Alternative No:		Index No:	0	1	0	0	8					

Supervising Examiner's/Invigilator's initial:

Paper 1 (Physics)

Writing Time: $1\frac{1}{2}$ Hours

Total Marks : 80

READ THE FOLLOWING DIRECTIONS CAREFULLY:

1. Do **not** write for the first **fifteen minutes**. This time is to be spent reading the questions. After having read the questions, you will be given **one and a half hours** to answer all questions.

2. Write the remaining seven digits of your **index number** in the space provided on the **top right hand corner of this cover page only**.

3. In this paper, there are **two** sections: A and B. Section **A** is compulsory. You are expected to attempt **any four** questions from Section **B.**

4. The intended marks for questions or parts of questions, are given in brackets [ ].

5. Read the directions to each question carefully and write **all** your answers in the space provided in the **question booklet** itself.

6. Remember to write **quickly** but **neatly**.

7. **Do not** remove or tear off any pages from the question booklet.

8. **Do not** leave the examination hall before you have made sure that you have answered all the questions.

For Chief Marker's and Markers' Use Only

Question Number														Total	Chief Marker's Signature ↓
Award															
Markers' initial →															

SECTION A (40 Marks)
Compulsory: To be attempted by all candidates.

Question 1

(a)   *Directions: Each question in this part is followed by four possible choices of answers. Choose the correct answer and write it in the space provided in the question booklet.*   **[15]**

(i)   The diagram given below illustrates that pressure

A   is the same in all directions about a point in a liquid.
B   is the same at all points in a horizontal plane in a stationary liquid.
C   at a point in a liquid increases with the density of the liquid.
D   at a point in the liquid increases with the depth from the free surface.

Answer:………………………………………………………………………………….

(ii)   We do not hear the echo of a teacher's voice inside the classroom because the
A   distance between the listener and the reflecting surface is less than 17m.
B   distance between the listener and the reflecting surface is more than 17m.
C   reflected sound reaches one's ear after 0.1s.
D   reflecting surface absorbs the sound.

Answer:………………………………………………………………………………….

(iii)   The unit of potential difference is
A   ampere.
B   coloumb.
C   joule.
D   volt.

Answer:………………………………………………………………………………….

(iv) The diagram below shows the formation of images using convex lens.
Which types of image formation are used in a photographic camera?

I	II
III	**IV**

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

Answer:………………………………………………………………………………………….

(v) A beam of cyan light falls on a girl wearing a red kira. The colour of her kira will appear

A   black.
B   blue.
C   green.
D   white.

Answer:………………………………………………………………………………………….

(vi) Which of the following information about a fuse is correct?

A   It is made of material having low resistance and high melting point.
B   It is made of material having high resistance and low melting point.
C   It is connected to the earth wire in the circuit.
D   It is connected to the neutral wire in the circuit.

Answer:………………………………………………………………………………………….

(vii)   A d.c motor converts

    A   magnetic energy to electrical energy.
    B   electrical energy to magnetic energy.
    C   electrical energy to mechanical energy.
    D   mechanical energy to electrical energy.

    Answer:…………………………………………………………………………………

(viii) Soft drinks are effectively cooled by cubes of ice at 0°C than water at 0°C because ice

    A   has a high specific latent heat of fusion.
    B   has a high specific heat capacity.
    C   is in the solid form.
    D   is very cold.

    Answer:…………………………………………………………………………………

(ix)   The rate of thermionic emission from a metal surface increases if the

    A   work function of the metal surface is high.
    B   temperature of the metal surface is low.
    C   area of the metal surface is large.
    D   melting point of the metal is low.

    Answer:…………………………………………………………………………………

(x)   A sheet of white paper is viewed through a piece of blue glass and the paper looks blue. This is because

    A   the colour of the glass is reflected on to the paper.
    B   the glass absorbs all the colours except blue.
    C   blue light travels faster than red light through glass.
    D   blue light is absorbed by the glass.

    Answer:…………………………………………………………………………………

(xi)   Pressure at a certain depth in river water is P_1 and at the same depth in sea water is P_2. Then
    A $P_1 = P_2$.
    B $P_1 > P_2$.
    C $P_1 < P_2$.
    D $P_1 - P_2 =$ atmospheric pressure.

    Answer:…………………………………………………………………………………

(xii)   A lens forms an image at 30 cm from it when the object is 2 cm. What is the height
        of the image?

        A   0.67 cm
        B   1.5 cm
        C   3 cm
        D   6 cm

        Answer:……………………………………………………………………………………

(xiii) A wire of 9 Ω resistance having 63 cm length is tripled on itself. What is the new
        resistance?

        A   1 Ω
        B   7 Ω
        C $\dfrac{1}{7}$ Ω
        D $\dfrac{7}{3}$ Ω

        Answer:……………………………………………………………………………………

(xiv)   Heat loss due to conduction in a calorimeter is prevented by

        A   polishing the outer surface.
        B   polishing the inner surface.
        C   using a wooden jacket.
        D   covering it.

        Answer:……………………………………………………………………………………

(xv)   In a step-up transformer, e.m.f in the secondary is 220 V and in the primary is 22 V.
        If the current in the primary coil is 10 A, then current in the secondary coil is

        A   22 A.
        B   10 A.
        C   2.2 A.
        D   1 A.

        Answer:……………………………………………………………………………………

(b) *Fill in the blanks by writing suitable words.*

(i)   A body whose mass is 15 kg will weigh ………… at a place where the acceleration

due to gravity is 10 m/sec^2.

(ii)   A stone when immersed in a liquid weighs less than its actual weight due to the

…………………

(iii)   A device that changes the voltage of an alternating current is called a ……………

(iv)   The colour in the visible spectrum having the highest wavelength is……………

(v)   In a musical instrument, the vibration of the lowest frequency and greatest amplitude

is called ……………………………….

(c)   *Match each item under Column A with that which is most appropriate in Column B.*
        You must rewrite the correct matching pairs in the space provided.   **[5]**

Column A	Column B
1. Concave lens 2. Energy 3. Magenta 4. Alpha particle 5. Switch	(a) primary colour (b) $_2^4 He$ (c) virtual image (d) secondary colour (e) erg (f) real image (g) Newton (h) Al (i) neutral wire (j) live wire

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(d)   *Correct and rewrite the following sentences.*   **[5]**

(i)   A stick dipped in water appears longer than its original length.

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…………………………………………………………………………………………..

………………………………………………………………………………………………

(ii)   While earthing an electrical appliance, the paint must be removed from the body

parts where live connection is made to remove insulation.

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(iii)   Alpha particle has the highest penetrating power and gamma radiation has the

highest ionisation power.

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(v)   Of all the substances, ice has an unusually very high specific heat capacity of

2.1 Jg^{-1} $°C^{-1}$.

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(v)   Red light is passed through yellow filter and then blue filter, the colour obtained

on the screen is magenta.

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(e)   *Answer the following questions.*

(i)   Mention *one* difference between a class II and class III lever in the table given below.   **[1]**

Class II lever	Class III lever

(ii)   1.   What changes does your ear detect when you are listening to a sound if the amplitude is raised?

………………………………………………………………………………………..

………………………………………………………………………………………..

2.   What changes does your ear detect when you are listening to a sound if the frequency is raised?   **[1]**

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(iii)   Name *two* radio active substances.   **[1]**

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(f)   (i)   The diagram given below shows a small bar magnet placed near a solenoid. When the current is switched on, will the magnet be attracted or repelled? Give a reason for your answer.   **[1]**

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(ii)   Why is heat energy supplied to a liquid at its boiling point to convert it into vapour at the same temperature?   **[2]**

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(g) (i) 'When heat energy is imparted to a metal surface, there is emission of free electrons'. What is this emission called?

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(ii) Why are electromagnets usually 'U' shaped? **[1]**

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(iii) What are the *two* conditions required for total internal reflection to occur? **[1]**

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SECTION B (40 Marks)

Attempt any four questions

Question 2

(a) (i) State the Law of Conservation of energy. **[1]**

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(ii) A boy whose weight is 600N runs up a flight of stairs 10 m high in 12 seconds. Calculate the power developed. **[1½]**

(iii)   Gear A has more number of teeth than gear B. How can we obtain gain in turning effect by using them?

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(b)   (i)   From the diagram of a pulley system given below answer the following questions.

                1.   Find the mechanical advantage.   [½]

                2.   Find the velocity ratio.   [½]

(ii)   Name *two* simple machines which work on the principle of Pascal's Law.

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(iii)   Define relative density of a substance and mention *one* practical application

of it.   **[1½]**

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(c)   (i)   Draw a labelled diagram of a hydrometer and write the principle on which it

works.   **[2]**

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(ii)   Why do washer men use a little indigo blue after washing white clothes?   **[1]**

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Question 3

(a)   (i)   What do you understand by the term 'critical angle'?   **[1]**

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(ii)   Mention *two* applications of total reflecting prism.   **[1]**

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(iii)   Draw a diagram to show the refraction of a single coloured light through a
glass prism. In the diagram mark the emergent ray by letter 'E' and angle of
deviation by letter 'D'.   **[2½]**

(b) (i) A fish lies at the bottom of a pond. The depth of water is 4m. If the refractive index of water is $\frac{4}{3}$, find its apparent depth?

(ii) The diagram given below shows refraction of a ray of light due to lens LL_1. **[1½]**

1. Complete the ray diagram given above to show the formation of the image of the object AB.

2. Name the lens LL_1.

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(iii) Write down *two* characteristics of the image formed by a microscope. **[1]**

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(c) (i) Which lens, concave or convex has more magnifying power?

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(ii) Write down *two* uses of colour filters. **[1]**

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Question 4

(a) (i) In a photographic camera, write the functions of the following: **[2]**

1. diaphragm

....

....

2. shutter

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(ii) If you are taking a photograph of a distant stationary object, what adjustment
would you have to make with the camera lens? **[1]**

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(b) (i) State *one* difference between the image formed in the camera and the eye in
the table given below. **[1]**

Camera	Eye

(ii)   Define resonance.

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(iii)   What are damped vibrations and what causes them?   **[2]**

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(c)   (i)   Why are stringed instruments provided with a sound box?   **[1½]**

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(ii)   The sound of an explosion on the surface of a lake is heard by two persons,

a boatman 100 m away and a diver 100 m below the surface of the lake.

From the two, who hears the sound first and why?   **[1½]**

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Question 5

(a) (i) The diagram given below shows an electrical circuit. Study the diagram and answer the questions that follow.
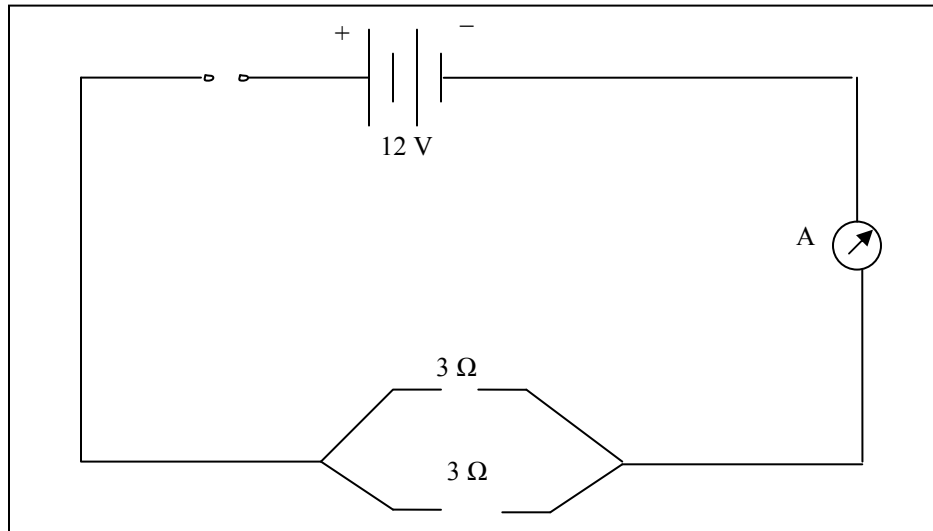
1. When the circuit is closed, calculate the total resistance. **[1 ½]**

2. When the circuit is closed, calculate the reading of the ammeter. **[1 ½]**

(b)   (i)   A 1000 W geyser is used for 1 hour daily and four 60 W lamps are lighted for
           2 hours daily for 30 days. If the Bhutan Power Corporation charges Nu. 1.00
           for 1 unit of electrical energy consumed, find the total bill to be paid in a month.   **[3]**

(ii)   State the new internationally accepted colours for live, neutral and earth wire.
       Which one of these is connected to the switch?   **[2]**

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(iii) What is the principle of calorimetry? Name a metal commonly used for
       making a calorimeter.   **[2]**

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Question 6

(a)   (i)   The diagram given below shows an electric bell.

1.   Name the parts A, B, C and D.   **[2]**

A =………………………………………………………………………………………

B = ………………………………………………………………………………………

C = ………………………………………………………………………………………

D = ………………………………………………………………………………………

2.   What is the function of part B in the electric bell?   **[1]**

……………………………………………………………………………………………..

……………………………………………………………………………………………..

……………………………………………………………………………………………..

3.   Write *one* difference between part A and a permanent magnet in
       the table given below.   **[1]**

Part A	Permanent magnet

4.   Write *one* use of an electromagnet other than in an electric bell.

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……………………………………………………………………………………………..

(b)   (i)   Define the term 'specific latent heat of fusion of a substance'.   **[1]**

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       (ii)   'Hot water bottles are used for formentation'. Explain.   **[2]**

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       (iii)   A bucket contains 10 kg of water at 30°C. 4 kg of water at 90°C is poured into it.
               Neglecting the heat absorbed by the bucket, calculate the final temperature of water.
               Given specific heat capacity of water = 4200 J/kg°C.   **[2]**

Question 7

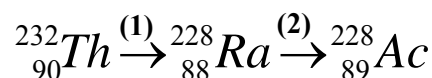(a)   (i)   Mention *four* factors on which the resistance of a wire depends.   **[2]**

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(ii) Part of a radioactive decay is shown below:

$$^{232}_{90}Th \xrightarrow{(1)} {}^{228}_{88}Ra \xrightarrow{(2)} {}^{228}_{89}Ac$$

What particles are emitted at each step (1) and (2)? **[2]**

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(b) A cathode ray tube is a very useful laboratory instrument in electric signal experiments.

1. What is the function of the fluorescent screen? **[1]**

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....

2. What is the function of the electron gun? **[1]**

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(c) (i) Name *two* devices in which a cathode ray tube is used. **[1]**

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(ii)   The diagram given below shows the deflection of radioactive radiations in an electric field.

1.   Name the radiations X, Y and Z.

X = ...

Y = ...

Z = ...

2.   Write down the charges of X, Y and Z radiations.

X = ...

....

Y = ...

....

Z = ...

....

for Rough Work

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