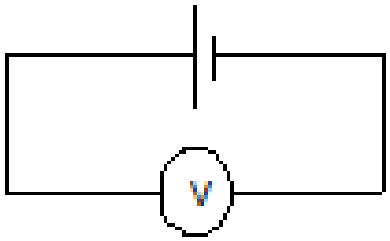


Figure 1

20. When a voltmeter is connected as shown in figure 2 above, the voltmeter reads;

A. the terminal p.d across the cell.

B. records the current in the circuit.

C. the e.m.f of the cell

D. The resistance in the circuit.

21. When transmitting electrical power, over long distance, the voltage is stepped up in order to;

A. allow transmission at a faster rate.

B. minimise power loss by lowering the transmission current.

C. reduce the resistance of the transmitting cables.

D. increase the resistance of the transmitting cables.

22. A convex mirror may be used as

(i) a driving mirror

(ii) security mirror in a supermarket.
(iii) a shaving mirror.
A. (i) only B.(i) and (ii) only C.(ii) and (iii) only D.(i) ,(ii) and (iii).

23. The constant rate of change of distance of a body with time is called;
A. Velocity B. Speed C. acceleration D. Uniform speed.

24. In which of the following substances is Ohm's law obeyed?
A. Semiconductor diode B. filament lamp
C. copper wire D. a thermistor.

25. Figure 3 below ,shows a voltmeter (V) connected across a resistor of resistance R.
The reason why the voltmeter is connected across the resistor as shown is
A. it has a low resistance and will draw current from the cell.
B. it has high resistance and will not draw current from the cell.
C. it is more accurate when connected in parallel to the resistor.
D. all the current flows through the voltmeter when it is connected as shown.

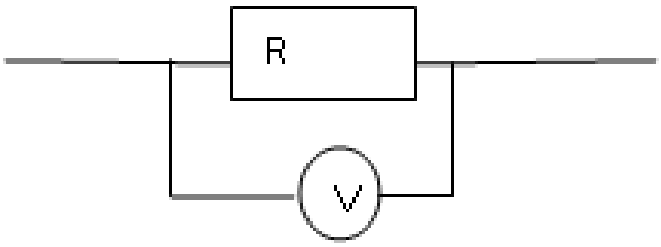


Figure 2

26. Which of the following is not a characteristic of a musical note?
A. Loudness B. Quality C. Tension D. Pitch

27. A material that can be rolled into sheets without breaking is said to be
A. strong B. elastic C. ductile D. brittle

28. Radiation is the transfer of heat
A. in a gas which involves the movement of molecules.
B. from one place to another by means of electromagnetic waves.
C. through a material medium without the bulk movement of the medium.
D. through a fluid which involves the bulk movement of the fluid itself.

29. The rate of evaporation of a body is increased by
(i) Temperature (ii) Surface area (iii) Pressure (iv) wind

A. (i) and (iv) only.
B. (i) and (ii) only.

C. (i),(ii) and (iv) only.
D. (i),(ii),(iii) and (iv).

30. Which of the following are both ***first class*** levers?

A. Pair of pliers, sea saw
B. Wheel barrow, Nutcrackers
C. Pair of tongs, claw hammer.
D. Table knife, sea saw.

31. The distance between the fixed points on a mercury in glass thermometer is 25cm.What is the temperature in degrees Celsius if the mercury thread is 8cm long?

A. $\frac{100\times 25}{8}$ B. $\frac{25\times 8}{100}$ C. $\frac{100\times 8}{25}$ D. $\frac{100}{25\times 8}$

32. A given mass of gas occupies a volume of $200cm^3$ at a temperature of 27^0C and a pressure of one atmosphere. Find the volume when its temperature rises to 54^0C at constant pressure.

A. $\frac{200\times 1\times 327}{300}$ B. $\frac{300\times 327}{200\times 1}$ C. $\frac{200\times 300}{327\times 1}$ D. $\frac{327\times 1}{200\times 300}$

33. In a sound wave the particles of the medium

A. are stationary
B. move along with the wave.
C. vibrate in the same direction as the wave.
D. vibrate at right angles to the direction of the wave.

34. Which of the following is a property of X-rays?
A. They are deflected by a magnetic field.
B. They are charged particles.
C. They can ionise matter.
D. they travel at the speed of sound.

35. The diagram in figure 4 below shows a steering wheel of a car having radius 20cm.A pair of forces 10N each is applied as indicated. The moment of the couple is

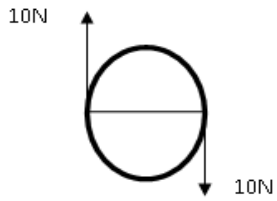


Figure 3

A.200N B.400N C.2Nm D. 4Nm

36. In a hydraulic machine

A. an object displaces its own weight of fluid.
B. The pressure transmitted in a fluid is the same in all directions.
C. The volume of fluid compressed is proportional to the applied force.
D. An object experiences an up thrust equal to the weight of fluid displaced.

37. ${}^{226}_{88}Ra \rightarrow {}^{x}_{y}Rn + {}^{4}_{2}He$

A radioisotope of radium decays by emission of an alpha particle as shown in the equation above. Find the values of x and y.

	x	y
A.	230	90
B.	222	90
C.	222	86
D.	230	86

38. Total internal reflection occurs only when ;
A. angle of incidence is less than the critical angle.
B. a ray is travelling from one medium to another of the same optical density.
C. a ray is travelling from a less dense to a more dense medium.
D. a ray is travelling from a more dense to a less dense medium.

39. The power of a lens is given as $-20D$. Determine the focal length of this lens in cm.
A.+0.05cm B.-0.05cm C.+5.0cm D.5.0cm

40. Brittle materials are;
A. Strong in compression and strong in tension.
B. Weak in compression but strong in tension.
C. Weak in compression and weak in tension.
D. Strong in compression but weak in tension.

SECTION B

41.(a) Define moment of a force.

(b) A uniform metre rule of weight 4N is balance by a 12N force which is placed at 10cm mark. Find the position of the knife edge.

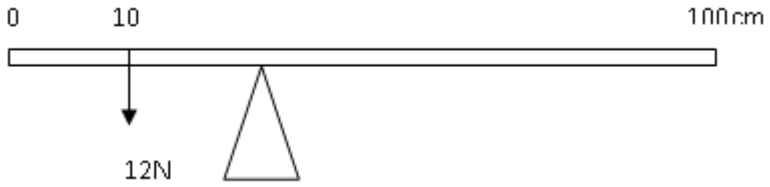


Figure 4

42.(a) Define the term *specific latent heat of fusion* of a substance.

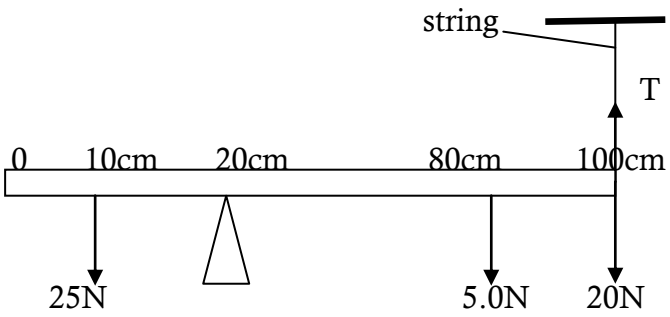
(b) Why are pieces of ice at 0^0C added to a drink at room temperature more effective in cooling the drink than an equal mass of water at the same temperature?

(C) Calculate the heat required to convert 2kg of ice at -12^oC to steam at 100^0C.

[8]

43.(a) State *the conditions for a body to be in equilibrium* under the action of forces.

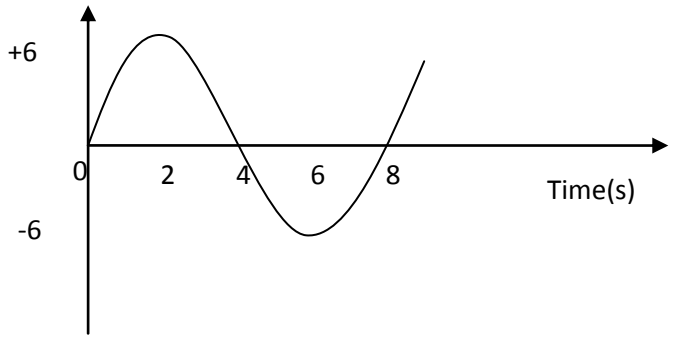
(b) The figure shows a uniform lath 100cm long acted upon by a system of forces. The mass of the lath is 1.2kg.Indicate all the forces acting on it. Find the tension in the string and the reaction at the pivot.



44.(a)What is a wave?

(b)The figure below shows a displacement time graph for a wave.

Displacement(m

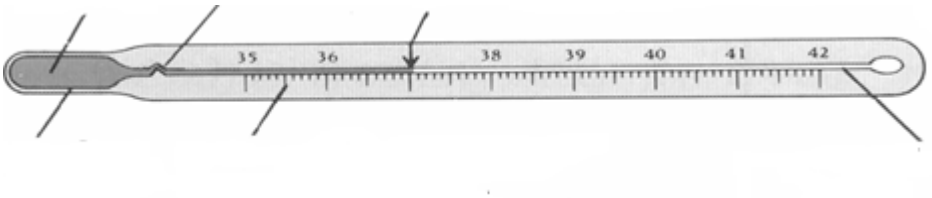


(i) What is the amplitude of the motion?

(ii) If the velocity of the wave is 10m/s what is its wavelength?

45.(a) The diagram below shows a clinical thermometer.

Label all the marked points and write the normal body temperature indicated by an arrow.



(b) Explain why ;

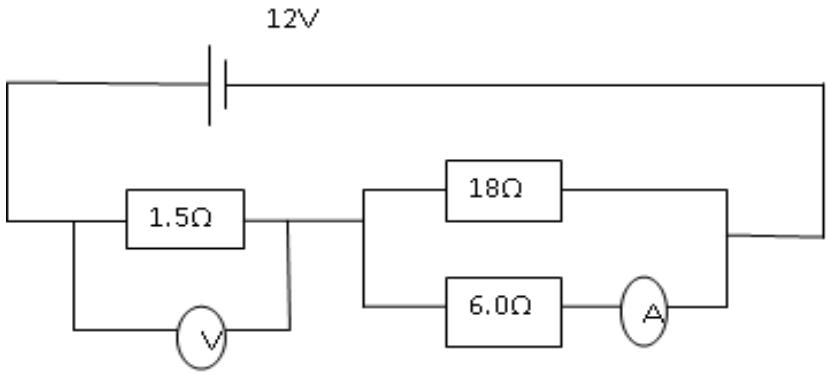
(i) it is unwise to sterilise such a thermometer in boiling water.

(ii) The thermometer should have a thin walled bulb.

46.(a) Define the term *electromotive force* of a cell

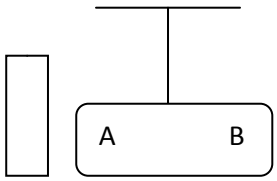
[10]

(b) The figure below shows resistors connected to a battery whose emf is 12V but having negligible internal resistance. Calculate the ammeter and voltmeter readings.



47.(a) What is an insulator?

(b) A negatively charged polythene rod is held near to end A of an uncharged metal rod suspended by a cotton thread.

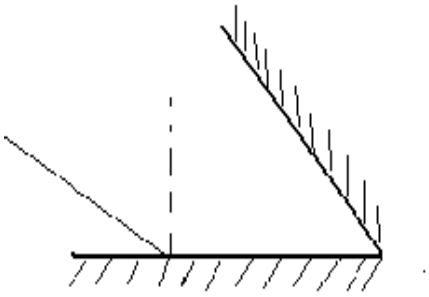


(i) Why is the metal rod suspended by a cotton thread?

(ii) State and explain the charges induced at the ends **A** and **B** of the metal rod.

48.(a) Define a virtual image.

(b) Two plane mirrors are inclined at an angle of 45^0 to each other. A ray of light is incident at an angle of 70^0 at one of them as shown below. Calculate the angle of reflection at the second mirror.



49.(a)Distinguish between *a primary cell* and *a secondary cell*.

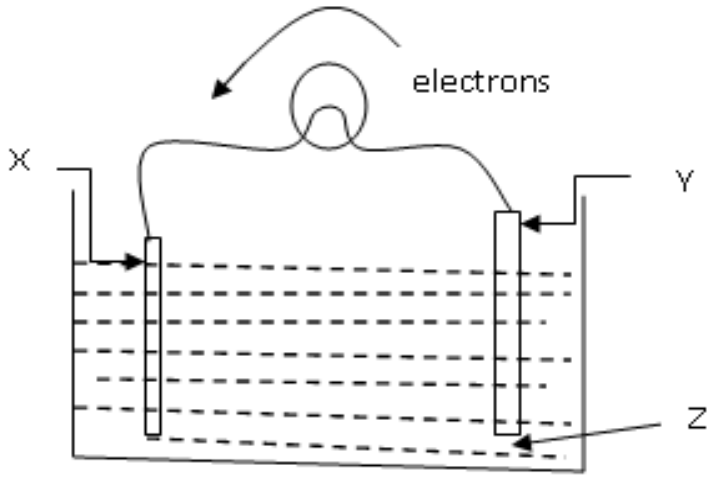
(b) The diagram below shows a simple cell in which a bulb is lit after connections through a wire to two electrodes X and Y.

Label:

X: ---------- Y: ----------

Z: ----------

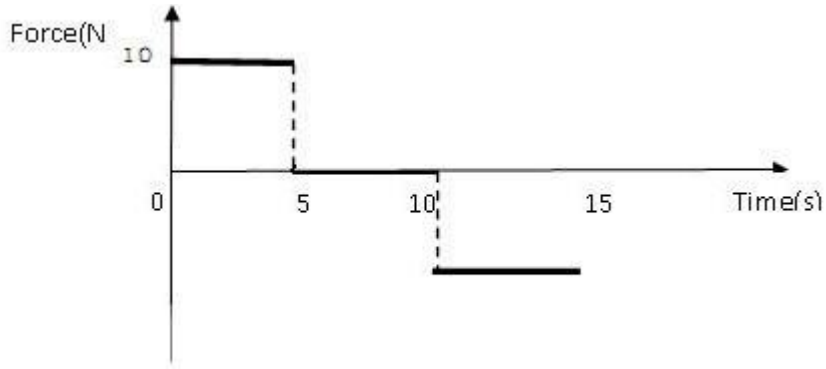
[12]



Give a reason why the bulb eventually stops lighting.

50.(a) What is *uniform acceleration* of a body?

The force against time graph for a body of mass 5kg is shown below.



(i) Find the acceleration of the body between O and A.

(ii) Between which two points is the body moving with constant velocity and why?