PHYSICS

Standard

X

Question Pool

Government of Kerala
Department of Education

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Preface

Learning and evaluation must go hand in hand to understand and enhance progress in learning. It will help to recognize how much progress has been made in conceptualisation, to what extent one has been able to acquire various skills and also to identify the fields one has special aptitude for. Continuous evaluation carried out along with learning activities play a very important role in this. The term evaluation helps in testing and ascertaining the learning outcomes at the end of each stage. This book offers guidance in this direction.

Lessons in each unit of class 10 have learning activities based on knowledge construction incorporated in them in the form of questions. Evaluation indicators and scores are also provided there in, to assess the skills acquired at each stage by the learner. In addition to all these, it is hoped that teachers would endeavour to present more class room activities to instill self confidence in the learners. Let this book show the path for effective learning.

Dr. J. Prasad
Director, SCERT Kerala

Content

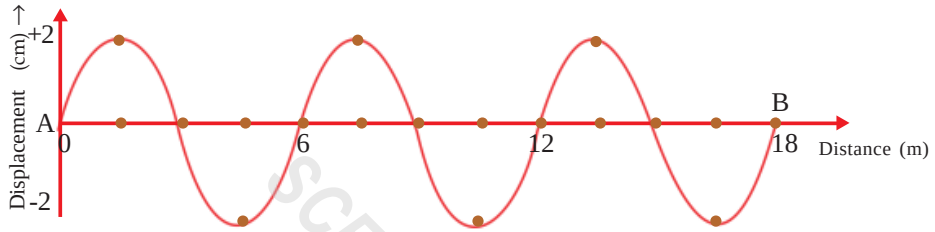
1

WAVE MOTION

Learning Outcomes

- Able to explain the relationship between amplitude, speed and frequency of a wave.
- Able to solve numerical problems.

1. Graphic representation of a wave is depicted below:



a) What type of wave is shown in the figure? (1)

b) What is its amplitude? (1)

c) Calculate the frequency of the wave if it takes 3 seconds to travel from A to B. (1)

d) Calculate the speed of the wave. (1)

Score : 4 Time : 8 minute

Learning Outcomes

- Able to explain the speed of sound in air, resonance and acoustics of buildings.

2. Give reasons

a) There is an increase in speed of sound during summer season. (1)

b) Soldiers are not allowed to march across suspension bridges. (1)

c) Side walls of auditoriums and halls are built rough. (1)

Score : 3 Time : 6 minute

Learning Outcomes

- Able to explain forced vibration,resonance and to give examples of instruments working on the principle of forced vibration.

3. Press the stem of an excited tuning fork of frequency 512 Hz on a table having a natural frequency of 384 Hz.

a) What is the frequency of vibration of the table at this instance? (1)

b) What is the change in the the loudness of the sound produced? Why? (1)

c) What phenomenon of sound would you observe if you press a tuning fork of natural frequency 384 Hz on the table? Explain. (2)

Score : 4 Time : 8 minute

Learning Outcomes

- Able to explain forced vibration, resonance and to give examples of instruments working on the principle of forced vibration.

(4) Excite a turning fork of frequency 512 Hz and hold it close to the mouth of a resonance column. Sound becomes slightly louder.

a) What do you call the vibration experienced inside the air column? (1)

b) Why does the loudness of sound increase when the inner tube is raised? (1)

c) What is the frequency of vibration of the air column when the maximum sound is heard? Explain it on the basis of resonance. (2)

Score : 4 Time : 8 minute

Learning Outcomes

- Able to explain how sound wave travels through water.
- Able to solve numerical problems based on speed and time of a wave.

(5) A sound signal from a ship on water reaches back to the ship 6 seconds after hitting a rock under the water. (The speed of sound in sea water = 1500m/s)

a) In which wave form is sound propagated through water? (1)

b) Which phenomenon of sound caused the return of sound signal to the ship? (1)

c) Calculate the distance from the water surface to the rock. (2)

Score : 4 Time : 8 minute

Learning Outcomes

- Able to explain multiple reflection, resonance, echo and amplitude.

(6) Match the following

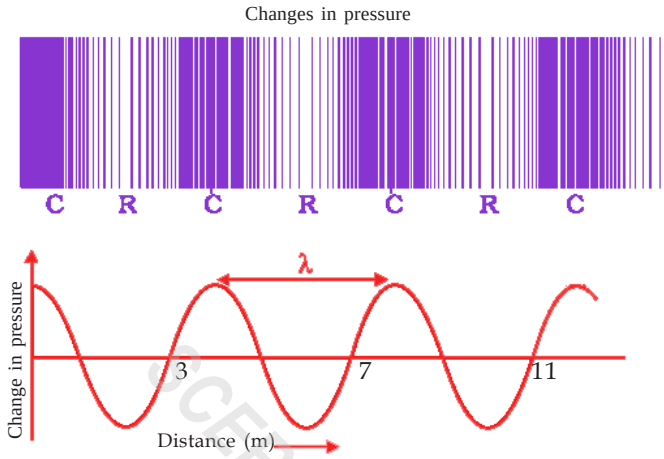
A	B
Sound board	Echo
Sonometer	Multiple reflection
Sonar	Amplitude
Seismograph	Resonance

Score : 2 Time : 5 minute

Learning Outcomes

- Able to identify different types of wave motion and differentiate between transverse wave and longitudinal wave
- Able to explain the relationship between frequency, wavelength and speed of a wave and solve related numerical problems.

(7) The graphic representation of the pressure variation caused by a source of sound in a medium is given below.



a) Which type of wave motion is indicated by the graph? (1)

b) Calculate the wave length. (1)

c) Calculate the speed of the wave if its frequency is 85 Hz. (2)

Score : 4 Time : 8 minute

Learning Outcomes

- Able to recognize the destructive nature and after effects of seismic wave and become aware of the precautionary measures and get involved in rescue operations.

(8) Both melodious music and destructive tsunamis are caused by waves.

a) Which wave causes tsunami? (1)

b) Which scale is used to measure the intensity of earthquake? (1)

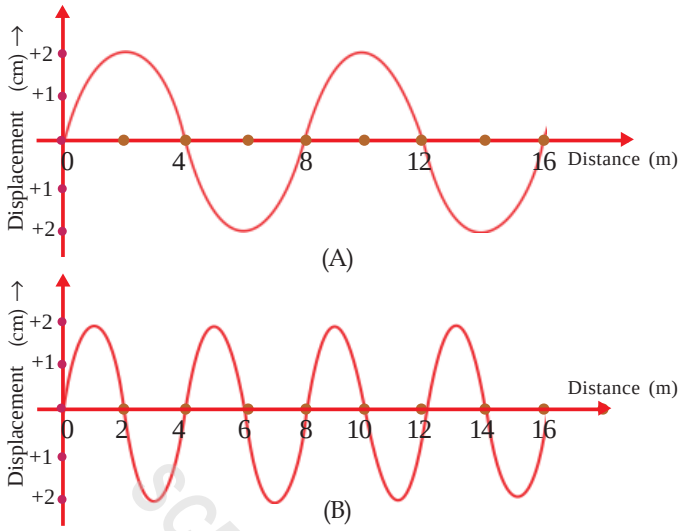
c) What are the aftereffects of earthquakes? List out the precautions to be taken. (2)

Score : 4 Time : 8 minute

Learning Outcomes

- Able to explain the relationship between frequency wave length and speed of the wave and solve related problems.

(9) Graphic representation of two transverse waves A and B propagating through air at a particular instant are given below.



If the waves take 4 seconds to cover the distance.

a) Compare the speed of the waves. (1)

b) Find out the wavelength of each wave. (1)

c) Which wave will have the maximum frequency? (1)

d) Write down the amplitudes of the waves A & B. (1)

e) How much distance will be travelled by the wave in 6 seconds? (1)

Score : 5 Time : 10 minute

Learning Outcomes

- Able to explain the properties of a wave and multiple reflection of sound.

(10) Identify the odd one out and state the reason.

a) Amplitude, Humidity, Wavelength, Velocity of the wave (1)

b) Megaphone, stethoscope, Sonometer, Sound board (1)

Score : 2 Time : 4 minute

Learning Outcomes

- Find out examples of instruments making use of natural frequency and forced vibration.

(11) Tabulate the following statements under the natural frequency and forced vibration.

a) Vibration of an excited tuning fork.

b) Sound board vibration when strings of veena are played on.

c) Vibration of sonometer when an excited tuning fork is pressed against the box.

d) Vibration of air inside a chenda when beaten.

e) Vibration of a coin when it falls on the floor.

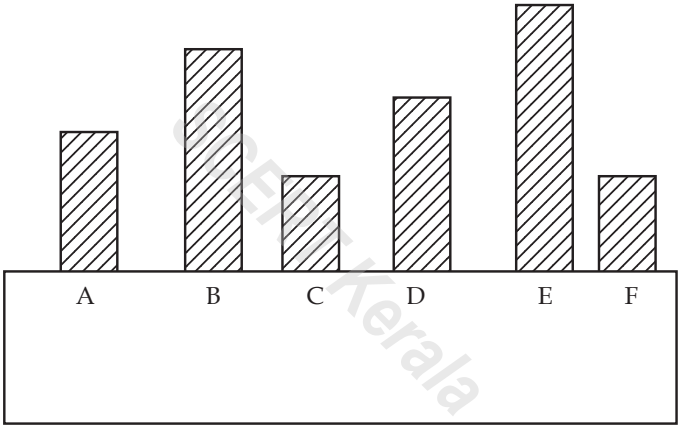
f) Striking of a stainless steel vessel with a spoon.

Score : 3 Time : 6 minute

Learning Outcomes

- Explain forced vibration and resonance.
- Give examples for instruments working on the principle of forced vibration.

(12) Diagram shows hacksaw blades of different sizes fitted on a wooden box.



a) Which blade will vibrate with identical amplitude when the blade C is plucked? Why?

b) What is the name of the vibration on the other blades?

Score : 2 Time : 4 minute

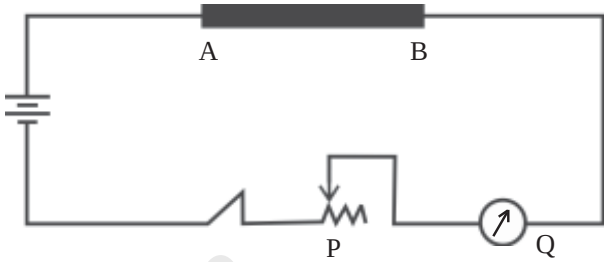
2

EFFECTS OF ELECTRIC CURRENT

Learning Outcomes

- Able to explain Joule's Law and solve mathematical problems based on Joule's Law.

(1) Observe the circuit diagram given below and answer the following questions.



a) Which are the instruments labelled as P and Q in the diagram? (1)

b) If you replace the copper wire AB with a Nichrome wire of same length and area of cross section.

i) What change would you notice in the reading on the device Q? Why? (1)

ii) What will happen to the heat produced in the conductor? Explain with reference to Joule's Law. (2)

Score : 4 Time : 10 Minute

Learning Outcomes

- Able to explain the working principle of different types of lamps.

(2) Write down the names of four types of lamps working on the lighting effects of electricity.

Score : 2 Time : 4 Minute

Learning Outcomes

- Able to explain the working principle of different types of lamps.

(3) Two types of lamps are given below.

- Discharge lamp.
- Filament lamp.

a) If nitrogen gas is filled in each lamp, what change will happen to their working? (1)

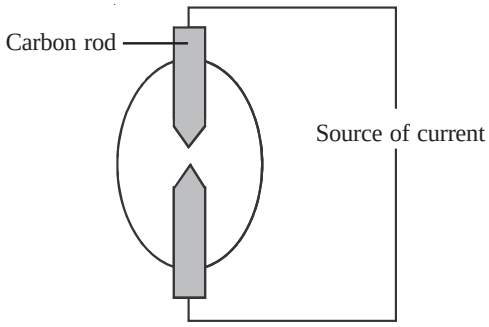
b) Why is it said that the use of filament lamp must be controlled? (1)

Score : 2 Time : 5 Minute

Learning Outcomes

- Able to explain the working principle of different types of lamp.

(4)



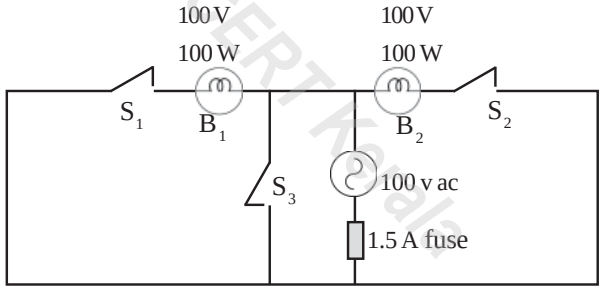
a) Identify the device shown in the picture. (1)

b) How are such devices used in rescue operations? (1)

Score : 2 Time : 5 Minute

Learning Outcomes

- Can explain the function,need and working of fuse in an electric circuit.



(5) Observe the diagram and answer the questions below.

a) Which bulbs will glow when S_1 is switched on? (1)

b) Which bulbs will glow when S_1 and S_2 are switched on? (1)

c) What change will happen to the circuit when S_3 is switched on? (1)

d) Calculate the amperage of the fuse to be used in the circuit. (1)

e) Describe short circuit and overloading with the help of the given circuit. (1)

Score : 5 Time : 8 Minute

Learning Outcomes

- Able to solve problems related to the equations of electric power.

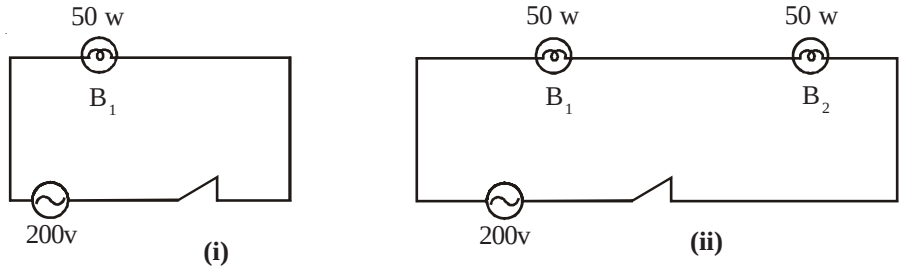
(6) A 800w electrical device is designed to work in 200 V. What will be its power if the device is working in 100 V?

Score : 2 Time : 3 Minute

Learning Outcomes

- Able to solve mathematical problems related to the equations of electric power.

(7) Bulbs marked 200Vand500W are shown in the picture.



a) Calculate the resistance of each bulb in the circuit. (1)

b) What is the power with which the bulb in Circuit I glows? (1)

c) What is the power of the bulb in Circuit 2? Why? (2)

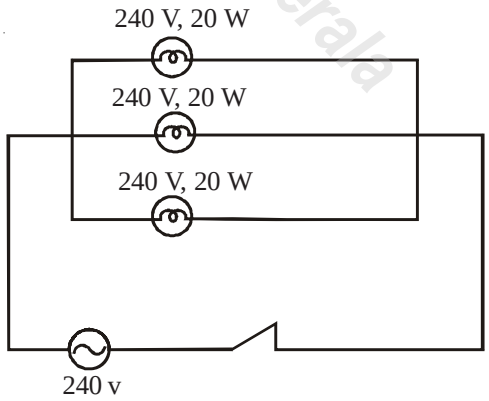
d) How is the power and resistance of an electrical device related to each other when the voltage is the same? (1)

Score : 5 Time : 8 Minute

Learning Outcomes

- Able to solve mathematical problems using equations related to electric power

(8) Electric bulbs are connected in a 240 V supply line are shown in the figure.



a) What is the total wattage of appliances used in the circuit? (1)

b) Calculate the amperage of the fuse to be used in the circuit. (2)

Score : 3 Time : 7 Minute

Learning Outcomes

- Able to explain the working of fluorescent lamps.

(9) Given below are the steps in the working of a fluorescent lamp. Arrange them in the proper order.

a) Ultraviolet rays are produced.

b) Visible light is emitted.

c) Fastly moving electrons collide with the unionized molecules of mercury.

d) Due to electric current thorium oxide coated heating element becomes red hot.

Score : 2 Time : 4 Minute

Learning Outcomes

- Able to explain the working of filament lamps.

(10) Correct the mistakes, if any:

a) Amperage decreases in proportion to the decrease in the area of cross section of the conductor .

b) Connecting appliances in a circuit beyond its power capacity is short circuit.

c) It is to reduce the heat loss that electric lamps are filled with inert gases

Score : 2 Time : 4 Minute

Learning Outcomes

- Able to explain Joules Law and thereby solve problems using equation of Joules Law.

(11) Power of an electric heater working in 230V is 1000W. Calculate the heat produced if the current passes for 5 minutes through the circuit.

Score : 2 Time : 5 Minute

Learning Outcomes

- Able to form power equations and solve numerical problems related to it.

(12) An electric bulb has marking 110 v, 100 w on it.

a) How much energy is used per second by the circuit?

b) What is the resistance of electric bulb?

Score : 3 Time : 7 Minute

Learning Outcomes

- Explain the working and design of heating appliances and state the peculiarities of heating coil.

(13) Fill up the blanks by finding the suitable relationship.

Nichrome	Heating coil	High melting point
Alloy of tin and lead	…….(A)……..	Low melting point
Tungsten	Filament	……(B)……..

Score : 2 Time : 5 Minute

Learning Outcomes

- Able to explain Joules law and solve problems
- Able to solve problems related to equations of power.

(14) If the resistance of two soldering irons working in 250 V are 500 Ω and 750 Ω.

a) Calculate which one of these will carry more current. (1)

b) Find out which soldering iron has more power. (1)

c) Calculate the heat produced in 5 minutes in the soldering iron having resistance 750 Ω. (2)

Score : 4 Time : 10 Minute

Learning Outcomes

- Able to solve problems related to equations for power.

(15) Two bulbs of 500W and 100W are connected parallelly in a circuit of 250V.

a) Which bulb will have more brightness? (1)

b) Through which bulb is current greater? (1)

c) Find out the resistance of filaments in each bulb. (2)

d) Which of these two bulbs will glow with more brightness if they are connected in series? Explain the reason.
(2)

Score : 6 Time : 10 Minute

Learning Outcomes

- Able to explain the functioning of discharge lamps.

(16) Fill in the blanks suitably using the relationship in the first pair.

a) Filament : High melting point
Fuse : ..... (1)

b) Nitrogen filled discharge lamp = Red
……..... = Blue (1)

Score : 2 Time : 5 Minute

Learning Outcomes

- Able to explain the working of LED lamps

(17) Choose and write the facts related to LED lamps from the given list.

a) Requires only a small quantity of power.

b) UV rays are produced due to electric discharge

c) Not harmful to environment since there is no mercury.

d) Intense light is produced when high voltage is applied.

Score : 2 Time : 4 Minute

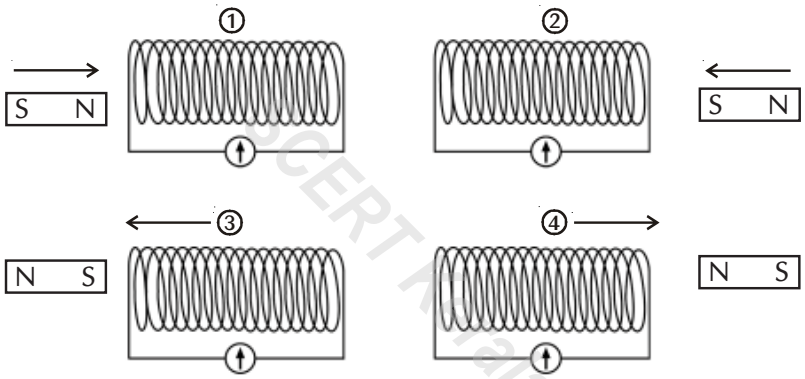
3

ELECTROMAGNETIC INDUCTION

Learning Outcomes

- Able to understand through experiments the phenomenon electromagnetic induction and to explain and suggest methods to increase the induced emf.

(1) Four identical solenoids and magnets are depicted in the diagram. Magnets are shown as moving in the figures 1 and 2 and solenoids are shown as moving in the figures 3 and 4.



a) Which are the figures showing inducing of *emf* ? How? (1)

b) Pair the pictures in which the galvanometer needle deflects in the same direction. What does the deflection indicate? (2)

c) Draw the picture of a device that can produce continuous electricity using the same principle as shown above for producing electricity.Explain its working. (2)

Score : 5 Time : 10 Minute

Learning Outcomes

- Able to understand through experiments the phenomenon electromagnetic induction.
- Able to explain and suggest methods to increase the induced emf.

(2) Certain factors that influence the induced emf in electromagnetic induction are listed below:

i. Increasing the speed of magnet.

ii. Decreasing the strength of magnet.

iii. Increasing the number of turns.

iv. Reducing the speed of rotation of the magnet

v. Increasing the strength of magnetic field

vi. Using solenoid with less number of turns.

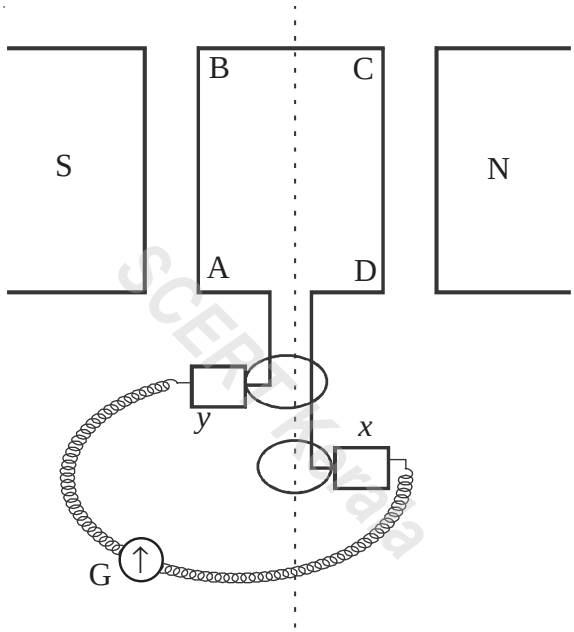
Which of the above ideas can be used to get maximum emf by electromagnetic induction?

Score : 6 Time : 10 Minute

Learning Outcomes

- Able to find out the direction of induced current using Fleming's Right Hand Rule.

(3) The diagram shown below is an arrangement for producing 10V AC using electromagnetic induction. Observe the diagram carefully and answer the questions.



a) Which law is used to find out the direction of induced emf when the armature coil ABCD starts rotating? (1)

b) In which direction the side CD should move (up/down) to produce a flow of current from *x* to *y*? What should be the direction of movement of the side AB (up/down) to produce a flow of current in the same direction? (2)

c) Find out the frequency by drawing a time – emf graph if the armature completes 10 cycles in 5 seconds. (2)

Score : 5 Time : 10 Minute

Learning Outcomes

- Able to explain the structure and function of an AC generator.

(4) Parts of an AC generator are given below.

Field magnet, Armature, Slip rings, Brush

a) Explain the positions of these parts in an AC generator. (2)

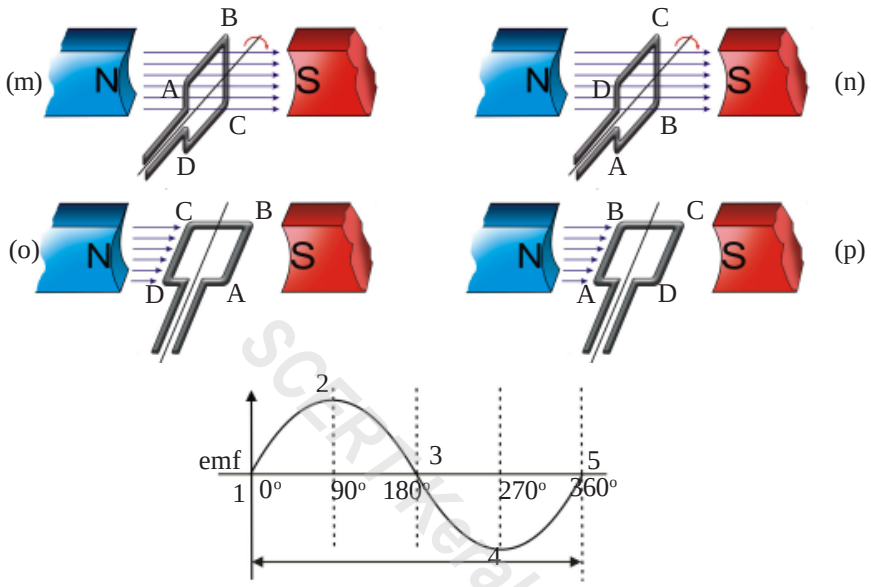
b) Write down the functions of any two. (2)

Score : 4 Time : 7 Minute

Learning Outcomes

- Able to explain the structure and function of an AC generator.

(5) The various stages of rotation of an armature coil while completing one rotation in a magnetic field, and the graph of the emf produced by the coil are shown below:



a) Select the appropriate points from the pictures m, n, o, p corresponding to the positions 1, 2, 3, 4 and 5 in the graph. (2)

b) Explain the scientific basis for the pairing. (1)

c) Which two pictures show the maximum flux changes? Point out one difference between the two. (2)

Score : 5 Time : 8 Minute

Learning Outcomes

- Able to explain the structure and function of an AC generator.

(6) Maximum voltage produced in an AC generator completing 60 cycles in 30 seconds is 250 V.

a) What is the period of the armature? (1)

b) How many cycles are completed in T/2 seconds? (1)

c) What is the maximum emf produced when the armature completes 180° rotation? (1)

Score : 3 Time : 6 Minute

Learning Outcomes

- Able to compare and explain the function and structure of single phase and three phase generators.

(7) In single phase generators armature functions as rotor whereas in power generators armature functions as stator.

a) List out the other differences between single phase and three phase generators. (2)

b) What are the advantages of using armature as stator in power generators? (2)

Score : 4 Time : 8 Minute

Learning Outcomes

- Able to compare and explain the function and structure of single phase and three phase generators.

(8) If a rotor in a power generator completes 3000 rotations in a minute

a) Which type of AC is produced here, single phase or three phase? (1)

b) What will be the frequency of the AC produced if a pair of magnetic poles are used in the generator? (1)

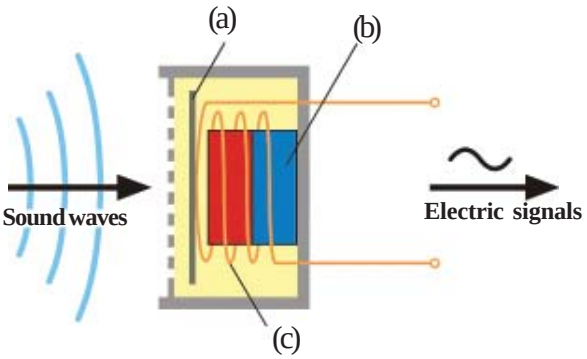
c) What would be the time interval to produce the same emf in the two phases if the rotor completes 20 rotations in a minute? (1)

Score : 3 Time : 6 Minute

Learning Outcomes

- Able to explain the functioning of a moving coil microphone based on the principle of electromagnetic induction.

(9)



a) Observe the picture and identify the parts labeled as a, b, and c in the picture shown. (1)

b) What is the energy change taking place in a moving coil microphone? What are the roles of the parts a, b, and c? (3)

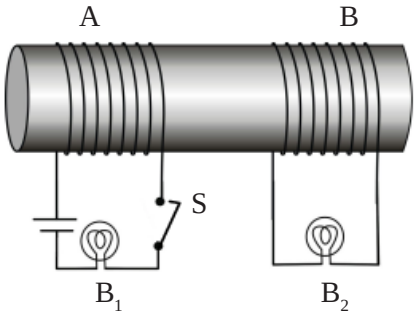
c) Why is the output signal of a moving coil microphone sent to the loud speaker only after feeding it directly into an amplifier? (1)

Score : 5 Time : 10 Minute

Learning Outcomes

- Able to understand mutual induction and explain the practical use of mutual induction.

(10) Coils wound around a soft iron core connects two bulbs, B_1 and B_2 of 6 V. Analyse the figure and answer the questions.



a) If 6 V DC is given in the coil A and the switch is on, which of the bulbs B_1 & B_2 will glow? Why? (1)

b) If AC is given to the coil A instead of DC, which of the bulbs will glow- B_1 or B_2? Why? (1)

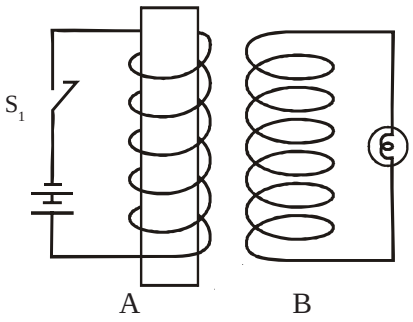
c) Was there any variation in the brightness of Bulb B_1 when AC and DC were supplied? Why? (2)

d) Write down the names of two instruments that use the principle of mutual induction. (1)

Score : 5 Time : 10 Minute

Learning Outcomes

- Able to understand the factors that influence electromagnetic induction



(11) Two solenoids A and B made of insulated copper wire are shown in the diagram. Observe the diagram and answer the questions below:

a) Write down different methods to light up the bulb connected in the coil B using the principle of electromagnetic induction. (2)

b) What is the scientific principle applied to light up the bulb B. (1)

Score : 3 Time : 6 Minute

Learning Outcomes

- Able to explain the structure and working principle of transformer.

(12) A transformer without power loss carries 4000 turns in the primary and 2000 turns in the secondary. If the primary voltage is 120 V and the current is 0.2 A.

a) What is the output voltage of transformer? (1)

b) What is the current in the secondary? (1)

c) What is the maximum output power? (1)

d) Where are the thick wires to be used in this transformer - in the primary or secondary? Why? (2)

Score : 5 Time : 6 Minute

Learning Outcomes

- Able to explain the structure and working principle of transformer.

(13) In a step up transformer, primary power is 50 W and output voltage is 100 V. If the current in the primary is 1 A,

a) What is the primary voltage? (1)

b) What will be the current in the secondary? (1)

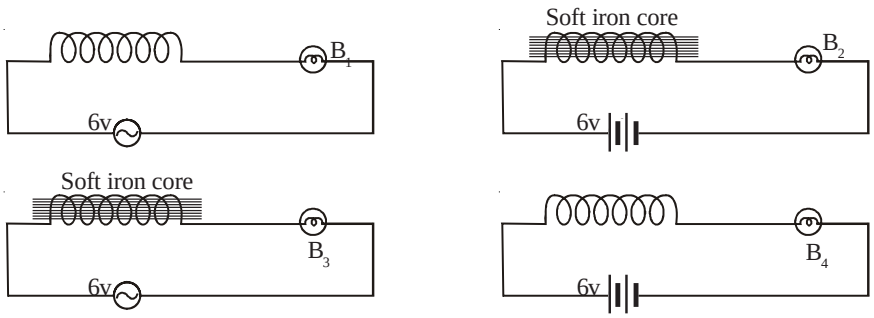
c) $\frac{\text{Secondary power}}{\text{Primary power will be}} = \frac{\qquad}{\qquad}$ (1)

Score : 3 Time : 6 Minute

Learning Outcomes

- Able to understand what is self induction and identify its practical use.

(14) The following circuits are made out of copper conductors having same length and area of cross section. Bulbs used in the circuit are also identical.



a) Which bulb will glow with minimum intensity? Why?

b) What is the solenoid that is used to reduce the emf?

c) Write down the name of a device that is used to reduce AC and DC electric current in a circuit.

Score : 3 Time : 6 Minute

4

POWER DISTRIBUTION AND TRANSMISSION

Learning Outcomes

- Able to explain the working of different types of power stations.

(1) Power Station A : Potential energy → Kinetic energy → Mechanical energy→ Electrical energy

Power Station B : Chemical energy → Heat energy → mechanical energy → Electrical energy

Power Station C : Nuclear energy → Heat energy → Mechanical energy → Electrical energy

(a) Identify the above power stations A, B, and C based on the energy change taking place in them.

b) Write down the merits and demerits of the power stations A, B and C.

c) Name other three energy sources that can be used instead of these.

Score : 6 Time : 12 Minute

Learning Outcomes

- Able to explain the working of different types of power stations.

(2) Names of power stations and statements related to them are given below in two groups.Match them suitably.

A (1) Uses the energy of water stored at a height .

(2) Uses the heat generated by the burning of fuels.

(3) Uses nuclear energy .

B (a) Pallivasal Power Station

(b) Ramagundam Power station

(c) Kalpakkam Power Station (3)

Score : 3 Time : 3 Minute

Learning Outcomes

- To explain the functioning of different types of Power Stations.

3. Different stages of power production and transmission are given. Arrange them in the proper sequence.

a) Distribution transformer reduces the voltage from 11 kV to 230 V.

b) Voltage is reduced from 220 kV to 66kV to supply electricity to large scale industries.

c) Turbine is rotated to operate the generator.

d) Transmission of electricity from the Power station starts at 220 kV.

e) Electricity is produced at 11 kV.

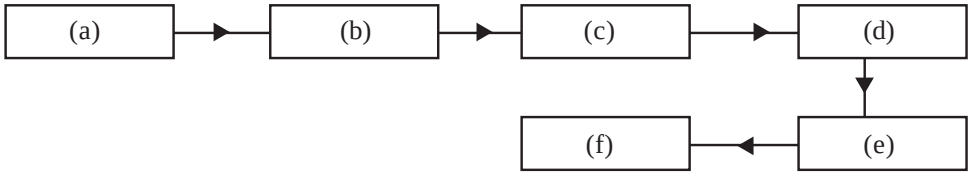
f) Domestic consumers get electricity.

Score : 3 Time : 4 Minute

Learning Outcomes

- Able to explain the working of different types of power stations.

(4) Different stages of power transmission and distribution are given in a flow chart.



(i) Choose the suitable terms from the bracket given below and arrange them in the given boxes in the correct order. (3)

(Power generator, substation, power transformer, star connection, distribution transformer, household connection, power grid) (2)

(ii) What do you mean by power grid? Give two advantages of power grid.

Score : 5 Time : 5 Minute

Learning Outcomes

- Able to explain the reason for sending electricity at high voltage to distant places

(5) We use 230 V for our household purpose. But the power produced at 11 kV is transmitted to distant places after increasing the voltage.

(a) Why is electricity transmitted to distant places at high voltage? (1)

(b) Write down one disadvantage of transmitting electricity at high voltage. (1)

(c) What is the use of substations? Which type of transformer is used here? (2)

Score : 4 Time : 8 Minute

Learning Outcomes

- Able to explain the reason for transmitting electricity to distant places at high voltage.

(6) Power stations are centers where electricity is produced and distributed on a large scale.

a) What is the voltage of power production in our country?

b) Calculate the current if the power produced here is 11 MW.

Score : 3 Time : 6 Minute

Learning Outcomes

- To explain the reason for transmitting electricity at high voltage to distant places.

(7) Identify the relation and fill up the blank.

Step up transformer : power transformer

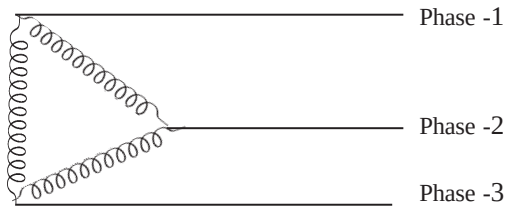
Step down transformer :

Score : 1 Time : 2 Minute

Learning Outcomes

- Able to explain star connection and its role in power transmission.

(8) Given diagram shows the star connection drawn by a child in his science diary.



a) Can you draw a neutral line from the diagram? Why? (1)

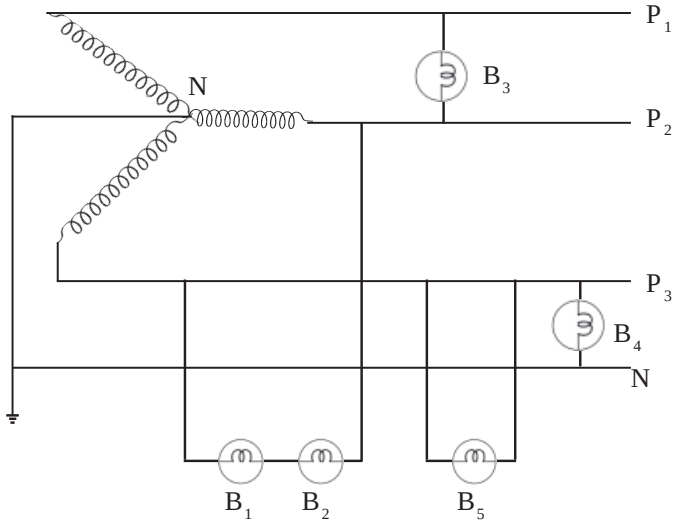
b) Draw the correct diagram of star connection. (2)

Score : 4 Time : 8 Minute

Learning Outcomes

- Able to explain star connection and how it is made use of in power transmission.

(9) Identical five bulbs of 230V and 40W are connected using star connection in the diagram given below:



a) What do you call the point N which is earthed in the circuit? (1)

b) State the voltage differences between two phases and between a phase and a neutral line in a star connection. (2)

c) Which of the connected bulbs will glow? Why? (1)

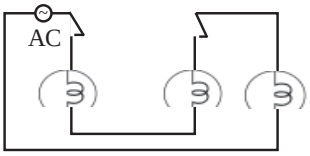
d) Two houses have electric connection from the same distribution transformer, but unfortunately one of the houses suffers power failure frequently. Explain it on the basis of household distribution. (1)

Score : 5 Time : 10 Minute

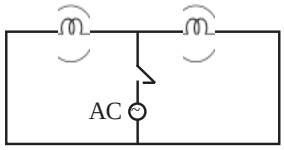
Learning Outcomes

- Able to explain star connection and understand how it is made use of in power transmission.

(10) Examine the given circuits and answer the questions.



Picture A



Picture B

a) Identiyfy series and parallel connection from the given circuits.

b) Parallel mode of connection devices is advisable for household electrification. Why?

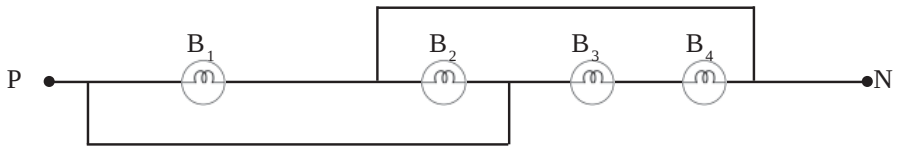
Score 4 Time 4 Minute

Learning Outcomes

- Able to draw household circuits required for operating specific appliances, after comparing the special features of series and parallel mode connections.

(11) Four 60W, 230V bulbs are connected between a phase and a neutral as shown in the diagram.

(Line voltage is 230V)



a) How are the bulbs B_3 and B_4 are connected? What about B_1 and B_2? (1)

b) Which bulb will glow at 60 W power? (1)

c) Which bulbs will glow with low power?. Why? (2)

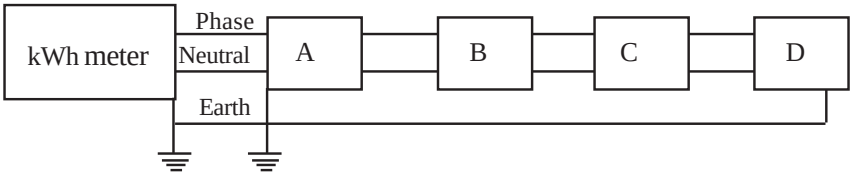
d) Which bulbs in the circuit can be controlled using separate switches. (1)

Score : 5 Time : 10 Minute

Learning Outcomes

- Able to draw household circuits for specific purpose after comparing the peculiarities of series and parallel mode connection.

(12) A flowchart of an household wiring is given in the diagram below. Fix the suitable devices in the space provided by picking from the given list.



(ELCB, MCB, Main switch, Watt hour meter, Three pin plug) (2)

Score : 2 Time : 4 Minute

Learning Outcomes

- Able to explain how earthing ensures safety.

(13) We know that earth is an electron bank and that it has zero potential. But quite often we get electric shock from computer despite proper earthing.

a) Can electric shock from electric devices be avoided by earthing alone? (1)

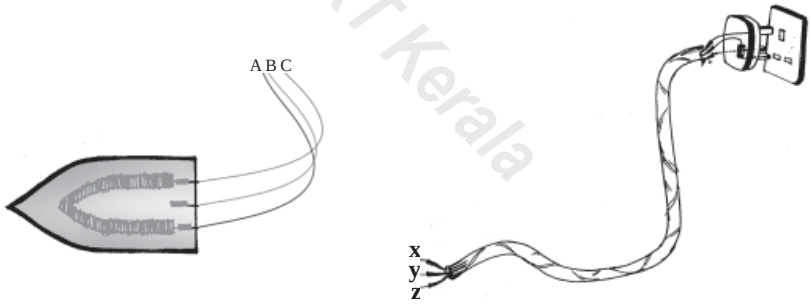
b) Proper earthing will give us safety from electric shock. What is meant by proper earthing? How can the earthing arrangement be done properly to ensure safety? (3)

Score : 4 Time : 8 Minute

Learning Outcomes

- Able to explain how earthing ensures safety.

(14) Examine the diagram.



a) How would you connect the wires A, B and C from the electric iron to the wires of three pin top correctly? (1)

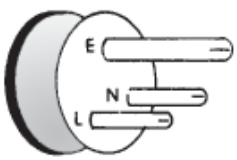
b) What is your response to the opinion that two pin top can be used instead of three pin top in an electric iron? (2)

Score (3) Time :5 Minute

Learning Outcomes

- Able to explain how earthing ensures safety.

(15) Which is the electric line to be connected to the point marked as E in the diagram?



Score (1) Time : 1 Minutes

Learning Outcomes

- Able to calculate the amount of energy needed to run the electrical devices in a circuit.

(16) A bulb of 60 W in a classroom remains switched on for a long time from 9 am to 5 pm due to the negligence of students in the class.

a) Calculate in joule the electric energy consumed by the bulb? (1)

b) If similar negligence had happened in 5 classrooms, how many units of electric energy would have been wasted? (2)

c) List out the different ways that can be adopted to save energy. (1)

Score : 4 Time : 8 Minute

Learning Outcomes

- Able to calculate the amount of energy needed to run the electrical devices in a circuit.

17. In a house 5 CF lamps each of 24 W work for a period of 5 hours and fans of 80W work for 5 hours.

a) What will be the electric consumption in kWh for a month? (1)

b) Calculate the bill amount for one month by collecting the rate from the given table. (1)

Monthly consumption	From 0 – 40 units	From 0 – 50 units	From 5 – 100 units	From 101 – 150 units	From 201 – 250 units	From 251 – 300 units	From 151 – 200 units
Rate per unit	1.50	2.80	3.20	4.20	5.80	7.00	5 rupees per all units

(c) Find out the change in the monthly bill amount if CF lamps are replaced by LED lamps of 3W. (2)

Score : 5 Time : 10 Minute

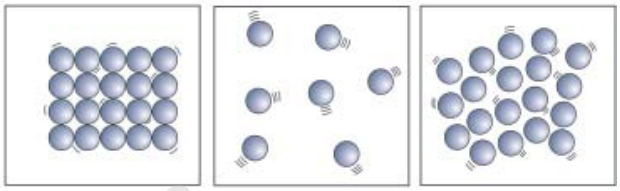
5

Heat

Learning Outcome:

- Able to explain change of state, moleclues and kinetic energy

(1) Molecular arrangement of a substance in its solid, liquid and gaseous is depicted.



A B C

(a) Which is the state of matter indicated in A, B and C respectively? Of these, in which one is the kinetic energy of molecules the maximum? (2)

(b) Which is the form of energy absorbed or released during the change of state? (1)

(c) There is a change in the molecular arrangement when there is a change of state. Which energy changes during the process - kinetic or potential? (1)

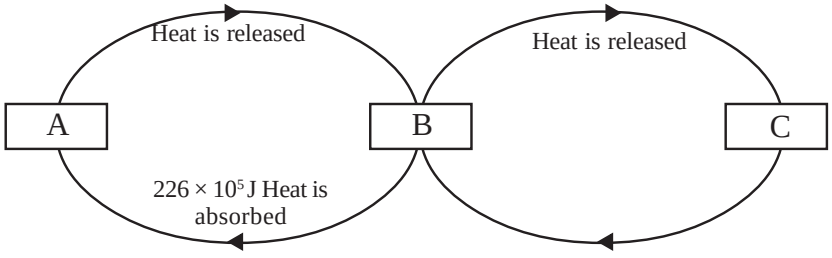
Score : 4 Time : 4 minute

Learning Outcome:

- Able to explain latent heat of fusion, latent heat of vaporisation and solving related mathematical problems.

(2) The flow chart depicts the change of state of matter of a definite mass of substance A to states of matter B and C & vice versa : C to B to A.

Based on the descriptions in the flow chart answer the following (Latent heat of fusion of C = 335×10^3 J/kg , latent heat of vapourisation of B = 226×10^4 J/kg)



(a) Out of solid, liquid & gas, which are the states indicated by A and B? (1)

(b) Find out the mass of the substance B. (1)

(c) Calculate the amount of heat absorbed by the substance C when it changes into B.

Score : 4 Time : 8 minute

Learning Outcome:

- Able to explain specific heat capacity and latent heat by identifying them.

(3) A copper block and an iron block, each of mass 1 kg, which are at the same temeperature, are heated to 300^0C.(Specific heat capacity : Copper :385 J/kgK, iron : 460 J/kgK, Water:4200 J/kgK)

(a) What is meant by the term 'specific heat capacity?' (1)

(b) Which of these has the higher amount of energy after heating? (1)

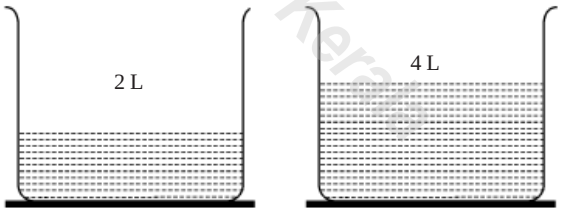
(c) An iron block is immersed into 1 kg water at 30°C and is stirred. By how much will the temperature of water rise up? (in °C) (2)

Score : 4 Time : 8 minute

Learning Outcome:

- Able to explain heat and temperature

(4) 6 L of water at 323 K is taken into beakers shown below as 2L and 4 L. (The heat lost to the surroundings is ignored.)



(a) Will there be a change in the heat and temperature of the water in each beaker? Why? (2)

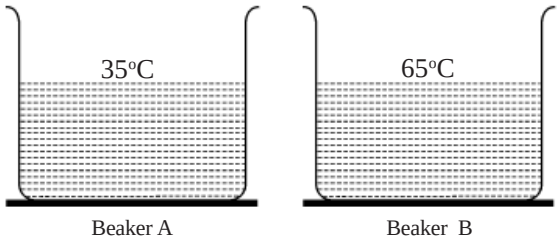
(b) If the water in each beaker is given 10000 calorie heat each what will be the change in temperaure of each in Kelvin scale? Will the change be the same in Farenheit as well? (2)

Score : 4 Time : 8 minute

Learning Outcome:

- Able to understand specifc heat capacity and lateret heat and explain them.

(5) 50 L of water at different temperatures are taken in two vessels. (Specific heat capacity of water is 4200 J/kgK)



(a) Find out the heat required to convert water at 35° C in the vessel A into 45° C which is the temperature of water needed for bathing. (2)

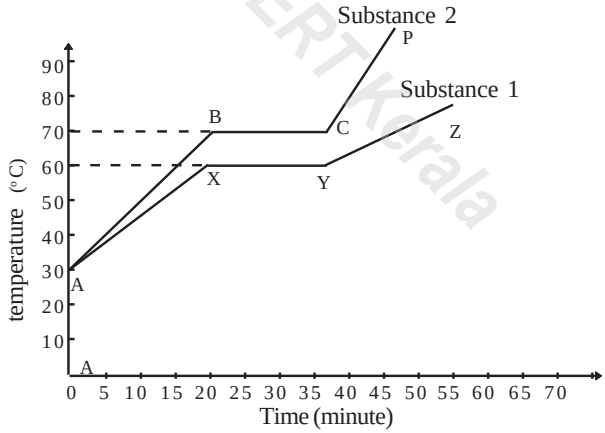
(b) How many litre of water is to be poured from the vessel B into the vessel A to make water to attain that temperature in A? (2)

Score : 4 Time: 8 minute

Learning Outcome:

- Able to analyse graphs and explain specific heat capacity and change of state.

(6) A time - temperature graph drawn on the basis of data obtained on heating two substances of mass 2 kg each at atmospheric temperature is depicted.



(a) What is the temeprature of the solids at the time of starting the heating? How much is it in Kelvin scale? (1)

(b) Of the substnaces shown in the graph, which is the one with a higher specific heat capacity? Why? (2)

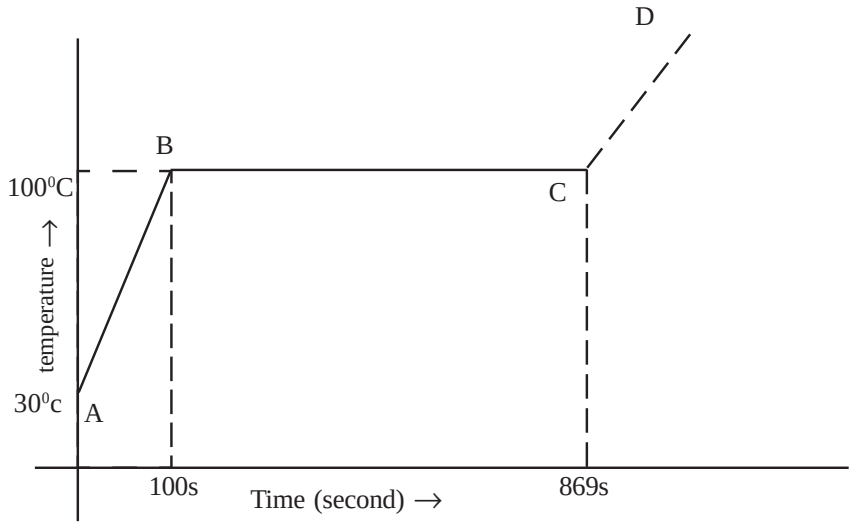
(c) What is the melting point of each? In what state of matter will be the substance at the points C and X in the grpah? (2)

Score: 5 Time: 8 minute

Learning Outcome:

- Able to analyse graphs and explain, specific heat capacity and change of state.

(7) An immersion water heater of power 2940 W is operated by immersing it in 1 kg liquid. The graph drawn on the basis of the data obtained is given. Analyse the graph and answer the following questions.



(a) What is the boiling point of the liquid? (1)

(b) Calculate the specific heat capacity of the liquid (2)

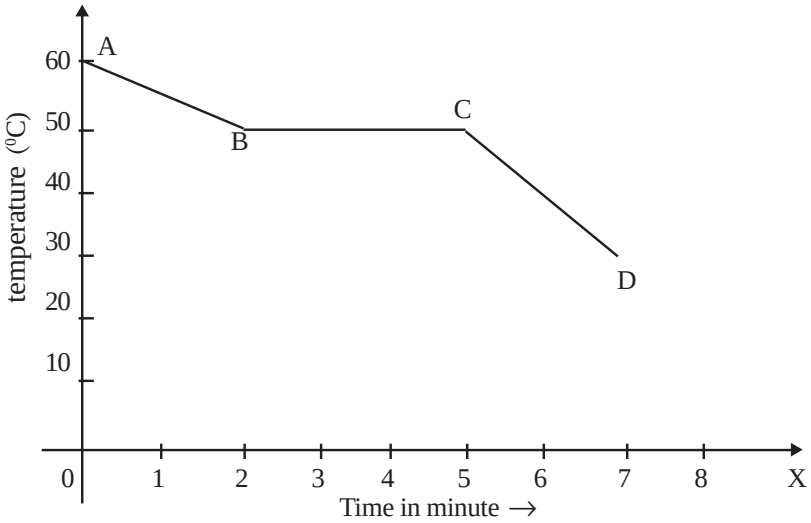
(c) Calculate the latent heat of vaporisation of the liquid if the entire liquid changes into vapour in 869 s. (2)

Score: 5 Time: 8 minute

Learning Outcome:

- Able to analyse graphs and explain, specific heat capacity and change of state

(8) The graph drawn using the data obtained on cooling a molten substance at 60°C is given. Analyse the graph and answer the following questions.



(a) What is the freezing point of the substance? (1)

(b) What is the state of matter at CD? (1)

(c) What is the temperature in the laboratory?

(d) How many minutes does it take to complete solidification once it starts?

Score: 2 Time: 4 minute

Learning Outcome:

- Able to distinguish and differentiate between heat and temperature and understand that they are related to the kinetic energy of molecules and identify and present their units.

(9) Identify the relationship and fill in the blanks and present

(a) temperature : kelvin ;
heat : .....

(b) ..... : takes place at all temperatures.
vaporisation : takes palce at a fixed temperature alone

Score: 2 Time: 4 minute

Learning Outcome:

- Can explain the different scales for measuring temperature and solve related mathematical problems

(10) The infomation obtained by using different kinds of thermometers are shown in the table.

I	II	III
0 K	(A)	- 459.67^0 F
(B)	0 ^{0}C	32^0 F
233 K	(D)	(C)

(a) Complete A,B,C and D in the table. (2)

(b) Which type of thermometer would have been used to get the measures shown in Columns 2 and 3? (1)

Score: 3 Time : 6 minute

Learning Outcome:

- Can explain day-to-day experiences connected with change of state, vaporisation and specific heat capacity.

(11) Write down the reason.

(a) Blisters from steam are more severe than that caused by boiling water at the same temperature.

(b) Food can be cooked fast using a pressure cooker.

(c) Changes in the atmospheric temeprature do not affect the human body instantly.

Score : 3 Time: 8 minute

Learning Outcome:

- Can present that there is a difference between heat and temperature and that they are related to the kinetic energy of molecules, identify their units and write them down.

(12) Tabulate the following into those related to heat and those related to temperature .

(a) It is measured in the unit joule

(b) Basic unit is kelvin

(c) It is proportional to the average kinetic energy of molecules

(d) It is equal to the total kinetic energy of molecules

Score : 2 Time: 4 minute

Learning Outcome:

- Specific heat capacity, coolant, land breeze, sea breeze

(13) Names of some substances and their specific heat capacities are given.

Substance	Specific heat capacity
Water	4200 J/kgK
Lead	120 J/1kgK
Sea water	3900 J/1kgK
Land (sand)	780 J/1kgK

(a) The specific heat cpapcity of water is 4200 J/kgK. What does it mean? (1)

(b) Why is water used as coolant? (1)

(c) Based on specific heat capacity explain how sea breeze occurs in day time and land breeze in the night time. (2)

Score: 4 Time: minute

Learning Outcome:

- Able to explain the facts about evaporation, change of state and specific heat capacity

(14) Match the following :

A	B	C
(a) Water to which propelene glycol is added	Evaporation	335×10^3 J/kg
(b) Spirit	Melting point	4200 J/kgK
(c) Mercury	Thermal expansion	129^o C
(d) ice	Vaporisation	Thermometer
	Latent heat of fusion	chillness

Score: 4 Time: 6 minute

Learning Outcome:

- Can solve mathematical problems related to change of state and specific heat capacity

(15) The data obtained on heating 2 kg of a solid substance by supplying heat uniformly is tabulated.

Time (minute)	0	10	20	30	40	50	60	70	80	90
Temperature (^oC)	5	10	15	20	25	30	30	30	38	46

(a) What is the melting point of the substance? (1)

(b) Calculate the specific heat capacity of the substance if the heat received by the substance from 20 minute to 40 minute is 6000 J. (2)

(c) What speciality is seen in the temperature from the 50th to the 70th minute? Give the reason. (2)

Score: 3 Time: 6 minute

Learning Outcome:

- Can solve mathematical problems connected with Joule's law and specific heat capacity.

(16) An immersion heater capable of raising the temperature of 10 L by 20 K in 10 minutes is needed.

(a) What is the quantity of heat required to raise the temperature of water by 20 K? (1)

(b) What is the power of a 250 V immersion heater that is to be used for the purpose? (2)

Score: 3 Time: 8 minute

Learning Outcome:

- Able to solve mathematical problems connected with specific heat capacity and change of state

(17) 10 kg of ice at - 5 ^oC is heated continuously and is converted into steam at 100^oC.

(latent heat of fusionof ice :335×10^3 J/kg, latent heat of vaporisation of water : 226×10^4 J/kg, Specific heat capacity of ice : 2.1×10^3 J/kgK, Specific heat capacity of water : 4.2×10^3 J/kgK)

(a) Calculate the heat required to convert the ice at - 5^{o}C into steam at 100^{o}C. (3)

(b) If this activity is done at high pressure, will the amount of heat required to convert water at 0^{o}C into steam increase or decrease? Why? (1)

Score: 4 Time: 8 minute

Learning Outcome:

- Can explain global warming and its reasons, suggest remedies and apply them in daily life situations.

(18) Global warming is the phenomenon by which the temperature of the earth's surface and the atmosphere increase due to the excess of Greenhouse gases.

(a) Which are the green house gases? (1)

(b) What are the precautions to be taken to minimise the amount of Greenhouse gases in the atmosphere? (1)

(c) Describe any two environmental problems created by global warming. (2)

Score: 4 Time: 6 minute

Learning Outcome:

- Can apply the concept that evaporation produces cooling and find out its influence in daily life.

(19) Some statements regarding evaporation are given.

(a) A wet cloth gets dried faster if it is spread out well.

(b) While waving, wet hand feels cold.

(c) The chillness felt by a hand when spirit falls on it is more severe than that caused by the falling of water.

Select the term that is best suited for the above statements from those given in the brackets.

(surface area, wind, humidity, nature of substance)

Score : 2 Time: 4 minute

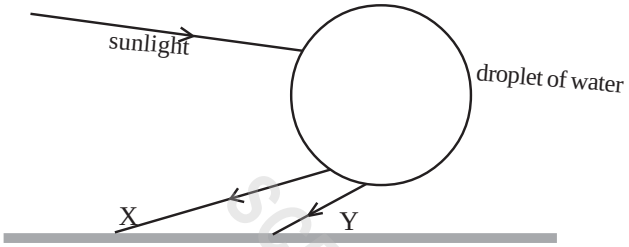
6

COLOURS OF LIGHT

Learning Outcomes

- Can explain the formation of rain bow and its peculiarites

(1) The figure shows a ray of light falling obliquely on a droplet of water for the formation of rainbow.



(a) Copy the figure and complete the unfinished part. (1)

(b) What is the phenomenon that took place inside the droplet? (1)

(c) What is the colour of 'X' (1)

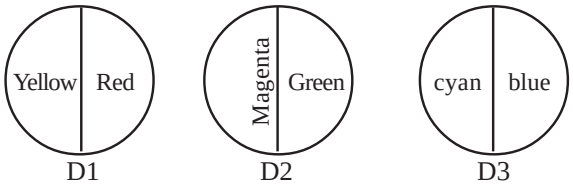
(d) What is the reason behind the red appearing at the outer edge of a rainbow ? (1)

Score: 4 Time : 8 minute

Learning Outcome

- Can indulge in experiments for identifying primary and secondary colours and explain the results of combination of colours.

(2) Oberve the colours painted on a circular disc.



(a) Which disc appears white on rotating fast? (1)

(b) What is the name of the colour pair seen on the disc? (1)

(c) Redraw the other two discs by interchanging the colours on the discs in such a way that the discs will appear white on rotating fast. (2)

Score: 4 Time : 8 minute

Learning Outcomes

- Explain the practical aspects of scattering
- Explain with examples the persistnece of vision.
- Explain the formation of a rainbow

(3) Analyse the following statements and find out the reason behind them.

(a) Stars can be seen even in day time while viewed from the moon
(b) Raindrops falling down during rain appear like a glass rod.
(c) A rainbow is seen in the shape of a circle when viewed from a height.
(d) The sky of cities mostly appears in grey colour.

Score: 4 Time : 8 minute

Learning Outcomes

- Can explain the original colours of transparent and opaque objects and why objects' colours in artificial light.

(4) Two teams A and B are taking part in a volley ball competition held on a ground illuminated by a sodium vapour lamp (yellow light). Team A is wearing white jersey and blue shorts while Team B is wearing yellow jersey and black shorts.

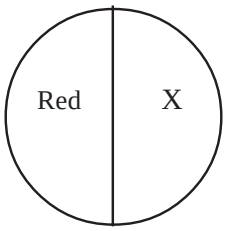
(a) Can you distinguish between the teams based on the colour of their dress ? (1)
(b) Justify your answer (2)

Score: 3 Time : 8 minute

Learning Outcomes

- Can explain the persistence of vision with the help of examples
- Can indulge in experiments for identifying primary and secondary colours and explain the results of combined colours.

(5) A disc painted with different colours is shown



(a) Which colour is X if the disc appears white on rotating fast? (1)
(b) Why did the disc appear white on being rotated fast? (1)
(c) In what colour will the disc appear if green light alone is made to fall on the disc when it is being rotated fast? (2)

Score: 4 Time : 8 minute

Learning Outcomes

- Can explain the original colours of transparent and opaque objects and why objects undergo change in their colours in artificial light.

(6) Colour filters are materials that will allow only certain colours of light to pass.

(a) What is the colour of the filter that can trasmit blue and red colours of light? (1)

(b) Which are the radiations that will be absorbed completely by an infrared filter? (1)

(c) Write down :

(i) Two specialites of infrared rays (1)

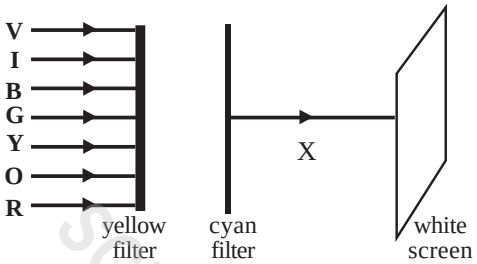
(ii) Two uses of infrared rays (1)

Score: 4 Time : 8 minute

Learning Outcomes

- Can explain the original colours of transparent and opaque objects and why objects undergo change in their colours in artificial light.

(7) The figure shows sunlight falling on a white screen after being passed through yellow and cyan filters.



(a) Supply the omitted portion and complete the diagram

(b) Which colour is 'X'? (1)

(c) (i) What is the complementary colour of this colour? (2)

(ii) What do you mean by complementary colours?

Score: 4 time : 8 minute

Learning Outcomes

- explain that a composite light can be subjected to dispersion.
- explain the practical aspects of scattering
- explain the persistence of vision with the help of examples

(8) Match the columns A, B and C suitably (3)

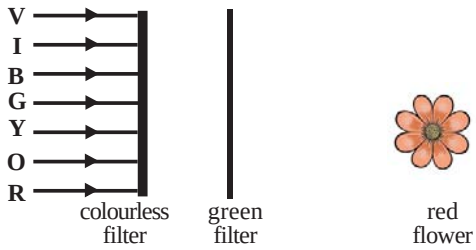
A	B	C
Light makes tiny particles visible due to scattering	Dispersion	Picutres on a TV screen keep on changing and give an illusion of motion.
The effect of seeing an object is retained by the eye for 1/16 of a second	Tyndal Effect	Formation of rainbow on the horizon
Composite light splits up into component colours	Persistence of vision	On foggy mornings the path of sunlight becomes clearly visible.

Score: 3 Time : 6 minute

Learning Outcomes

- Can explain the reason for original colours of transparent and opaque objects

(9) The figure shows white light passing through colour filters



(a) The light passsing through the filters falls on the flower. In which colour will the flower appear? Why? (2)

(b) Why is it that pure water is colourless? (1)

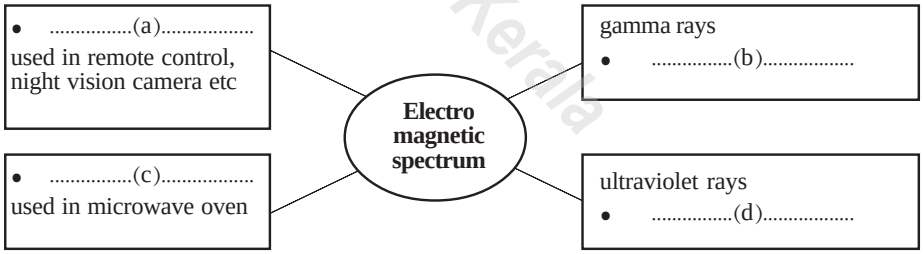
Score: 3 Time : 6 minute

Learning Outcomes

- Can explain electromagnetic spectrum

(10) Complete the wordweb given below:

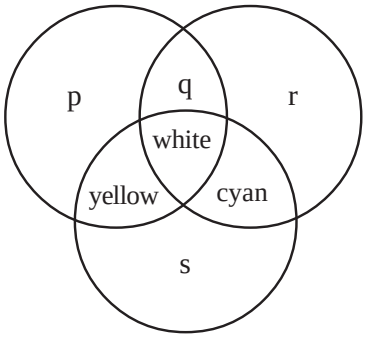
Score: 4 Time : 4 minute



Learning Outcomes

- Can engage/conduct in experiments for identifying primary and secondary colours and explain the results of combination of colours.

(11) Primary colours are allowed to fall on a white wall.



(a) Which are the colours indicated by p, q, r and s? (2)

(b) What do you mean by secondary colours? (1)

(c) Find out from the picture one secondary colour and its complementary colour and write them down (1)

Score: 4 Time : 8 minute

Learning Outcomes

- Can explain that composite light is subject to dispersion and that the deviationof each component colour depends on the wavelength

(12) A spectrum is obtained by passing white light from a torch through a glass prism.

(a) Write down the steps of this experiment. (1)

(b) Draw a figure that represents the experiment. (2)

Score: 3 Time : 6 minute

Learning Outcomes

- Can explain the practical aspects of scattering

(13) The telescope 'Chandra' is installed on the outer space. Identify the correct statements related to it. (2)

(a) There is no scattering of light in the outer space

(b) There is a greater scattering in the outer space

(c) The vision is more accurate and clear

(d) Presence of dust in the outer space helps in better vision and clarity

Score: 2 time : 4 minute

Learning Outcomes

- Can explain primary and secondary colours
- Can explain electromagnetic spectrum

(14) Which of the following does not belong to the group?

(a) red, yellow, blue, green (1)

(b) visible light, sound, X – rays, radio waves (1)

Score: 2 Time : 4 minute

Learning Outcomes

- Can explain primary and secondary colours
- Can explain electromagnetic spectrum

(15) Find out the relation between the first pair and complete the other accordingly:

(a) Black : absorbs all colours of light :: white : ..... (1)

Score: 1 Time : 2 minute

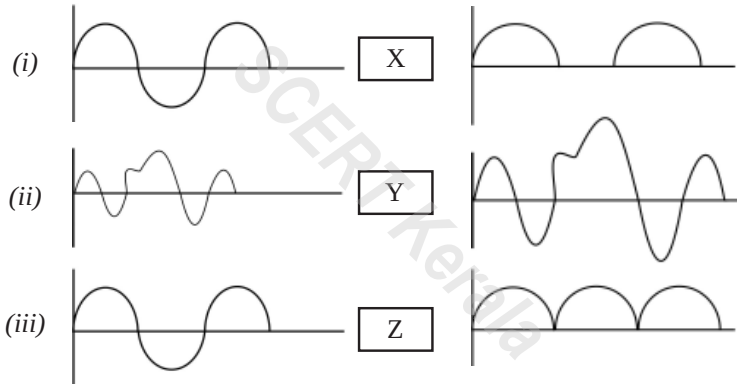
7

ELECTRONICS

Learning Outcome

- Can arrange and operate diode/LED in both forward bias and reverse bias and explain the differences and draw the circuits
- Arrange and operate diode in AC circuits, and recognise what half wave rectification and full wave rectification are and illustrate them by drawing their graphs

(1) Graphic diagrams depicting different electronic functions are given below.



(a) Write down the names of devices to be used at x,y and z (1½)

(b) What are the electronic functions indicated by them? (1½)

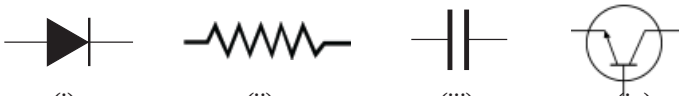
(c) Of these which is the function that is used in mobile phones? (1)

Score: 4 Time : 10 minute

Learning Outcome

- Can tabulate electronic devices by distinguishing them, know the components in them and present the symbols by tabulating them

(2) Devices used in electronic circuits are given below.



(i) (ii) (iii) (iv)

(a) Identify each of the above. (2)

(b) Find out which electronic device is associated with the following electronic functions and write them down

(i) Increases the strength of audio signals

(ii) Stores charge and releases it as and when needed.

(iii) Converts AC into DC

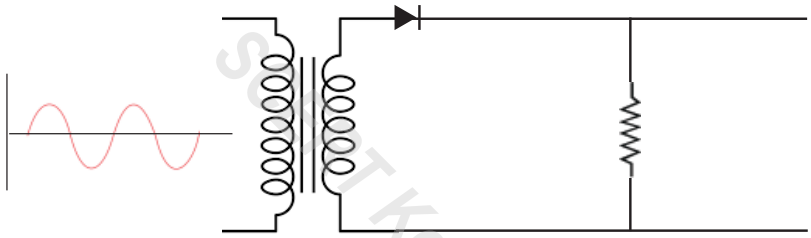
(iv) Supplies the necessary potential difference to components by regulating the current in a circuit

Score: 4 Time : 10 minute

Learning Outcome

- can arrange and operate diode/LED in forward bias as well as reverse bias, explain the differences and draw the circuits
- arrange and operate diode in AC circuits, and recognise what half wave rectification and full wave rectification are and draw their graphs

(3) The circuit diagram of a rectifier is depicted.



(a) Which type of rectifier is this? (1)

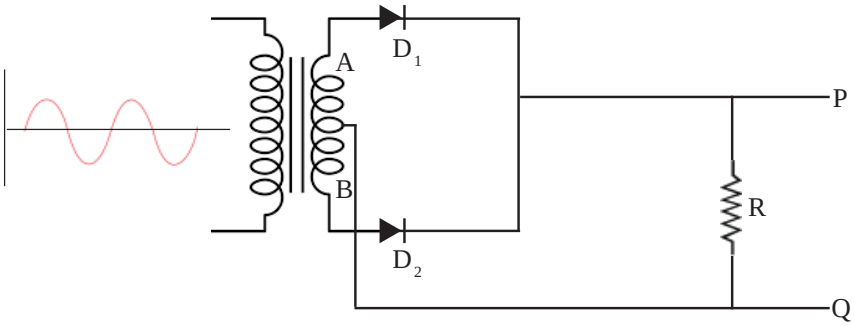
(b) Draw the graph of its output (1)

Score: 2 Time : 5 minute

Learning Outcome

- Can arrange and operate diode/LED in both forward bias and reverse bias and explain the differences and draw the circuits
- Arrange and operate diode in AC circuits, and recognise what half wave rectification and full wave rectification are and illustrate them by drawing their graphs

(4) An electronic circuit is given below. R is a resistor. D_1 and D_2 are resistors



(a) Which diode is forward biased and which is reverse biased when the end A of the transformer is positive and the end B is negative? (1)

(b) What is the direction of current at this instance? (1)
(from P to Q/ from Q to P)

(c) What change occurs in the direction of current when the end A is negative? Why? (1)

(d) Draw the graph of the output (1)

Score: 2 Time : 5 minute

Learning Outcome

- Can explain the scopes of photonics, nanotechnology etc., which are different fields of modern technology

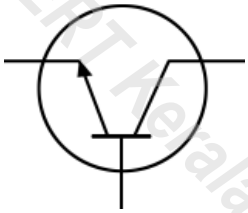
(5) Which is the device that convert pictures and images directly into digital signals. (1)

Score: 1 Time : 2 minute

Learning Outcome

- Explain the scopes of photonics, nanotechnology etc., which are different fields of modern technology

(6) The symbol of a PNP transistor drawn by a child when the child is given.



(a) Is the symbol correct? If not correct it and redraw (2)

(b) Write down any one use of a transistor (1)

Score: 3 Time : 7minute

Learning Outcome

- Can make use of the advantages of modern technology in daily life.
- Can explain the scopes of photonics, nanotechnology etc., which are different fields of modern technology

(7) Using wiFi it is easy to transfer information between mobile phones .

(a) What is meant by WiFi? (1)

(b) Which electromagnetic wave is used in this? (1)

Score: 3 Time : 5 minute

Learning Outcome

- Can explain the scope of photonics, nanotechnology etc., which are different fields of modern technology

(8) Laser optics and fibre optics are two branches of science related to photonics. Write down two fields which make use of laser optics. (1)

Score: 1 Time : 4 minute

Learning Outcome

- Can explain the scope of photonics, nanotechnology etc., which are different fields of modern technology

(9) There exist different types of small and big robots.

(a) In which name is UAV (flying robots) known as? (1)

(b) Which are the different fields in which robots are made use of? (1)

(c) Which is the system used for their remote control? (1)

Score: 3 Time : 5 minute

Learning Outcome

- Can make use of the advantages of modern technology in daily life.
- Can explain the scope of photonics, nanotechnology etc., which are different fields of modern technology

(10) Some statements are given below about analogue, microwave and HD.Which of them is associated with each of these statements?

(a) This is a mode of transmission.

(b) More than 2 lakhs of pixels are transmitted from each frame.

(c) TV and mobile phones make use of this.

(analogue, microwave, HD)

Score: 1 Time : 5 minute

Learning Outcome

- Can explain the scope of photonics, nanotechnology etc., which are different fields of modern technology

(11) Choose the correct answer from those given in brackets.
(photonics, robotics, nanotechnology)

The branch of science that

(a) makes use of particles of size 1 nm to 100 nm to make new substances and devices.

(b) deals with the study of the assembling and use of robots

(c) deals with the study of properties,control and use of photons

Score: 3 Time : 7 minute

Learning Outcome

- Can tabulate electronic devices by distinguishing them, know the components in them and present the symbols by tabulating them

(12) Find out the relation.

 : Capacitor

 : .....

Score:1 Time : 3 minute

Learning Outcome

- Can explain the scopes of photonics, nanotechnology etc., which are different fields of modern technology

(13) We know the characteristics of metals like gold, copper and aluminum. It is possible to make copper transparent, to burn aluminium and to dissolve gold using nanotechnology

(a) How did nanotechnology get that name? (1)

(b) Into how many parts should you divide an object of length 1 m to make its length 1nm? (1)

(c) What is the reason behind the change in physical properties of substances when made into nano size? (1)

(d) Write down the use of nanotechnology in any two distinct fields (1)

Score: 4 Time : 10 minute

Learning Outcome

- Can describe the characteristics of IC chips

(14) When the First Computer Eniac was switched on in America in 1940, there was 40% reduction of voltage in the city and more heat was generated.

(a) Why did Eniac produce large amount of heat and increase the electricity consumption?

(b) Which are the electronic components that are used in modern computers to help in minimising the energy loss?

Score: 2 Time : 5 minute

8

ENERGY MANAGEMENT

Learning Outcomes

- Explain and distinguish between different forms of energy

(1) Though energy is available in many forms we depend mostly on electrical energy.

(a) Write down two forms of energy, other than electrical energy, used in daily life. (1)

(b) Electrical energy is used much in daily life.Why ? (1)

(c) Does increase in population and mechanisation lead to energy crisis? How? (2)

Score: 4 Time: 4 minute

Learning Outcomes

- The learner can explain different kinds of fuels and their efficiency

(2) The heat energy obtained on burning 2 kg of hydrogen, coal and petrol are given below:

Petrol	- 9×10^7 J
Hydrogen	- 3×10^8 J
Coal	- 6×10^7 J

(a) Which of these is the most efficient fuel? (1)

(b) How much is the calorific value of hydrogen? (1)

(c) Arrange these fuels in the ascending order of their calorific values. (1)

(d) Which of the above will you select as a good fuel? What is the basis of your selection? (1)

Score: 4 Time: 4 minute

Learning Outcomes

- The learner can explain the factors affecting the combustion of fuels

(3) It is advisable to keep stirring heap of wastes while burning them.

(a) Wrtie down two essentail situations for the complete burninig of fuels. (1)

(b) How does the stirring help the combustion? Explain. (2)

(c) Write down two disadvantages of partial combustion. (1)

Score: 4 Time: 5minute

Learning Outcomes

- The learner can undersand about conventaional and non conventional energy sources.

(4) (a) What is meant by non renewable sources of enegy? (1)

(b) How did such fuels originate in nature? (2)

(c) Write down any two examples for it. (1)

Score: 4 Time: 5 minute

Learning Outcomes

- The learner can explain the need for the judicious use of fuels

(5) (a) What are fuels? Wrtie down the names of two fuels each from the various category of fuels (2)

(b) How does the excessive use of fuels influence global warming? Explain. (1)

(c) Esablish the need for prohibiting diesel vehicles in our country in the context of environment pollution. (1)

Score: 4 Time: 9 minute

Learning Outcomes

- The learner can explain the relation betwen biomass and biogas.

(6) (a) How does the biomass change into biogas in a biogas plant?

(b) Of these which is the fuel that is advantageous?

(c) What are the advantages of having community biogas plants?

Score: 3 Time: 5 minute

Learning Outcomes

- The learner can explain how green energy can be used to the maximum level to minimise the problems of using brown energy.

(7) (a) On what basis are the sources of energy classified as green enegy and brown energy? (1)

(b) Classify the following into green energy and brown energy

Solar cell, nuclear reactor, tidal energy, hydro electric, diesel engine, windmill, thermal power station (2)

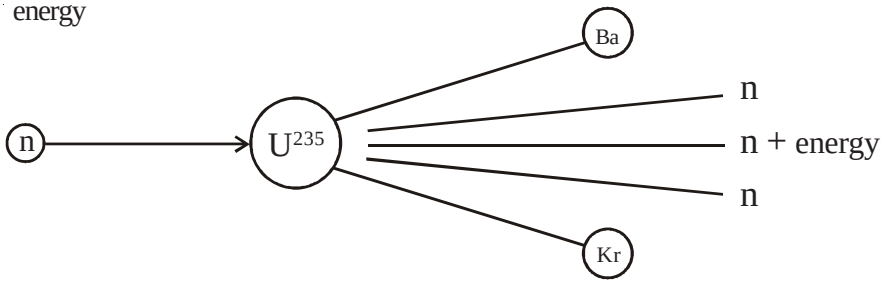
(c) Give any two suggestions to use the green energy to the maximum level. (1)

Score: 4 Time: 9 minute

Learning Outcomes

- The learner can explain the difficulties as well as the practical applications of nuclear energy

(8)



The figure indicates the fission reaction of a heavy nucleus of Uranium – 235

(a) Write down an activity to make energy available by using lighter nucleii. (1)

(b) Calculate the energy obtained if 1 g matter changes into energy during nuclear fission reaction ($c = 3 \times 10^8$ m/s) (2)

(c) What will be the result if the reaction shown in the above figure continues? (1)

(d) Why are we establishing nuclear reactors despite of the realisation that nuclear reactors are controlled nuclear bombs? (1)

Score: 3 Time: 6 minute

Learning Outcomes

- The learner can explain how the excessive use of fossil fuels affects global warming

(9) Coal is the most abundant fossil fuel on the earth.

(a) How did the fossil fuels originate? (1)

(b) Which is the main constituent of coal? (1)

(c) What are the substances obtined when coal is allowed to undergo distillation in the absence of air? (1)

(d) How does the excessive use of fossil fuels cause global warming? (2)

Score: 5 Time: 10 minute

Learning Outcomes

- The learner can inderstand the differences between LNG and CNG and their advantages

(10) LNG and CNG are made from natural gases.

(a) What is the advantage of CNG over LNG ? (1)

(b) Compare LNG and CNG from the point of view of fuel efficiency. (2)

Score: 3 Time: 5 minute

Learning Outcomes

- The learner can explain the possibilities as well as the limitations of hydrogen being used as a source of fuel in the future

(11) Hydrogen is a fuel with a high calorific value

(a) What is the limitation of hydrogen as a fuel? (1)

(b) Which is the substance added to hydrogen to make a hydrogen fuel cell? (1)

Score: 2 Time: 4 minute

Learning Outcomes

- The learner can explain how biomass and biogas are related.

(12) Biomasses are animal wastes and plant wastes

(a) What is the advantage if biomass is converted into biogas? (1)

(b) Which is the main constituent of biogas? (1)

(c) "Community biogas plant is a better remdy for energy crisis" Write down your comments about this statment. (1)

Score: 3 Time: 7 minute

Learning Outcomes

- The learner can explain about energy source from nuclear power stations

(13) Suggest the methods that can be used to free energy from nucleus. How is energy produced using them?

Score: 2 Time: 4 minute

PART - B

Evaluation Indicators

WAVE MOTION

Evaluation Indicators

Q. No	Evaluation Indicators	Score details	Total
1.	(a) Transverse wave (b) 2 cm (c) Frequency = $\frac{n}{t} = \frac{3}{3}$ = 1 Hz (d) Speed of wave $v = f\lambda = 1 \times 6 = 6$ m/s	1 1 1 1	4
2.	(a) Humidity will be high during summer season. Velocity of sound increases when humidity is high. (b) The bridge may collapse if and when the vibration produced due to the rhythmic march of soldiers is in resonance with the natural frequency of the bridge. It is to avoid the collapse of the brige owing to the high amplitude oscillation that soldiers are not allowed to march across suspension bridges. c) This is to reduce the disturbance caused by the multiple reflection of sound in a hall. Rough surfaces absorb the sound and considerably reduce the rate of multiple reflection .	1 1 1	3
3.	(a) 512 Hz (b) Loudness increases. Surface area of table is more. (b) Resonance; when the natural frequency of the table and tuning fork become equal they will be in resonance. Hence the amplitude of vibration of the table increases, thereby increasing the loudness also .	1 1 1	3
4.	(a) Forced vibration (b) When the length of air column increases the area undergoing vibration also increases. So loudness increases. (c) 512 Hz Loudness of the sound increases when the natural frequency of the tuning fork become equal to the frequency of air column. Both will be in renonance at this time.	1 1 2 1	4
5.	(a) Longitudinal wave (b) Reflection of sound (c) v = 1500 m/s t = 6 s Distance travelled by sound = $v \times t = 1500 \times 6$ Distance from water surface to the rock $= \frac{\text{Total distance travelled by sound}}{2} = \frac{1500 \quad 6}{2} =$ $1500 \times 3 = 4500$ m	1 2	4

Q. No	Evaluation Indicators	Score details	Total
6.	**A** **B** Sound board Multiple reflection Sonometer Resonance Sonar Echo Seismograph Amplitude	4×½	2
7.	(a) Longitudinal waves (b) $\lambda = 7 - 3 = 4$ metre (c) $v = f\lambda = 4 \times 85 = 340$ m/s	1 1 2	4
8.	(a) Seismic wave (b) Richter scale (c) Impacts (Any two of the following) • Damage to buildings • Damage to dams • Loss of life Precautions (Any two of the following) • Construct underground shelters • Keep away from walls doors and windows • Keep away from heavy furniture	1 1 2	4
9.	(a) Velocity of the two waves are equal (b) Wavelength of A (λ) = 8 m Wavelength of B (λ) = 4 m (c) Wave B (d) Amplitude of A = 2 cm Amplitude of B = 2 cm (e) A - $\frac{16}{4}$ 6 = 4 × 6 = 24 m	1 1 1 1 1	5
10.	(a) Humidity - humidity is related to water vapour in the air but all others are special features of wave. (b) Sonometer – - Sonometer works on the principle of resonance others are related to multiple reflection	1 1	2
11.	**Natural frequency** **Forced vibration** (a) (b) (e) (c) (f) (d)	6×½	3
12.	(a) 'F', because of resonance (Natural frequency is the same) (b) Forced vibration.	1 1	2

EFFECTS OF ELECTRIC CURRENT

Evaluation Indicators

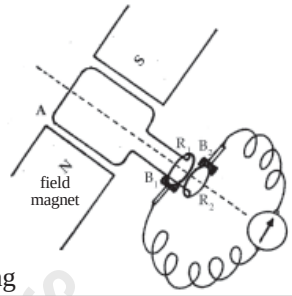
Qn. No	Evaluation Indicators	Score details	Total
1.	(a) P - Rheostat. Q - Ammeter. (b) i) Reading will decrease. Due to high resistance current decreases ii) Because of Nichrome's high resistance the current in the circuit will decrease. According to Joules law $H=I^2Rt$, decrease in the amount of current will reduce the amount of heat.	½ ½ 1 2	4
2.	Discharge lamp, Fluorescent lamp. LED, Arc lamp.	 ½ x 4	2
3.	(a) Nitrogen filled discharge lamp will give red light, but in a filament lamp nitrogen is filled to reduce the evaporation of the filament. (b) In a filament lamp, major part of the electrical energy we supply is converted into heat energy.	1 1	2
4.	(a) Arc lamp (b) Light intensity in an Arc lamp is very high compared to other lamps, so Arc lamps are helpful in rescue operations even in adverse climatic conditions.	1 1	2
5.	(a) B_1 (b Bulb will not glow. (fuse burns out due to overloading) (c) The circuit breaks as fuse burns out due to short circuit. (d) Amperage $\frac{200}{100}$ = 2A (more than 2A) (c) Short circuit happens when two wires in the mains in contact without the presence of a resistance in between. Over loading is connecting appliances with more power in the circuit, than it can bear.	1 1 1 1 1	5
6.	Resistance of the appliance $R = \frac{V^2}{P} = \frac{200\times200}{800} = 50\ \Omega$ Power when connected in 100 V $P = \frac{V^2}{R} = \frac{100\times100}{50}$ = 200 W	 2	2

Qn. No	Evaluation Indicators	Score details	Total
7	(a) Resistance of $B_1 = \frac{V^2}{P} = \frac{200 \times 200}{50} = 800$ Ohm	1	
	Resistance of $B_2 = 800$ Ohm	1	
	(b) Will work in 50 W	1	
	(c) Since the 50 W bulbs are in series current will be equal and voltage will be half. Since P = VI, Power also will become half.	1	5
	(d) $P = \frac{V^2}{R}$ (No change in resistance. Power will change)	1	
8.	(a) P = 20 w + 20 w + 20 w = 60 w	1	
	(b) Amperage = $\frac{\text{Wattage}}{\text{Voltage}} = \frac{60\text{ w}}{240\text{ v}} : \frac{1}{4}$ A	2	3
9.	(d) (c) (a) (b)	2	2
10	(b) Over loading is connecting appliances with more power in the circuit, than it can bear. (c) inert gases are filled in filament lamps to reduce the rate of evaporation.	2	2
11	Heat = $P \times t$ = $1000 \times 5 \times 60$ = 300000 J	1 1	2
12	(a) 100 J (b) $P = \frac{V^2}{R}$, $R = \frac{V^2}{P} = \frac{110 \times 110}{100}$ = 121 J	2	3
13	A = Fuse wire B = High melting point		
14	(a) $I = \frac{V}{R}$ Current through 500 Ω $\frac{250\text{ v}}{500\ \Omega} = \frac{1}{2}$ A Current through 750 Ω		½

Qn. No.	Evaluation Indicators	Score details	Total
	$\frac{250\,v}{750\ \Omega} = \frac{1}{3}$ A	½	
	(b) Soldering iron having less resistance	1	
	(c) H = I^2Rt Or H = $\frac{V^2 t}{R}$		
	H = $\frac{250^2 \quad 300}{750}$ = 25000 J	2	4
15	(a) 500 W	1	
	(b) Bulb having power 500W.	1	
	(P = VI)		
	100 W bulb		
	Current will be the same in series, High resistance bulb will shine more brightly.	2	6
	(c) 500 W bulb		
	R = $\frac{V^2}{P}$ $\frac{250 \quad 250}{500}$ 125		
	(d) 100 W lamp	2	
	R = $\frac{V^2}{P}$ $\frac{100 \quad 100}{250}$ 40		
16.	(a) Low melting point	1	
	(b) Hydrogen used in discharge lamp	1	2
17.	a, c	1	1

ELECTRO MAGNETIC INDUCTION

Evaluation Indicators

Qn. No.	Evaluation Indicators	Score details	Total
1.	(a) emf will be induced in all the 4 coils in the diagrams; flux change happens in all the four activities. (b) Pairs (1) and (4) (2) and (3) deflection of galvanometer needle indicates the direction of the flow of current (c)  to explain the working	½+½ 1 1 1 1	5
2.	(i) (iii) (v)	2	2
3.	(a) Fleming's Right Hand Rule (b) Upward, side AB moves down (c)  f = 2 Hz	1 2 2	5
4.	(a) Armature rotates in the magnetic field of the field magnet. Sliprings are soldered to the ends of armature coil. Graphite Brush is connected in such a way as to have constant contact with slip rings (b) Based on the change in direction and intensity of magnetic flux, when the armature ABCD rotates. magnetic flux.	2 2	4
5.	(a) 1-m, 2-o, 3-n, 4-p, 5-m OR 1-n, 2-p, 3-m, 4-o, 5-n (b) Armature ABCD rotates (c) n and 0 magnetic flux change takes place in the opposite directions in these two.	2 1 2	5
6.	(a) Period = Time taken to complete one full rotation Period $= \frac{\text{Time taken for rotation}}{\text{Number of rotations}} = \frac{30}{60} = \frac{1}{2} = 0.5$ s when the Armative ABCD rotates, change in the magnetic flux depends on its direction and intensity.	1	

<table>
<tr><th>Q. No</th><th>Evaluation Indicators</th><th>Score details</th><th>Total</th></tr>
<tr><td></td><td>(b) only $\frac{1}{4}$ of a rotation T $\frac{1}{2}$, $\frac{T}{2}$ $\frac{1}{4}$</td><td>1</td><td>3</td></tr>
<tr><td></td><td>(c) 250 V</td><td>1</td><td></td></tr>
<tr><td>7.</td><td>(a)
<table>
<tr><th>Single</th><th>Three phase</th></tr>
<tr><td>• Single armature between a pair of magnetic poles.
• Generated ac comes out through a single phase from the out put</td><td>• Three sets of armature coil for each field magnet
• Generated ac comes out through three different phases from the out put</td></tr>
</table>
</td><td>½ x 4= 2</td><td></td></tr>
<tr><td></td><td>(b) • Can increase the no. off turns of the armature coil.
• Can avoid sliprings and also the subsequent sparks</td><td>2</td><td>4</td></tr>
<tr><td>8.</td><td>(a) Three phase ac</td><td>1</td><td></td></tr>
<tr><td></td><td>(b) Frequency= $\frac{3000}{1 \times 60}$ = 50 Hz</td><td>1</td><td></td></tr>
<tr><td></td><td>(c) 20 rotations in a minute - 3 seconds for completing one rotation.
So the time interval to produce same emf is 1 second</td><td>1</td><td>3</td></tr>
<tr><td>9.</td><td>(a) a. Diaphram
b. Permanant magnet
c. Vocice coil</td><td>1</td><td></td></tr>
<tr><td></td><td>(b) Mechanical energy to electrical energy
Diaphram - Vibrates in accordance with the second
Permanant magnet - Creates a magnetic field
Voice coil - Creates electric signal corresponding to the second</td><td>3

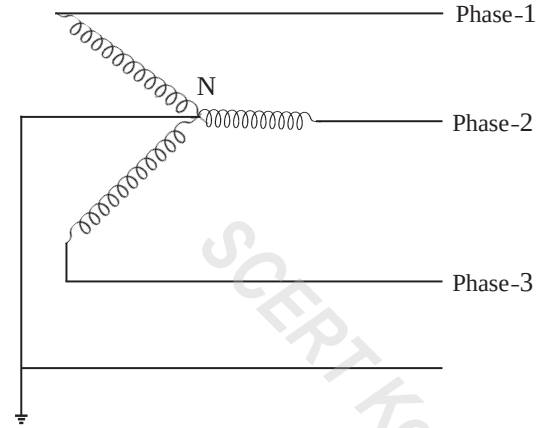
1</td><td>5</td></tr>
<tr><td></td><td>(c) The weak signals obtained from the microphone are strengthened by an amplifier</td><td></td><td></td></tr>
<tr><td>10.</td><td>(a) Only B_1 because electricity flows only through B_1</td><td>1</td><td></td></tr>
<tr><td></td><td>(b) B_1 and B_2 because of mutual indction</td><td>1</td><td></td></tr>
<tr><td></td><td>(c) Light of B_1 will be reduced when ac is passed through. This is due to the back emf produced due to self induction.</td><td>2</td><td>5</td></tr>
<tr><td></td><td>(d) Transformer, relay switch</td><td>1</td><td></td></tr>
<tr><td>11.</td><td>(a) i) Switching S_1 on and off by giving a DC supply
ii) Keeping switched on after giving AC supply to the coil A.
iii) When coil A is moved relatively after supplying DC.</td><td>
3</td><td>2</td></tr>
<tr><td></td><td>(b) Mutual induction</td><td>1</td><td></td></tr>
</table>

Q. No	Evaluation Indicators	Score details	Total
12.	(a) 60V, $\frac{Vs}{Vp} = \frac{Ns}{Np}$ $Vs = \frac{Ns}{Np} \times Vp = \frac{2000}{4000} \times 120 = 60$ V	1	
	(b) 120 V × 0. 2 A = 60 V × x X = 0.4A	1	
	(c) P = VI = 60 × 0.4 = 24 W	1	5
	(d) In the secondary. Since P = VI current is more in the secondary	2	
13	(a) P = Vp Ip 500W = Vp × IA Vp = 500 V	1	
	(b) Is = 5 A	1	3
	(c) Primary and secondary powers are equal $\frac{\text{Secondary power}}{\text{Primary power}} = 1$	1	
14	(a) B_3 Back emf is high in this circuit	2	
	(b) Inductor	1	
	(c) Resistor	1	4

POWER TRANSMISSION AND DISTRIBUTION
EVALUATION INDICATORS

Evaluation Indicators

Qn. No	Evaluation Indicators	Score details	Total
1.	(a) A - Hydroelectric power station B - Thermal power station C - Nuclear power station (b) A - Merits - No pollution - Energy of waterfall is used. Demerits - Deforestation - Extinction of rare species of flora and fauna B - Merits - less area needed - danger possibility is less. Demerits - Pollution. - High consumption of fossil fuels C - Merits - Energy production on large scale - less area needed Demerits - Pollution - Problems of radiation (c) (1) Solar energy (2) Tidal energy (3) Wind mills	3 4×½ = 2 1	6
2.	(a) 1 (b) 2 (c) 3	3×1	3
3	Arrange the statements in the proper sequential order from power production to the household distribution by recalling. c, e, d, b, a ,f	6 × ½	3
4.	(i) (a) Power generator (b) Power transformer (c) Substation (d) distribution transformer (e) star connection (f) household connection (ii) Power grid is the network that connects different power generating centre and distribution systems to one another. Due to this arrangement, if any defect occurs either at the generator or transmission lines, electricity can be taken from any other power generating centre through another set of transmission lines.	2 2	4
5.	(a) To reduce energy loss in the form of heat high voltage is used for long distance transmission. (b) Transmission through populated areas is difficult. Transmission lines must be at a great height to ensure safety. (c) To reduce high transmission line voltage as and when required. Step down transformers are used for this purpose.	1 1 2	4

Qn. No	Evaluation Indicators	Score details	Total
6.	(a) 11 kV (b) P = VI $I = \frac{P}{V} = \frac{11MV}{11\,kV}$ $= \frac{11 \quad 10^6}{11 \quad 10^3} = 10^3$ A	1 2	 3
7.	Step down transformer.		
8.	No. Three phase lines do not meet at a single point.  	1 2	 3
9.	(a) Neutral point (b) 400 V in between two phases 230 V in between a phase and neutral (c) B_4 glows because it is connected between the lines phase and neutral B_1 and B_2 glows with low brightness – each bulb gets 200 V as it is connected in series with 400 V. (d) Three phases in a transformer have separate fuses. So power supply problems in a line need not affect the other phases.	1 1 1 1	 4
10.	(a) figure A in series connection. Figure B in parallel connection. (b) If the appliances are connected in parallel it will be help to control each appliance with separate switches. It gives the needed voltage and current to appliances.	1 1 1 1	 4
11.	(a) B_3 and B_4 in series B_1 and B_2 in parallel (b) B_1 and B_2 (c) B_3 and B_4 because each bulb gets less voltage as they are in series. So the bulb's intensity will be less. (d) B_1 and B_2	1 1 2 1	 5
12.	(A) Main switch (B) ELCB (C) MCB (D) Three pin plug	4×½ = 2	2

Qn. No	Evaluation Indicators	Score details	Total
13.	(a) No (b) Earth wire should carry all charge from the metal body of an electrical device to the earth effectively. - Wire of suitable thickness must be used. - Pits must be prepared to ensure effective earthing. - Metal plates having large area as in plate earthing can be used.	1 1 2	4
14.	(a) X wire is to be connected to earth pin. So connection should be made to be B. A and C must be connected to the wires Y and Z respectively (b) Doesn't agree. Insulation damage will carry electricity to the metallic part of electric iron. Will get shock once touches the metallic part. If the metallic part is earthed the charge will flow to the earth through the less resistance path. Due to low resistance path the electric flow increases and the fuse burns out, thus safety is ensured. OR Agree. Special techniques are employed in new type iron boxes for avoiding shocks.Two pins shall be used only in such type appliances.	½ ½ ½ ½ ½ ½	3
15.	The pin marked E must be connected to the earth line.	1	1
16.	(a) Energy consumed = = $60 \times 8 \times 60 \times 60 = 1{,}728{,}000$ J = 1728 KJ (b) Energy loss $\frac{60 \quad 8 \quad 5}{1000}$ = 2.4 unit (c) (i) Avoid unnecessary use of lights and bulbs. (ii) Promote maximum use of natural light and wind. (iii) Use energy efficient electrical appliances. (iv) Promote use of LED bulbs instead of filament lamps and CFL.	1 1 2	4
17.	(a) One month's consumption of energy by CFL = $\frac{24 \quad 5 \quad 5}{1000} \times 30 = 18$ Unit One month's consumption of energy by Fan = $\frac{80 \quad 2 \quad 5}{1000} \times 30 = 24$ Unit One month's total consumption of energy = 18 + 24 = 42 Unit (b) One month's total bill amount = 2.80×42 = Rs.117.6 (c) One month's total energy consumption by LED = 24 + 2.25 = 26.25 Unit One month's bill amount = 26.25×1.50 = Rs.39.38 Difference in bill amount = 117.6 - 39.38 = 78.22	1 1 1 1	4

HEAT

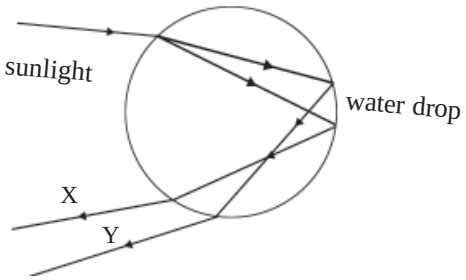
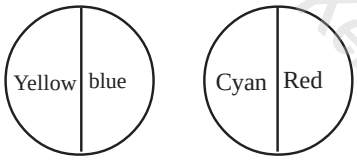
Evaluation Indicators

Qn. No	Evaluation Indicators	Score details	Total
1.	(a) A solid B gas C liquid, in gas	½ × 4 = 2	
	(b) Heat	1	
	(c) For potential energy	1	4
2.	(a) A gas B liquid	2	
	(b) Mass = $\frac{\text{Amount of heat absorbed (Q)}}{\text{latent heat of vaporisation(Lv)}} = \frac{226 \quad 10^5}{226 \quad 10^4} = 10$ kg	1	
	(c) $Q = m \times L_V = 10 \times 335 \times 10^3 = 335 \times 10^4$ J	1	4
3.	(a) specific heat capacity of a substance is the amount of heat required to raise the temperature of 1 kg of the substance by 1 K	1	
	(b) for iron Specific heat capacity of iron is greater than that of copper		
	(c) Heat gained by water = heat lost by iron sphere $m_1c_1(T - 30) = m_2c_2(300 - T)$, $1 \times 4200 \times (T - 30) =$ $1 \times 460 \times (300 - T)$, $4200T - 4200 \times 30 = 4\,60 \times 300 - 460T$, $4200T - 126000 = 138000 - 460T$ $4660T = 264000$, $T = \frac{264000}{4660} = 56.65^oC$		
	Increase in the temperature of water = 56.65 - 30 = 26.65°C	2	4
4.	(a) Temperature may be equal or with a slight difference. This is because this is the average kinetic energy of molecules.There will be a large difference in the heat since it denote the total kinetic energy of molecules	2	
	(b) Vessel A : $Q = mc\theta$, $42000 = 2 \times 4200 \times \theta$, $\theta = 42000/2 \times 4200 = 5K$ Vessel B : $\theta = 42000/4 \times 4200 = 2.5$ K		
	No	2	4
5.	(a) Heat absorbed by Vessel A = $mc\theta = 50 \times 4200 \times 10 = 2100000$ J $= 21 \times 10^5$J	2	
	(b) $2100000 = m \times 4200 \times 10$ $m = \frac{2100000}{84000} = 25$ kg = 25 L	2	4
6.	(a) 30°C, 30 + 273 = 303K	1	
	(b) Substacne 1 It is in Substance 1 that rise in temperature in 15 minutes is minmum	2	
	(c) Substance 1 = 60° C, Substance 2 = 70°C, C = liquid; x = solid	2	5
7.	(a) 100°C	1	
	(b) $C = \frac{Q}{m} = \frac{294000}{1 \quad 70} = 4200$ J/kgK	2	
	(c) The time taken for the change of state is 769 s. Hence the heat absorbed = $2940 \times 769 = 2260860$ J/kg	2	5

Qn. No	Evaluation Indicators	Score details	Total
8.	(a) 50°C (b) Solid (c) 30°C (d) 3 minute	½ ½ ½ ½	2
9.	(a) Heat: : Joule (b) Evaporation	1 1	2
10.	(a) A = -273°C, B = 273K, C = - 40° F, D = - 40°C (b) II Celsius thermometer III Farenheit thermometer	2 1	3
11.	(a) Latent heat of vapourisation is also contained in steam (b) In presure cooker rhe boiling point increases due to the increase in pressure. Therefore more heat is made available. (c) Water has a higher specific heat capacityThe major part of human body is comprised of water	1 1 1	3
12.	Heat – a, d: Temperature - b, c	2	2
13.	(a) The amount of heat required to raise the temperature of 1 kg of water by 1 K is 4200 J (b) Water has a high specific heat capacity.Hence it can receive more heat from water and cool the engine faster. (c) The specific heat capacity of land is low and that of water is high. Hence the temperature of land rises up faster in day time. At night the temperature of land decreases faster	1 1 2	4
14.	Spirit - Evaporation - Chillness Mercury - thermal expansion - thermometer Ice - latent heat of fusion - 335×10^3 J/kg	4	4
15.	(a) 30°C (b) $Q = mc\theta$, $C = \frac{Q}{m} = \frac{6000}{2 \quad 10} \quad \frac{6000}{20} = 300$ J (c) No change in temperature. This is because the heat received during change of state is used to overcome the force of attraction of molecules	1 1 2	4
16.	(a) Heat received $= mc\theta = 10 \times 4200 \times 20 = 840000$ J (b) $P = \frac{H}{t} = \frac{840000}{600} = 1400$ W	1 2	3
17.	(a) Total heat received $= mc\theta + mLf + mc\theta + mLv =$ $(10 \times 2.1 \times 10^3 \times 5) + (10 \times 336 \times 10^3) + (10 \times 4.2 \times 10^3 \times 100) +$ $(10 \times 226 \times 10^4) = 105000 + 3360000 + 4200000 + 22600000 =$ 30265000 J $= 302.65 \times 10^5$ J (b) Increases This is due to the increase in the boiling point along with the increase in temperature.	3 1	4
18.	(a) CO_2, H_2O vapour, CFC, methane (any two) (b) Any two methods (c) To explain any two problems	1 1 2	4
19.	a-Surface area, b- wind, c- nature of substance, d-humidity	2	2

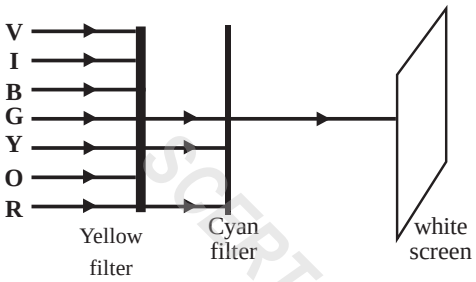
COLOURS OF LIGHT

Evaluation Indicators

Qn. No	Evaluation Indicators	Score details	Total
1.	(a) 	1	
	(b) Internal reflection	1	4
	(c) Violet	1	
	(d) Sunlight undergoes refraction and internal reflection while passing through drops of water. All the drops that appear in the same colour are seen in the same arc. Thus red having higher wavelength is seen in the outer edge at a higher angle.	1	
2.	(a) D2	1	
	(b)Complementary colours	1	
	(c) 	1	3
3.	(a) There is no scattering for the light around the moon since there is no atmosphere around it.Hence the sky of moon appears dark.	1	
	(b) Raindrops come down faster during rain. The distance travelled by a drop in 1/16 of a second appears like a glass rod due to persistence of vision.	1	
	(c) When viewed from a height the observer can see points at 42.7^0 upwards, downwards as well as sideways. Hence rainbow is seen as a circle	1	
	(d) In cities there will be large particles in the atmosphere. Hence all colours of light scatter equally.	1	4
4.	(a) Cannot be disinguished.	1	
	(b) In yellow light the white jersey and yellow jersey appear in yellow colour. This is because both white and yellow surfaces can reflect yellow light. The black shorts appears black itself and blue shorts appears dark since both of them absorb yellow light.	2	3

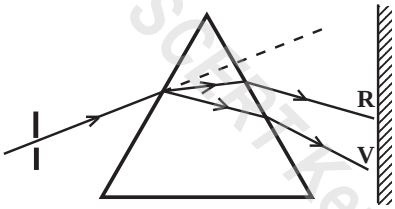
<table>
<tr><th>Qn. No</th><th>Evaluation Indicators</th><th>Score details</th><th>Total</th></tr>
<tr><td>5.</td><td>(a) Cyan
(b) Due to persistence of vision
(c) In green colour
On rotating the disc faster, the disc appears white due to persistence of vision. The cyan appears as green since it reflects green light.</td><td>1

1
2</td><td>4</td></tr>
<tr><td>6.</td><td>(a) Magenta
(b) Visible light, ultra violoet radiations
(c) (i) Higher wavelength than that of visible light; becomes the reason for the heat of the sunlight.
(ii) (Any 2) Used to take photograph of distant objects, remote sensing, secret signalling, for controlling robots</td><td>1
1

2</td><td>4</td></tr>
<tr><td>7.</td><td>(a)
 

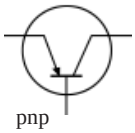
(b) Green
(c) (i) Magenta
(ii) If a primary colour and a secondary colour can give white light on mixing, then they are complementary colours</td><td>1

1
2</td><td>4</td></tr>
<tr><td>8.</td><td><table>
<tr><th>A</th><th>B</th><th>C</th></tr>
<tr><td>Light makes tiny particles visible due to scattering</td><td>Tyndal Effect</td><td>The path of sunlight becomes visible in foggy mornings.</td></tr>
<tr><td>The effect of seeing an object is retained by the eye for 1/16 of a second</td><td>Persistence of vision</td><td>The pictures of a TV screen continuously change giving the Illusion effect of motion of them</td></tr>
<tr><td>Composite light splits up into component colours</td><td>Dispersion</td><td>Rainbow appears on the horizon.</td></tr>
</table></td><td>3x1</td><td>3</td></tr>
<tr><td>9.</td><td>(a) Appears dark
All colours of light passes through colourless filter and fall on the green filter.The green filter transmits green light alone. The red flower appears dark in the green light.
b) Pure water is a transparent substance. It transmits all colours in the sunlight.</td><td>2
1</td><td>3</td></tr>
</table>

ചോദ്യ നമ്പർ	മൂല്യനിർണയസൂചകങ്ങൾ	സ്കോർ വിശദാംശങ്ങൾ	ആകെ
10.	(a) Infrared (b) Used for the treatment of cancer (c) Microwaves (d) produces vitamin D on the skin	1 1 1 1	4
11.	(a) p- red q- magenta r- blue s- green (b) A colour obtained by the combination of any two primary colours is a secondary colour (c) Secondary colour → yellow Complementary colour → blue	½ × 4 = 2 1 1	4
12.	(a) Fix a black paper in front of a torch.Put a small hole in the middle of the paper. Arrange a screen on the other side. Make the beam of light fall obliquely on the prism. (b) 	2 1	3
13.	Correct statements: a and c	2	2
14.	(a)Yellow – it is a secondary colour The rest are primary colours. (b) Sound – it is a mechanical wave The rest are electromagnetic waves	1 1	2
15.	(a) Reflects all colours of light. Does not absorb any colours	1	1

ELECTRONICS

Evaluation Indicators

Qn. No	Evaluation Indicators	Score details	Total
1.	a) X - Half wave rectifier (diode) Y - Amplifier (transistor) Z - Full wave rectifier (diode) b) Amplification i) Half wave rectification ii) Amplification iii) Full wave rectification c) Full wave rectification	½ ½ ½ ½ ½ ½ 1	4
2.	a) i) Diode ii) Resistor iii) Capacitor iv) Transistor b) i) Transistor ii) Capacitor iii) Diode iv) Resistor	½ × 4 = 2 ½ × 4=2	4
3.	a) half wave rectifier b) 	1 1	2
4.	a) D_1 Forward bias D_2 Reverse bias b) from P to Q c) The direction of current does not change since D_2 is in forward bias and D_1 is in reverse bias d) 	½ ½ 1 1+1 1	5
5.	Digital camera	1	1
6.	a) Symbol is wrong  b) Amplification	1 1 1	3
7.	a) WiFi (Wirless Fidelity) is a method in which data is transferred using radio waves to link equipments without connecting with wires. b) Radio waves	1 1	2
8.	CD writer, Barcode reader	2	2

9.	a) Drones b) Industry/education/domestic c) Using GPS	1 1 1	3
10.	HD	1	1
11	a) Nanotechnology b) Robotics c) Photonics	1 1 1	3
12	Variable resistor	1	1
13	a) From the word nano which means very small b) 1 nm=10^{-9} m/ or one portion of 10^{9} of a metre c) when the substances are made into small size, the ratio of their surface areas to volume increases uncontrollably d) The field of medicine – to make bandages that heal wounds faster Industry - for making paints	1 1 1 1	4
14	a) Thousands of valves used in the Eniac produced heat b) Development of microprocessor, transistor and IC chip	1 1	2

ENERGY MANAGEMENT

Evaluation Indicators

Q. No	Evaluation Indicators	Score details	Total
1.	a) Heat energy, Light energy	1	
	b) Electrical energy can be easily converted in to many other forms	1	
	c) Small increase in population causes large increase in the use of energy consumption, mechanisation will lead to excessive use of sources of energy and leads to energy crisis	2	4
2	a) Hydrogen	1	
	b) 150000 kJ/kg	1	
	c) Coal, petrol, hydrogen	1	4
	d) Petrol	1	
	Easy to handle: less atmospheric pollution, Calorific value is high		
3	a) To increase the availability of oxygen		
	a) (i) Increase the surface area exposed to air	1	
	(ii) Make available the temperature needed for burning		
	b) Sufficient oxygen is made available which increases the rate of combustion	2	4
	c) Partial combustion pollutes the air by giving excess of smoke, soot, carbon monoxide and carbon dioxide	1	
4	a) Non - renewable sources - fossil fuels	1	
	b) The biowastes (bio residue) that went into the earth change into petroleum by undergoing chemical changes due to high temperature,in the absence of air	1	3
	c) Petrol, coal	1	
5	a) Fules are substances that release large quantiy of heat on burning; solid : logs:liquid : kerosene	2	
	b) Excess use of fuels produces green house gases which increase the temperature of atmosphere and cause global warming	1	4
	c) The amount of CO_2 and SO_2 released by diesel vehicles is very large. This accelerates global warming	1	
6	a) Biogas is formed in the biogas plants by the action of bacteria on biomass in the absence of oxygen	1	
	b) Biogas has igher calorific value; environmental pollution is less	1	
	c) Community biogas plants. Helps in controlling environment pollution, centralised energy source minimises expense	1	3

7	a)	Green energy – green energy is the energy produced from natural resources that do not cause environmental pollution Brown energy – Energy from petrolieum, coal etc., and nuclear energy.		
	b)	Green energy: solar cell, tidal energy, electricity from water, windmill Brown energy : nuclear reactor, diesel engine, thermal power station	2	4
	c)	(i) Install biogas plants (ii) Use solar panels	1	
8	a)	Nuclear fusion	1	
	b)	$E = mc^2$ m = 1 g $= \frac{1}{1000} \times 3 \times 10^8 \times 3 \times 10^8$ $\frac{1}{1000} = \frac{9 \times 10^{16}}{10^3} = 9 \times 10^{13}$ J	2	5
	c)	Continuous fission reaction ends on an explosion (atom bomb)	1	
	d)	Energy crisis and industrial growth promote production of energy	1	
9	a)	Plants and animals that went under the earth many years ago changed into fossil fuels by undergoing changes under high pressure, high temperature and absence of oxygen.	1	
	b)	Carbon	1	5
	c)	Ammonia, coal gas, coaltar, coke	1	
	d)	The greenhouse gases given out by the burning of fossil fuels increases the temperature of atmosphere and causes global warming	2	
10	a)	LNG – liquefied natural gases can be conveniently transported by liquefaction. Can be changed into gaseous state at the same temperature and can be distributed through pipes	1	3
	b)	LNG can easily be liquefied and transported to distant places	2	
11	a)	Hydrogen easily catches fire and has a high chance of explosion. It is difficult to store and transport.	1	2
	b)	Oxygen	1	
12	a)	By coverting bio mass into biogas we get a fuel of higher calorific value	1	
	b)	Methane	1	3
	c)	The wastes thrown carelessly on premises can be put into biogas plants.This can minimise the energy crisis. We can prevent the spreading of contageous diseases caused by these wastes	1	
13	i)	Nucelar fusion	1	
	ii)	Nuclear fission Matter changes into energy as per (accordion to the relation $E = mc^2$	1	2

PART - C

Model Question Papers

A

SSLC EXAMINATION, MARCH 2016
PHYSICS

Standard: X **Time: 1½ Hour**
Score: 40

Instructions

1. 15 minutes cool off time. Use this time to read the questions carefully and prepare to write answers.
2. Answer only after reading the instructions and questions carefully.
3. Consider the time and score allotted for each question while answering.

1. Find out the correct relation and fill up the blank
   C.N.G : Methane
   LPG : ..... (1)
2. LED lamps have become common nowadays _____
   (a) On which factor does the colour of L.E.D light depend? (1)
   (b) Give any two merits and uses of L.E.D lamps (2)
3. Rewrite incorrect statements if any
   (i) The speed of sound decreases when the humidity increases.
   (ii) Armature is used as stator in power generators.
   (iii) AC generated in all the three armature coils will be of the same phase at the same time.
   (iv) Speed of sound through air increases when the temperature increases. (2)
4. Find out the odd one and state the reason
   Resonance, Refraction, Reverberation (1)
5. Match those given in column A,B,C suitably

A	B	C
(a) Renewable source of energy	Atomic reactor	Brown energy
(b) Non renewable source of energy	Wind mills	Green energy
(c) Fuels	Calorific value	kilo joule/ kilogram
	Power	Joule /kilogram

(3)

6. 3A current flow through an immersion heater working in 230V for 420 seconds.
   (a) What effect of electricity is made use of in immersion heater? (1)
   (b) Calculate the heat energy produced. (1)
   (c) Calculate the rise in temperature of 1 litre of water at 283K by using the heat produced by immersion heater? (Express the rise in kelvin)
   (Hint: specific heat capacity of water = 4200 J/kg K 1 litre of water = 1 kg of water) (2)
7. New scientific advances are possible in the field of nano technology in the coming years.
   (a) What does the word 'nano' mean? Why it is possible to bring about great changes to physical properties at nanolevel? (1)

(b) Give any two uses of nanotechnology (2)

8. Power stations are centres where electricity is produced.

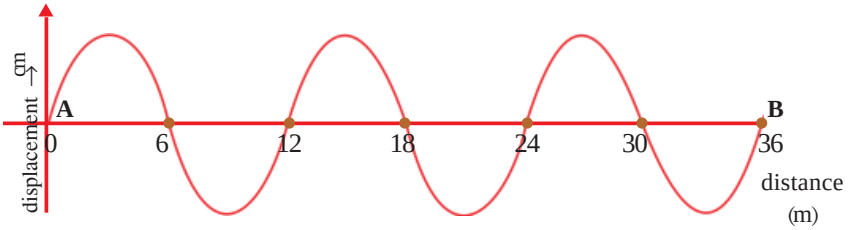
(a) Which of the following generators are used in powerstations (1)

Single phase AC generator, Three phase AC generator

(b) Write any one peculiarity of this generator. What is the voltage at which electricity is generated at the power station? (1)

(c) Give reason for the use of stepup transformer in the power station. (2)

9. Graphic representation of a wave propagated in 2s is given



(a) What is the wavelength of the wave shown? (1)

(b) Calculate the speed of wave. (1)

Answer 10 A or 10 B only

10. A

100 g of water and 100 g of coconut oil at 300K are taken in two beakers and heated for 10 minutes in a waterbath

(Specific heat capacity of water = 4200J/kgK

Specific heat capacity of coconut oil = 2100J/kgK)

(a) Which liquid will attain 310 K first? Give reason. (1)

(b) What will be the temperature of coconut oil when the temperature of water becomes 320K? Explain. (2)

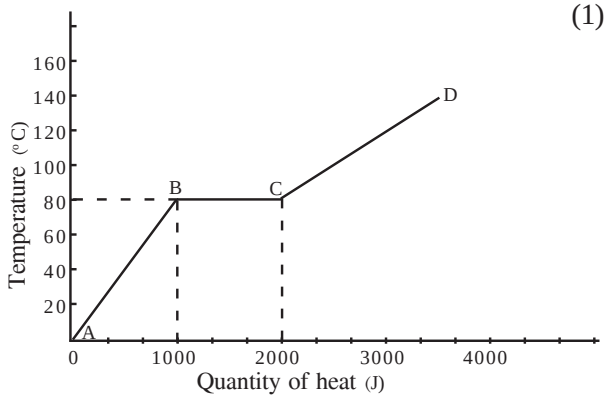
OR

10.B

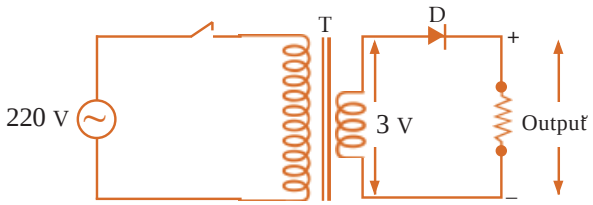
Heat a solid of 1 kg at 0°C. Graph shows the variation of temperature on heating. Answer the questions based on the graph.

(a) What is the melting point of the substance in degree celsius? What will be the melting point in kelvin scale? (2)

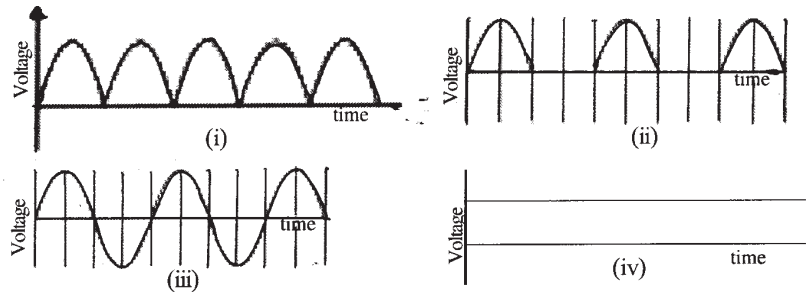
(b) Find out the latent heat of fusion of substance from the graph. What will be the state of substance in the graph CD (1)



11. Observe the circuit

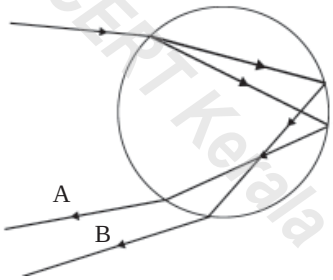


Which of the following graph shows the output of the transformer? What is taking place here?



(1)

12. The picture shows the path of a ray through a rain drop

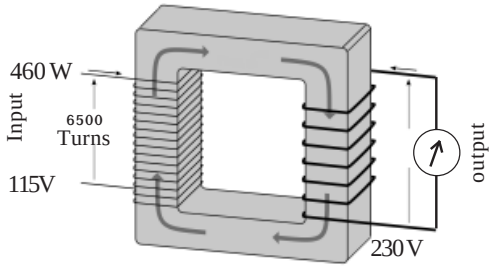


(a) Which colours are represented by A and B? (1)

(b) How many times does the ray undergo refraction? Which phenomenon related to the above representation can be observed in nature? (1)

13 Answer any of the two 13 A or 13 B

13.A. Observe the diagram of a transformer



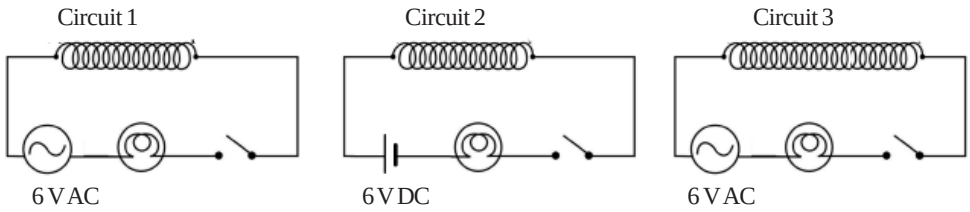
(a) Which type of transformer is depicted here? Write any one of its pecularities ? (1)

(b) What will be the power in the secondary? Justify your answer (1)

(c) Findout the number of turns in the secondary and the current flowing through it. (2)

OR

13.B The diagrams show the current carrying solenoids made of insulated copperwire



(a) Which bulb will glow with less intensity when it is switched on? Justify the answer (2)

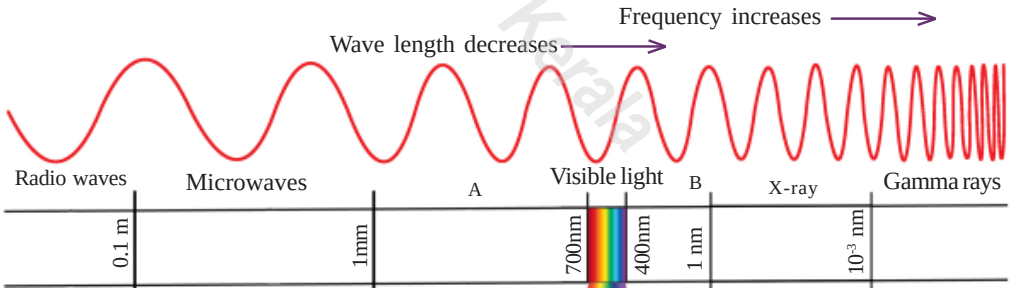
(b) Which bulb will not show any change in light intensity when identical soft iron cores are inserted into the solenoid? Justify your answer. (2)

14. A tuning fork of natural frequency 512 Hz is excited and pressed the stem is pressed against a table of natural frequency 200 Hz

(a) What will be the frequency of vibration of the table? What do you term this phenomenon? Explain (2)

(b) If the above experiment is repeated with a tuning fork of frequency 200 Hz, what is the change noticed ? Why? (2)

15. Electromagnetic spectrum is shown below:



(a) Identify the radiations A and B. Which radiation is used to take the photograph of distant objects? Why ? (2)

(b) Write any one use of X ray and Gamma ray. (1)

B

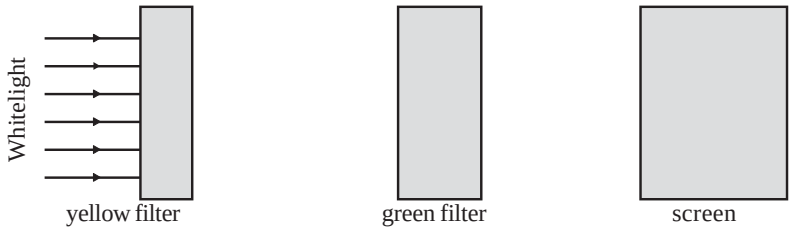
SSLC EXAMINATION, MARCH 2016
PHYSICS

Standard: X **Time: 1½ Hour**
Score: 40

Instructions

1. 15 minutes cool off time. Use this time to read the questions carefully and prepare to write answers.
2. Answer only after reading the instructions and questions carefully.
3. Consider the time and score allotted for each question while answering.

1. observe the figure and answer the following questions.



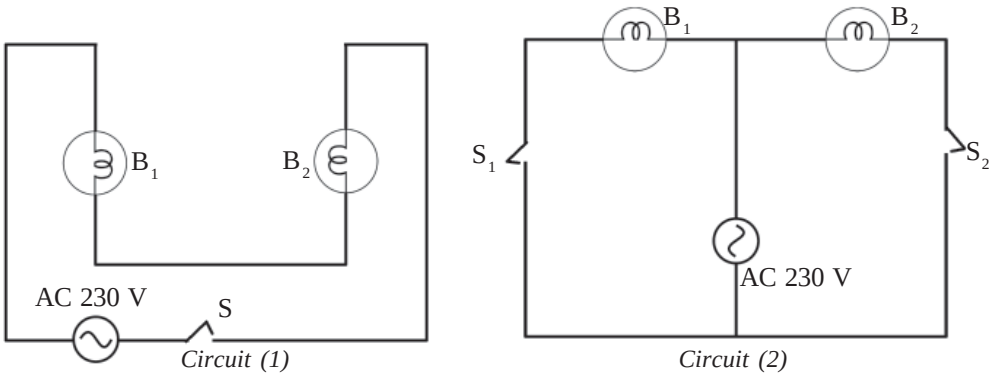
(a) Which colour reaches the screen? (1)

(b) What change occurs inthe colour of light falling on the screen if blue filter is used instead of green filter? (2)

2. Find out the relation suitable for a step up trnsformer from among those given within brackets. (1)

Vs < Vp , Np > Ns , Is < Ip

3. Observe the given circuits. B_1 and B_2 are identic bulbs



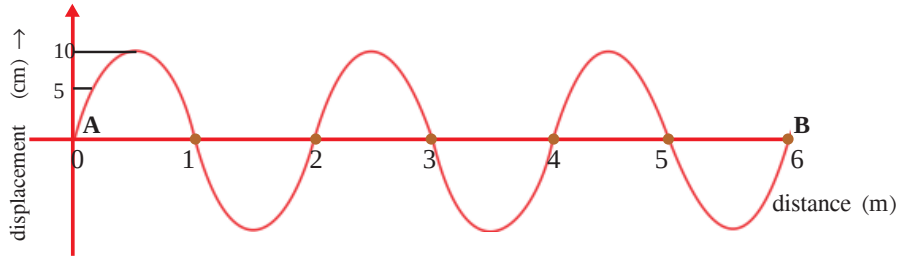
(a) Lamps in which circuit glows brighter when switched on? (1)

(b) In which mode are the devices connected in each circuit? (1)

(c) Which among these methods is adopted for house hold wiring? Explain the advantages of this arrangement. (2)

4. Based on sources of energy find out the one which does not belong to the group.
[solar cell,windmill, atomic reactor, tidal energy] (1)

5. Observe the graphic representation of the wave motion.

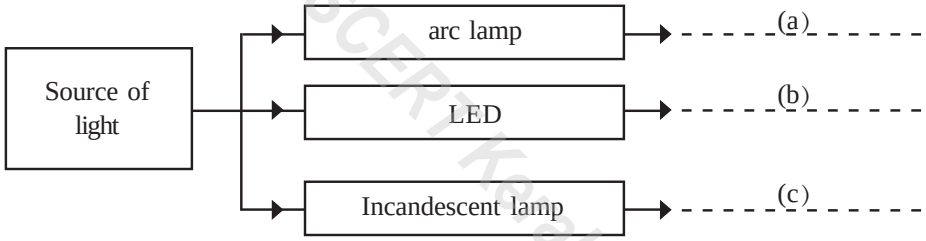


(a) What is the amplitude of the wave? (1)

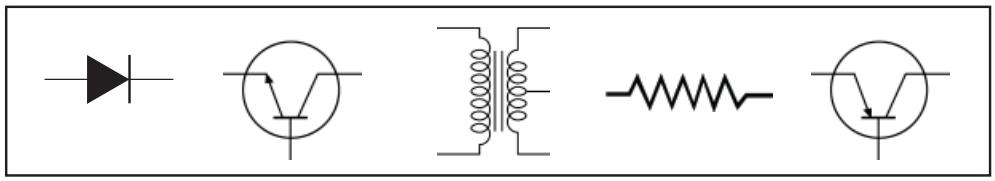
(b) What is the time taken by the wave to reach B from A, if the frequency of the wave is 1 Hz? (1)

(c) Calculate the speed of the wave. (1)

6. In the flow chart a,b and c indicate certain factors related with sources of light. Choose the most appropriate terms from within brackets that suits the above. (3)
(very low power, carbon rods, tungsten)



7. Symbol of some electronic components are given within the box.



(a) Using appropriate components draw the circuit of full wave rectification. (2)

(b) Draw the diagram showing the output signal. (1)

8. A tuning fork of natural frequency 256 Hz is excited and the stem is pressed on a table of natural frequency 486 Hz.

(a) Why does the loudness of sound increase? (1)

(b) What is the frequency with which the table is vibrating now? (1)

(c) What is the phenomenon behind the loudness becoming maximum if a tunig fork of natural frequency 486 Hz is used. (1)

9. Find out the relation form the first pair and complete the other.

Bar code reader: laser optics :: telephone: : ..... (1)

Answer anyone from among 10A and 10 B

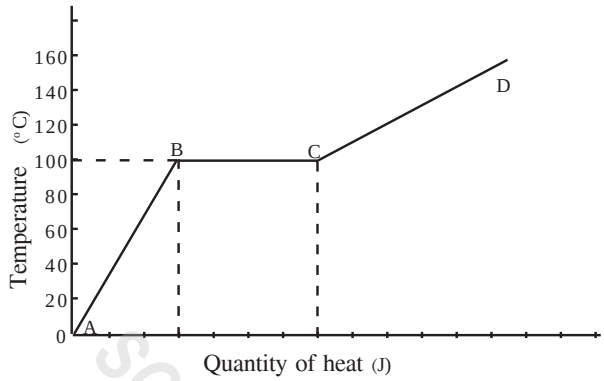
10A. The specific heat capacity of water is very high.

(a) Based on this explain how land breeze occur at night and sea breeze at day time. (2)

(b) Calculate the quantity of heat required to convert the temperture of 10 kg water at 300 K into water at 340 K. (specific heat capacity of water 4200 J/kgK) (2)

10B.

2 kg of a liquid at 0^0C is being heated.The graph showing the changes in temperature is given below. (specific heat capacity of liquid is 4200 J/kgK).



(a) Which is the liquid used in this activity? (1)

b) Though heat is being absorbed in the portion BC the temeprature does not chagne. Why? (1)

c) Calculate the heat received by the substance in the portion AB. (2)

11. Explain the reason for the following statements.

a) water kept in earthern pot is felt colder. (1)

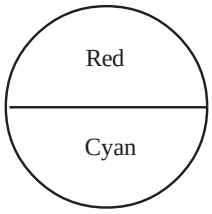
b) Ice cream does not melt quickly (1)

12. Observe the figure.

Bulb (A) *Bulb (B)*

(a) Calculate the resistance of bulb A and bulb B. Find which is of greater resistance. (2)

13A. Observe the figure.

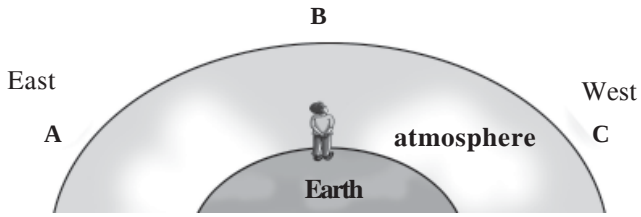


(a) In what name are the pair of colours known as? (1)

b) In what colour will the disc appear if rotated fast? (1)

c) In what colour will the disc appear if rotated fast if blue light alone is made to fall on it? (1)

13B. Observe the figure.



(a) Why does the Sun appear in orange colour when it is at the position A? (2)

b) On foggy day the path of light through branches of trees can be seen clearly when the Sun is at A. In which name is this phenomenon known as? (1)

14. Select the correct statement regarding a step up transfromer and write it down.

(a) the current in the primary coil and secondary coil are the same (1)

b) the current in the primary coil is less than that in the secondary coil

c) the current in the secondary coil is less than that in the primary coil

15. Observe the circuit. AB and CD are insulated copper wires of the same thickness.

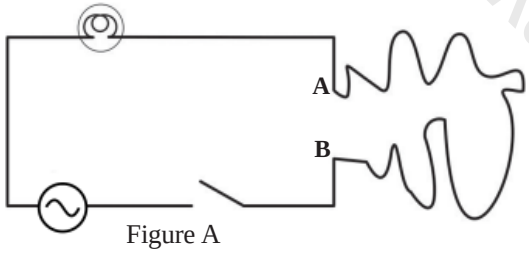


Figure A

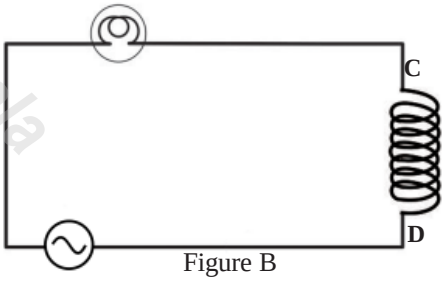


Figure B

(a) The bulb in which circuit glows with higher brightness? Why? (2)

b) What change is observed in the brghtness of the bulbs if DC is used instead of AC? (1)

16. The increase in the need of energy leads us to energy crisis.

(a) Why is it easy to cook food in pressure cooker? (1)

(b) In most of the foreign countries the use of private vehicles is discouraged and public transportation is put into maximum use .Write down your cmments about this. (2)

SET-A

EVALUATION INDICATORS

Qn. No.	Scoring Indicators	Split up Score	Total Score
1	(a) Butane	1	1
2	(a) Depends on the material used for making. (b) Less energy loss. Harmless to environment as there is no mercury content Less power is needed (any two use)	 1 1+1=2	 3
3	(i) Speed of sound increases when humidity increases. (iii) AC generated in all the three armature coils will be of different phases at the same time	 1	 1
4	Refraction: This is a phenomenon of light others are phenomenon of sound.	1	1
5	A: a. Renewable source of energy; b. Non renewable source of energy; c. Fuel B: Wind mills; Atomic reactor; Calorific value C: Green energy; Brown energy; Kilogram		3
6	(a) Heat effect (b) H = VIt $= 230 \times 3 \times 420$ joule = 2,89,800 joule Q = mcθ $Q = 1 \times 4200 \times \theta$ $2,89,800 = 4200 \times \theta$ $\theta = \frac{2,89,800}{4200} = 69\,K$	1 1 1 1	 4
7	(a) A very small, the ratio between the surface area and volume increase considerably (b) Band aids to heal the wounds immediately can be made. Efficient batteries can be produced (any two uses)	 1 2	 3
8	(a) Three phase AC generator (b) Armature is used as stator. Field magnet, electro magnet- any one peculiarity 11000V or 11KV (c) Stepup transformer increases the voltage without any powerloss. So the intensity of electric flow decreases, loss of heat also reduces as per the equation $H = I^2Rt$	 1 1 ½ x 4 2	 4

9	(a) 12 m	1	
	(b)	½	
	$f = \frac{n}{t} = \frac{3}{0.2} = 15$ Hz	½	2
	$V = f \times \lambda = 15 \times 12 = 180$ m/s		
	OR		
	Distance travelled by the wave in 0.2 s = 36m	½	
	Speed of wave $= \frac{36}{0.2}$	½	
	$= \frac{360}{2} = 180$ m/s		
10 A	(a) Coconut oil		
	Specific heat capacity of coconut oil is less than water	1	
	(b) Specific heat capacity of water is two times than coconut oil.		
	The temperature of coconut oil increase by 40°C when the water record 20° increase	½	
	The temperature of water = 320 K	½	
	The temperature of coconut oil = 340 K	1	3
	OR		
	Q = mcθ can be used to justify the answer		2
10 B	(a) 80° C	1	
	80 + 273 = 353 K	1	
	(b) 1000 J/kg liquid	1	
11	Diagram 2	1	1
12	(a) A = Violet	½	
	B = Red	½	2
	(b) Two times, rainbow	1	
13 A	(a) Step down transformer		1
	(b) 460 W	1	
	(c) $P = V \times I$		
	$I = \frac{460}{230} = 2$ A	1	4
	Ns = 13,000 turns	1	
	OR		
13 B	(a) Circuit- 3	1	
	Number of turns are more, high self induction		1
	(b) Circuit-2		
	No self induction because of DC supply	1	
	OR		

	There is no change in magnetic flux as the direction and intensity of current remain unchanged		
14	(a) 512 Hz Forced vibration - a body undergoes vibration under the influence of another vibrating body. (b) Resonance Loudness increase/amplitude of vibration increase	1 1 1	4
15	(a) A - Infrared B - Ultra violet Infrared, scattering is less because of high wavelength (b) X-rays To identify bone fracture/ crack inside the pipes in industry Gamma rays - to treat cancer Sterilise surgical instruments.	½ ½ ½ + ½ ½ ½	3

SET-B

EVALUATION INDICATORS

Qn. No.	Scoring Indicators	Split up Score	Total Score
1	(a) Green (b) (b) No colour is obtained Blue filter does not allow yellow light and its components to pass through	1 1 1	3
2	Is < Ip	1	1
3	(a) Circuit (2) (b) Circuit (1) - in series circuit (2) in parallel (c) Parallel/circuit (2) for writing two advantages	1 1 1+1	4
4	Atomic reactor	1	1
5	(a) 10cm (b) 3s (c) v = f λ = 1 2 = 2m/s 1	1 1 3	
6	(a) carbon rods (b) very low power (c) tungsten	1 1 1	3
7	(a) circuit diagram of full wave rectifier selecting suitable components (b) 	1 1 1	3
8	(a) since surface area under vibration is larger (b) 256 Hz (c) Resonance definition	1 1 ½+½	3
9	(a) Fibre Optics	1	1
10 A	(a) The specific heat capacity of sand $\frac{1}{5}$ times that of water Sand gets heated and cooled 5 times faster than that of water (b) m = 10 kg, θ = 340 K-300 K = 40 K Heat Q = mcθ = 10 4200 40 = 1680000 J	1 1 ½ ½ 1	4

Qn. No.	Scoring Indicators	Split up Score	Total Score
10 B	(a) Water	1	
	(b) For the change of state/ for the increase in potential energy	1	2
	(c) m = 2kg		
	c = 4200J/kgK		
	$\theta = 100^{o}c / 100$ K	½	
	Heat, $Q = mc\theta$	½	2
	$= 2 \quad 4200 \quad 100$	1	
	= 840000 J		
11	(a) due to evaporation	1	
	(b) the latent heat of fusin of ice cream is very high	1	2
12	Bulb A, $R \quad \frac{V^2}{P} \quad \frac{230 \quad 230}{100} \quad 529$	1	
	Bulb B, $R \quad \frac{V^2}{P} \quad \frac{230 \quad 230}{40} \quad 1322.5$	1	2
13 A	(a) complementary colours		1
	(b) white	1	3
	(c) blue	1	
13 B	(a) when the sun is at A, the rays of light tavel more distance to reach the earth orange and red colours having greater wavelength scatter less	1 1	3
	(b) tyndal effect explanation	½ +½	
14	(c) the current in the secondary coil is less than that in the primary coil	1	1
15	(a) Bulb A	1	
	self induction - definition	1	3
	(b) the same intensity, No self induction in DC	1	
16	(a) boiling point increases with increase in pressure. Food items gets more heat in minimum time.	1	3
	(b) Any two responses	1+1	
	• Enegy is precious		
	• Though wealth is yours resources are common property of the world		
	(should consider about the use of own vehicles using own money etc which are away from the ccalues of life)		

A

FIRST TERMINAL EVALUATION 2016

PHYSICS

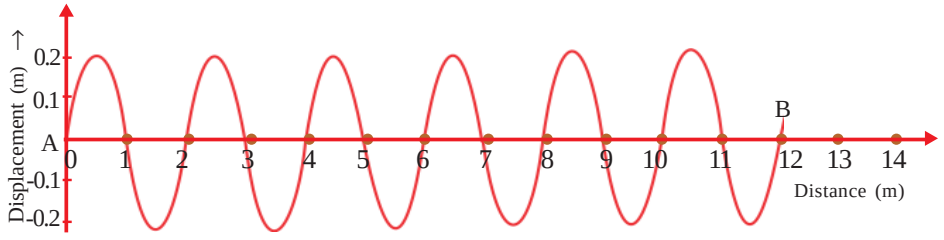
Standard : X **Score : 40**

Time : 1½ hour

Instructions

1. 15 minute is given as cool off time. This time is to be used for reading and understanding the questions.
2. Write down answers for all questions.
3. For questions having choices, only one need be answered.
4. The score for each question is given along with the question.

1. Using the relation between the terms in the first pair, complete the second. (1)
   In a discharge lamp
   Hydrogen : Blue : : Chlorine : _____
2. Find out the odd one out. (1)
   Stethoscope, Megaphone, Tuning fork, Horn
3. Choose the characteristics of nichrome from the following. (1)
   (a) High resistivity
   (b) Low melting point
   (c) High melting point
   (d) Low resistivity
4. The power of an electric heater working in 230 V is 690 W.
   (a) Calculate the electric current flowing through the device. (1)
   (b) Calculate the heat produced if the electric current is passed through this device for 3 minutes (2)
5. Choose the correct statements related to three phase generator from the following. (2)
   (a) In a three phase generator, the field magnet is a permanent magnet.
   (b) In a three phase generator, the field magnet is a temporary magnet.
   (c) The three armature coils generate AC of the same phase at the same time.
   (d) For each field magnet, there is an armature coil.
   (e) The three armature coils produce AC of different phases at the same time.
6. The graphical representation of a wave is given.



The wave took 3 s to reach B from A.

a. What is the amplitude of the wave? (1)
b. What is the frequency of the wave? (1)
c. Calculate the speed of the wave given in the figure. (1)

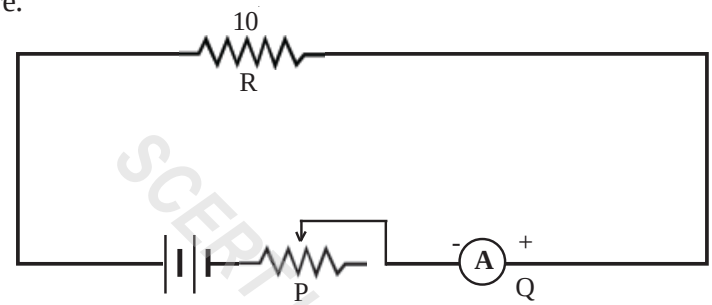
7. Power generators are used for producing electricity on a large scale for transmission.
   a. Which is the part of the generator that remains stationary? (1)
   b. Write down two advantages of using an electromagnet as field magnet in a power generator. (2)
   c. Write down the need of using an exciter in a power generator. (1)

8. Match the following suitably. (3)

A	B	C
Fluorescent lamp	Carbon rods	Rare gas
Arc lamp	Tungsten filament	Mercury vapour
Incandescent lamp	Heating coil coated with thorium oxide	Intense light

Answer any one of the following

9(A) Observe the figure.



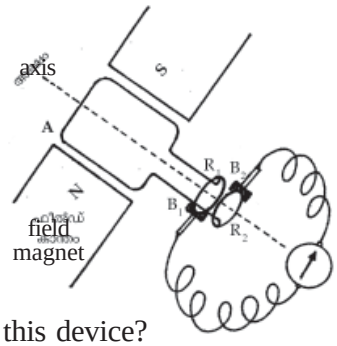
   a. Name the devices indicated by P and Q? (1)
   b. What is the heat produced in R if a current of 2 A is passed through the circuit for 1 minute. (2)

OR

9(B) In an electrical device it is marked as 440 W, 220 V.
   a. What is meant by 440 W, 220 V? (1)
   b. Calculate the power of this device if it works in 110 V. (2)

10. The speed of sound is high during summer.
   a. Which factor influenced the speed of sound here? (1)
   b. Why is the speed of sound low in winter season? (1)

11. Observe the figure.



   a. What is the working principle of this device? (1)
   b. Write down two factors that influence the emf induced in the armature? (2)

c. Which law helps to understand the direction of the induced current in the armature, if its direction of motion and the direction of the magnetic field are known? (1)

12. A tuning fork of frequency 512 Hz is excited and its stem is pressed on a table of natural frequency 388 Hz.
    a. What change takes place in the loudness of sound? (1)
    b. Find the reason for this. (1)
    c. What is the frequency of vibration of the table at this moment? (1)
    d. What phenomenon would occur, if the frequency of the tuning fork were 388 Hz? (1)

13. Safety fuse is a device that works on the basis of the heating effect of electricity.
    a. What are the contexts leading to the melting of a fuse wire in an electric circuit? (1)
    b. What are the precautions to be taken while connecting a fuse wire in a household circuit? (2)

14. In a musical concert conducted in a hall, the sound was not heard distinctly, but felt as a boom.
    a. Which phenomenon caused the boom? (1)
    b. Suggest two ways of solving this problem related to the multiple reflection of sound. (2)

15. When a fire cracker cracks, its sound reflected from a hill is again heard after 3 s. (Speed of sound in air =340 m/s)
    a. Write down the name of this phenomenon of hearing the sound after reflection. (1)
    b. What must be the minimum distance of the reflecting surface for experiencing this hearing experience? (1)
    c. Calculate the distance of the source from the hill. (1)

B

FIRST TERMINAL EVALUATION 2016

PHYSICS

Standard : X **Score : 40**

Time : 1½ hour

Instructions

1. 15 minute is given as cool off time. This time is to be used for reading and understanding the questions.
2. Write down answers for all questions.
3. For questions having choices, only one need be answered.
4. The score for each question is given along with the question.

1. Using the relation from the first pair, complete the other.

   Wave length : m: : Frequency : …… (1)

2. Heating coil is made of an alloy Nichrome. Choose the metal which <u>is not a constituent</u> of it. (1)

   (Nickel, Iron, Magnesium, Chromium)

3. Power generators are used for producing electricity in a large scale.

   (a) Which is the part in it used as stator? (1)

   (b) What is the advantage of using this part as stator? (2)

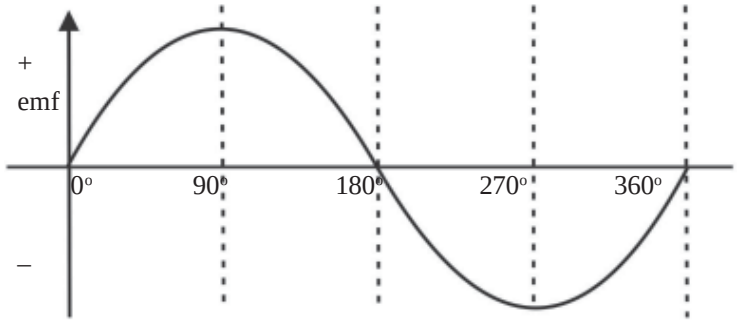
4. Storage battery (while charging) and electric bulb are two devices that make use of electrical energy. What energy change takes place in each? (2)

5. A paper rider is placed on the wire between the bridges of a sonometer and the stem of an excited tuning fork is pressed over the sonometer between the bridges.

   (a) Why does the sonometer wire vibrate? (1)

   (b) On adjusting the distance between the bridges of the wire, the paper rider is thrown away at a particular stage. What is the name of this phenomenon. Explain. (2)

6. The graph of the electricity generated by an AC dynamo is given.



   (a) What are the instants of maximum flux change? (1)

   (b) In our country, the frequency of electricity meant for transmission is 50 Hz. What is the meaning of this statement? (1)

7. Discharge lamp is being used widely nowadays.

(a) Write down its working by rearranging the following in the correct sequence. (2)

(i) Ionised atoms collide with unionised atoms.

(ii) Light energy is emitted when electrons come to initial state for attaining stability.

(iii) The electrons of unionised atoms go to higher energy levels.

(iv) The gas in the tube is ionised.

(b) Which gas is to be filled in the tube for getting blue light? (1)

8. Match the following columns suitably. (4)

A	B	C
Stethoscope	Heating coil	Exciter
Arc lamp	Field magnet	Heating effect
Power generator	Heart beat	Lighting effect
Electric heater	Carbon rod	Multiple reflection

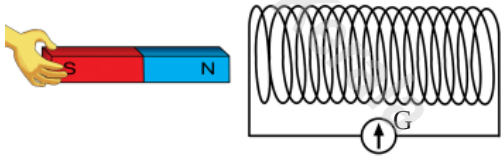
9. On an iron box it is marked as 690 W, 230 V.

(a) What do these markings mean? (1)

(b) What is the current flowing through the coil? (1)

(c) Calculate the heat produced when the iron box works for 5 minutes. (2)

10. An experiment is performed using a magnet and a coil of wire as shown in the figure.



(a) From the following activities, find out the instants in which the galvanometer deflects.

(i) The magnet is placed at rest inside the solenoid .

(ii) Magnet is quickly inserted into the solenoid.

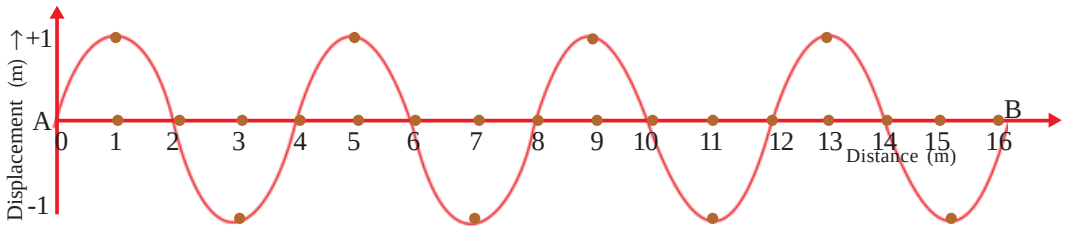
(iii) The magnet is placed in the solenoid and then the solenoid and the magnet are moved with the same speed in the same direction.

(iv) The magnet is placed within the solenoid and the solenoid alone is moved to one side. (2)

(b) Write down the principle of the above observations. (1)

Attempt any one of the following from 11 A and 11 B.

11A. The graphical representation of a sound wave is given below.



It takes 4 s for the wave to reach B from A.

(a) Find out the amplitude of the wave from the figure. (1)

(b) Find out the frequency of the wave. (1)

(c) How is the frequency of a wave related to the wave length? (1)

OR

11B. Sound waves from a ship on the surface of water returns to the ship 4 s after its production by reflection from a rock at the bottom of water.

(a) Calculate the distance of the rock from the surface of water (speed of sound in sea water = 1500 m/s) (2)

(b) Name the scale used to measure the strength of earth quake. (1)

12. Electronic ballasts are used in fluorescent lamps. How do the electronic ballast help the working of a fluorescent lamp. (2)

13. Find out the appropriate terms from the box for the statements given below.

(a) During thunder, windows vibrate producing sound. (1)

(b) A measure of water vapour in the atmosphere. (1)

(c) After hearing the first sound, the same sound is heard after reflection. (1)

density, humidity, resonance, reverberation, echo

14. In a newly constructed hall the sound is not distinctly heard, instead a boom is felt.

(a) Name this phenomenon related to the reflection of sound. (1)

(b) Suggest methods to overcome this. (2)

(c) Which branch of science deals with the study of getting clear audibility while constructing a hall. (1)

15. Safety fuse is an integral part of an electrical circuit. Justify this statement. (2)

●●

C

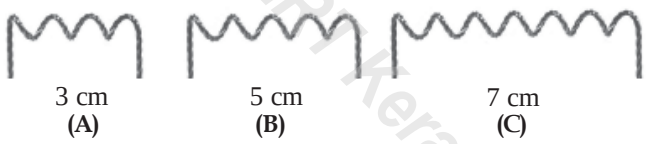
FIRST TERMINAL EVALUATION 2016
PHYSICS

Standard : X **Score : 40**
Time : 1½ hour

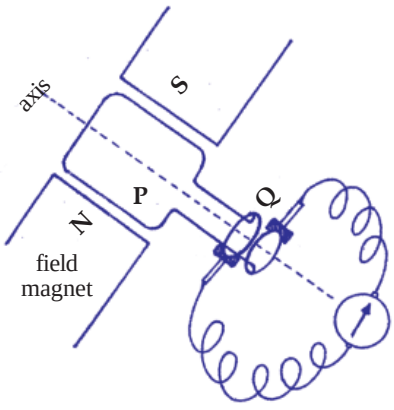
Instructions

1. 15 minute is given as cool off time. This time is to be used for reading and understanding the questions.
2. Write down answers for all questions.
3. For questions having choices, only one need be answered.
4. The score for each question is given along with the question.

1. Using the relation between the terms in the first pair, complete the second.
   Wavelength : m :: frequency: . . . . . (1)
2. Which of the following does not belong to the group? (1)
   (I^2Rt, $\frac{V^2t}{R}$, $\frac{Vt}{R^2}$, VIt)
3. Three filaments made of tungsten and of the same thickness are shown in the figure.



   (a) Of these which one will you select to make a filament lamp of maximum power? (1)
   (b) Justify your answer. (1)
4. Observe the figure of an AC generator given.



   (a) Identify the parts P and Q and write them down. (1)
   (b) What is the working principle of this device? (1)
   (c) Suggest two methods to increase the current flowing, through the external circuit. (2)

5. The natural frequency of a table is 512 Hz. You are given a tuning fork of natural frequency 256 Hz.

   (a) How many times will the table vibrate in one second if this tuning fork is excited and the stem is pressed on the table? (1)

   (b) Why does the loudness of the sound increase at this instant? (1)

6. Tabulate the following statement into those applicable for CFL and LED separately. (2)

   (i) Very low power is enough
   (ii) There are traces of mercury
   (iii) Harmful to the environment
   (iv) Not harmful to the environment

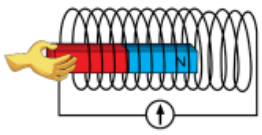
7. Electronic ballasts are used in modern fluorescent lamps. How do these ballasts help the function of the lamp? (2)

8. Observe the figure.

   (a) What is the energy conversion that takes place in this device? (1)

   (b) 60000 J of heat is developed when current is passed through a heating coil of resistance 200 Ω for 5 minute. Calculate the current in the circuit. (2)

9. Two different activities are given.

Activity
Activity 1 The galvanometer, cell, resistor, and switch are connected in series. Circuit is switched on.
Activity 2 The galvanometer is connected to a solenoid. A magnet is moved in and out continuously in the solenoid. 

   (a) Draw the graph of emf induced in activity 2. (1)

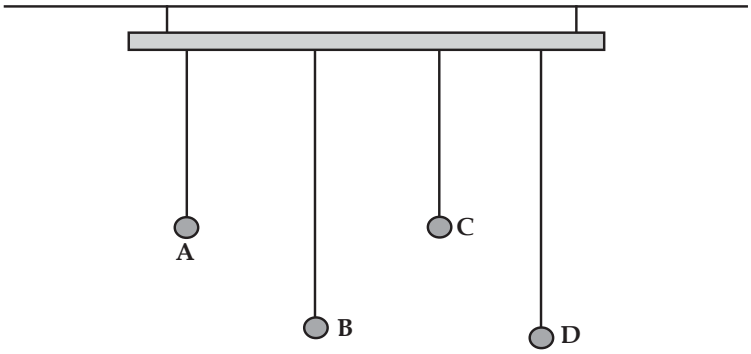
   (b) What is the difference in the emf produced in activity 1 and emf induced in activity 2? (2)

10. Match the following. (3)

A	B	C
Earthquake	Multiple reflection	Red light
Discharge lamp	Seismic waves	Richter scale
Reverberation	Nitrogen	Boom of sound

Answer any one from among 11A and 11 B

11 A. Four bobs are suspended as shown in the figure.



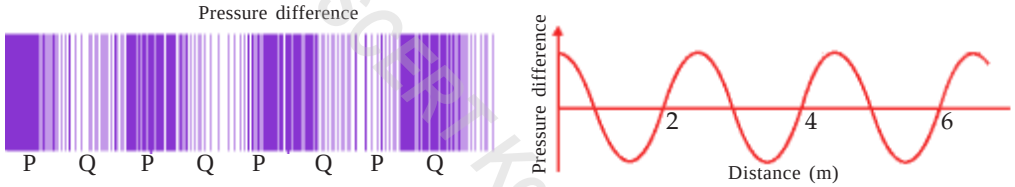
(a) When the bob A is made to oscillate, other bobs also oscillate. What is the name of this phenomenon? (1)

(b) Which bob oscillates with a greater amplitude? (1)

(c) What is the phenomenon responsible for this? (1)

OR

11 B. The given figure shows the pressure variations taking place in a medium while a sound passes through the medium.



(a) What do P and Q indicate? (1)

(b) What type of wave is this? (1)

(c) Find out the wavelength of these waves (1)

12. Both the waves depicted took 6 s to reach B from A.

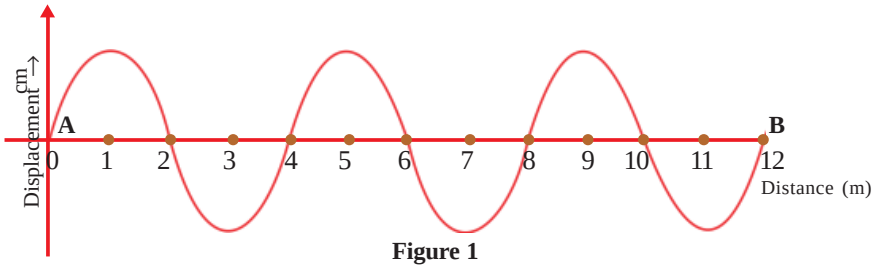


Figure 1

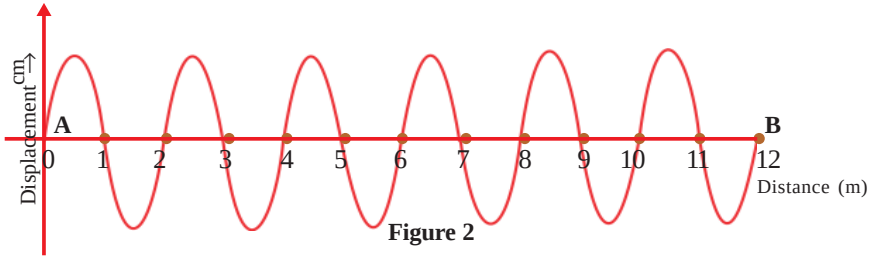


Figure 2

(a) Find the frequency of the two waves and compare them. (2)
(b) What is the relation between the wave velocities of the two waves? (2)
(c) What is the relation between the wavelength and frequency of a wave? (1)

13. The broken filament of a lamp is rejoined and tried to light again.
(a) What happened to the length of the filament on rejoining? (1)
(b) What change happens to the resistance in this situation? (1)
(c) What change happens to the current in the circuit in accordance with Ohm's law? (1)

14. In a hall a boom of sound was heard instead of hearing with clarity. Suggest two methods to rectify this problem. (2)

15. Electric bulb and storage battery (*while charging*) are two equipment that make use of electricity. What is the energy conversion in each? (2)

16. (a) Write down a factor that affect the speed of sound in air. (1)
(b) How does this factor influence the speed of sound in air. (1)

EVALUATION OF SET A

Qn. No.	Scoring Indicators	Split up Score	Total Score
1	green	1	1
2	Tuning fork	1	1
3	a, c	1	1
4	(a) $I = \frac{P}{V}$ $\frac{690}{230}$ or 3 A (b) H = V I t t = 3 minute $\therefore$ H = $230 \times 3 \times 3 \times 60$ = 124200 J OR H = P × t = $690 \times 3 \times 60$ = 124200 J	½ ½ ½ 1 ½	3
5	b & e	2	2
6	(a) 0.2m (b) $\frac{6}{3}$ = 2 Hz (c) $V = f \lambda$ $= 2 \times 2 = 4$ m/s	1 1 1	3
7	(a) Stator (b) • We can make powerful magnets • Strength ofmagnetsdoes not changeincourse of time (c) Provides required DC for the field magnet used in power generator	1 2 1	4
8	A | B | C Fluorescent lamp | Thorium oxide | Mercury vapour Arc lamp | Carbon rods | Intense light Incandescent lamp | Tungsten filament | Inert gas	1 1 1	3
9 (A)	(a) P - rheostat Q - ammeter (b) $H = I^2 Rt$ $= 2 \times 2 \times 10 \times 60$ = 2400 J	1 ½ 1 ½	3

Qn. No.	Scoring Indicators	Split up Score	Total Score
9 (B)	(a) 220 V The voltage to be given to the device 440 w the power of device	1	
	(b) $R = \frac{V^2}{P}$ or $\frac{220 \quad 220}{440} = 110\,\Omega$	½ + ½	
	$P = \frac{V^2}{R} = 110$ W OR if the voltage is reduced to half power becomes one fourth	½ + ½	3
10	(a) • Humidity	1	
	(b) • The humidity is less in winter/ density of air is low	1	2
11	(a) • Electromagnetic induction	1	
	(b) • No: of turns of coiled conductor • The speed of rotation of armature • The strength of elctromagnet (any two)	2	
	(c) • Fleming's left hand rule	1	4
12	(a) loudness increases	1	
	(b) since surface area under vibration is large	1	
	(c) 512 Hz	1	
	(d) resonance	1	4
13	(a) • overloading • short circuit	1	
	(b) • the ends of fuse wire should be properly and strongly fitted in proper place • fuse wire should not be exposed to outside the carrier • use fuse wire of appropriate amperage • should be connected in the phase (any two)	2	3
14	(a) • reverberation	1	
	(b) • make the floor rough • use many folded curtain (any two)	2	3
15	(a) echo 1		
	(b) 17 m	1	
	(c) t = 3 s V = 340 m/s Distance travelled = speed × time = 340 × 3 = 1020 m Distance to hill = $\frac{1020}{2}$ = 510 m	1	3

EVALUATION OF SET B

Qn. No.	Scoring Indicators	Split up Score	Total Score
1	Hz		1
2	Magnesium		1
3	(a) magnesium (b) (i) can avoid rings and brushes (ii) this avoids spark	1 1 1	3
4	Storage battery: electrical energy → chemical energy Electric bulb :electrical energy → light energy	1 1	2
5	(a) Forced vibration (b) The natural frequency of tuning fork and that of the string in between the bridges becomes equal	1 2	3
6	(a) 90^o , 270^o (b) Rotates 50 times in one second	1 1	2
7	(a) Statements (iv) → (i) → (iii) → (ii) (b) Hydrogen gas	2 1	3
8	Stethoscope heart beats multiple reflection Arc lamp carbon rod lighting effect Power generator field magnet exciter Electric heater heating coil heating effect	1 1 1 1	4
9	(a) 230 V potential difference to get 690 W power (b) P = VI = 690 W ; V = 230 V $I = \frac{P}{V} \quad \frac{690}{230} = 3$ A (c) P = 690 t = 5 minute H = pt = 690 5 60 = 207000 J	1 1 2	4
10	(a) Statements (ii) and (iv) (b) Electromagnetic induction	2 1	3
11 A	(a) 1 m (b) n = 4, t = 4, $f = \frac{t}{n} = \frac{4}{4} = 1$ Hz (c) Frequency and wavelength are inversely proportional OR when frequency increases wavelength decreases OR when wavelength increases frequency decreases	1 1 1	
11 B	(a) t = 4s, v = 1500 m/s. distance between rock and water surface $= \frac{1500 \quad 4}{2} = 3000$ m (b) Richter scale	2 1	3

12	(i) The frequency of electricity is increased from 50 Hz and is given to tube (ii) Give required voltage for starting the discharge at the starting time	2	2
13	(a) Resonance (b) Humidity (c) echo	1 1 1	3
14	(a) reverberation (b) (i) make the floor rough (ii) use many folded curtain (c) acoustics of buildings	1 2 1	4
15	When there is excess current the fuse wire gets over heated since the fuse wire is of low melting point it melts and breaks the circuit	2	2

EVALUATION OF SET C

Qn. No.	Scoring Indicators	Split up Score	Total Score
1	Hz -Hertz) 1	1	
2	$\frac{Vt}{R^2}$	1	1
3	(a) 3 cm (b) As length decreases Resistance decreases. So current increases	1 ½+½	2
4	(a) P - Armature Q - Slip rings (b) Electro magnetic Induction (c) Increase the number of turns Increase the magnetic power Increase the speed of rotation of magnet or armature (any two)	1 1 2	4
5	(a) 256 Hz (b) 3Surface area is more	1 1	2
6	(a) CFL: • Contain mercury • Hazardous to environment LED: • Low power consumption • Not hazardous to environment	2	2
7	(i) It amplifies the frequency of applied electricity from 50 Hz to a hgiher frequency (ii) It give higher voltage in the tube to initiate discharge	2	2
8	(a) Electrical energy - Heat energy (b) $H = I^2 Rt$ $60000 = I^2 \times 200 \times 5 \times 60$ $I^2 = \frac{60000}{200 \times 5 \times 60}$ $I = 1\ A$	 ½ 1 ½	1 3
9	(a) Graph of AC (b) In activity (i) DC In activity (ii) AC OR In activity (i) direction does not change In activity (ii) direction change	 1 1 + 1	3

Qn. No.	Scoring Indicators	Split up Score	Total Score
10	A: Earthquake / Discharge lamp / Reverberation B: Seismic waves / Nitrogen / Multiple reflection C: Richter scale / Red light / Boom of sound		
11 A	(a) Forced vibration	1	
	(b) C	1	
	(c) Resonance	1	
	OR		
11 B	(a) P compression	½	
	Q Rarefaction	½	
	(b) Longitudinal	1	
	(c) Wave length 2 m	1	3
12	(a) In figure (i) 0.5 Hz	1	
	In figure (ii) 1 Hz	1	
	(b) In figure (i) $V = f\lambda$ or $0.5 \times 4 = 2$ m/s	½, ½	
	In figure (ii) $V = 1 \times 2 = 2$ m/s	½, ½	
	(c) Inversely proportional	1	5
13	(a) Length decreased		1
	(b) Resistance decreases	1	
	(c) Increases	1	3
14	Make the floor and wall rough, Use curtain with more frills, Make ceilings with thermocole and plaster of paris (any two)	1+1	2
15	Electric bulb - electrical energy - light energy Storage battery - electrical energy - chemical energy		
16	(a) Any one factor	1	
	(b) To write how it influence	1	2