Alternative No:

Index No: | 0 | 1 | 0 | 0 | 7 | | | | | | |

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 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** draw lines or pictures **on** or in the question booklet to beautify it.
9. **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 →																

This booklet contains 24 pages.

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) Nose bleeding may occur at high altitude because

A there is strong air current in the upper atmosphere.
B the oxygen content of the atmosphere decreases.
C the atmospheric pressure decreases.
D the atmospheric pressure increases.

Answer:……

(ii) An object is placed at 5 cm distance from a convex lens of focal length 10 cm. The image formed is

A real and inverted.
B real and enlarged.
C virtual and enlarged.
D virtual and diminished.

Answer:……

(iii) The infra-red radiations are used for photography in fog because they are

A scattered more by fog.
B scattered less by fog.
C absorbed by fog.
D produced by fog.

Answer:……

(iv) If yellow light and blue light are made incident on the same spot on a white screen, the spot would appear

A blue.
B magenta.
C white.
D yellow.

Answer:……

(v) Which of the diagrams given below shows the note from a musical instrument?

I	II
III	IV

A I
B II
C III
D IV

Answer:…….

(vi) The unit of internal resistance of a cell is
A ampere.
B coloumb.
C ohm.
D volt.

Answer:…….

(vii) An electric motor is used in
A a telephone.
B a rice cooker.
C an electric fan.
D a water boiler.

Answer:…….

(viii) The electrical energy consumed in our homes is measured in

A Joule.
B KWh.
C MW.
D Wh.

Answer:……

(ix) Steam produces more severe burns than water at 100°C because

A steam has high specific heat capacity.
B water has high specific heat capacity.
C steam has high latent heat of vaporisation.
D temperature of steam is much higher than water.

Answer:……

(x) The mass number of a element does not change when a radioactive substance emits

A α, β and γ radiations.
B α and γ radiations.
C β and γ radiations.
D α and β radiations.

Answer:……

(xi) The mechanical advantage of a pair of scissors is

A equal to 1.
B less than 1.
C more than 1.
D all of the above.

Answer:……

(xii) The stem of a hydrometer is made narrow because it

A increases its sensitivity.
B will not tilt sideways.
C reduces the cost.
D will not sink.

Answer:……

(xiii) Karma wants to take a picture of a 100 m race finishing, his camera should have a

A small aperture and low shutter speed.
B small aperture and high shutter speed.
C large aperture and low shutter speed.
D large aperture and high shutter speed.

Answer:……

(xiv) One horse power is equal to

A 764 W.
B 746 W.
C 674 W.
D 647 W.

Answer:……

(xv) The refractive index of water and glass with respect to air are $\frac{4}{3}$ and $\frac{3}{2}$ respectively.

The refractive index of water with respect to glass is

A $\frac{4}{3} - \frac{3}{2}$.

B $\frac{4}{3} + \frac{3}{2}$.

C $\frac{4}{3} \div \frac{3}{2}$.

D $\frac{4}{3} \times \frac{3}{2}$.

Answer:……

(b) 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.

Column A	Column B
1. Steam engine	(a) red + green
2. Concave lens	(b) high ionisation
3. Magenta	(c) mechanical energy
4. Alpha particle	(d) red + blue
5. Electrical power	(e) virtual, diminished
	(f) high penetrating power
	(g) electrical energy
	(h) virtual, magnified
	(i) watt hour
	(j) watt

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(c) Fill in the blanks by writing suitable words. **[5]**

(i) When a force of 40N is applied on a body of mass……., it moves with an acceleration of 5m/sec^2.

(ii) The instrument used to measure relative density of milk is ……

(iii) A soccer player wearing a blue shirt will appear ……. in colour when seen in yellow light.

(iv) The device which converts mechanical energy into electrical energy is ……

(v) The material used in an electric bulb filaments is ……

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

(i) Loudness of sound depends upon the frequency.

……

……

(ii) A fuse is always connected to the neutral wire.

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……

(iii) Among the three radio-active radiations, beta radiation causes immense biological damage.

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(iv) When a ray of light travels from a rarer to a denser medium, it bends away from the normal.

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……

(v) Specific latent heat of fusion of ice is 2268000 Jkg^{-1}.

……

……

(e) Answer the following questions.

(i) Why does mechanical advantage increase with increase in number of pulleys in a block and tackle system? **[1]**

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(ii) How can you detect a vessel filling under a tap by listening to its sound from a distance? **[1]**

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(iii) A transformer has primary coil of 400 turns connected to a 100 V a.c supply and secondary coil of 4 turns. What is its output voltage? **[2]**

(f) (i) A ladder is a simple machine. Name the type of machine it belongs to. **[½]**

……

……

(ii) How does it make our work easier? **[½]**

……

……

(iii) A nucleus of an element which has the symbol ${}^{202}_{84}X$ emits an alpha particle and then a beta particle. The final nucleus is ${}^{a}_{b}Y$ Find the value of 'a' and 'b'. **[2]**

……

……

(g) (i) Why is the anode in a CRT maintained at high positive potential with respect to the cathode? **[1]**

……

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(ii) Write *one* difference between light waves and sound waves in the table given below.

Light waves	**Sound waves**

(iii) State *one* safety precaution that you would take while handling radioactive substances. **[1]**

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SECTION B (40 Marks)

Attempt any four questions

Question 2

(a) Define 'specific heat capacity" of a substance and state its S.I unit. **[2]**

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(b) An object of mass 20 kg is raised to a height of 5 m in 10 seconds by a machine. Calculate the power of the machine. (Take g = 10 m/sec^2)

(c) Why is it easier to swim in sea water than in river water? **[2]**

……

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……

(d) A solid weighs 50 gf in air and 44 gf when completely immersed in water.

1. Calculate the upthrust. **[½]**

2. Calculate the relative density of the solid.

(e) State *one* similarity and *two* differences of images formed by a concave lens and convex lens when a object is kept beyond the centre of curvature (2F) in the table given below. **[3]**

Similarity	Differences

Question 3

(a) State Pascal's law. **[1]**

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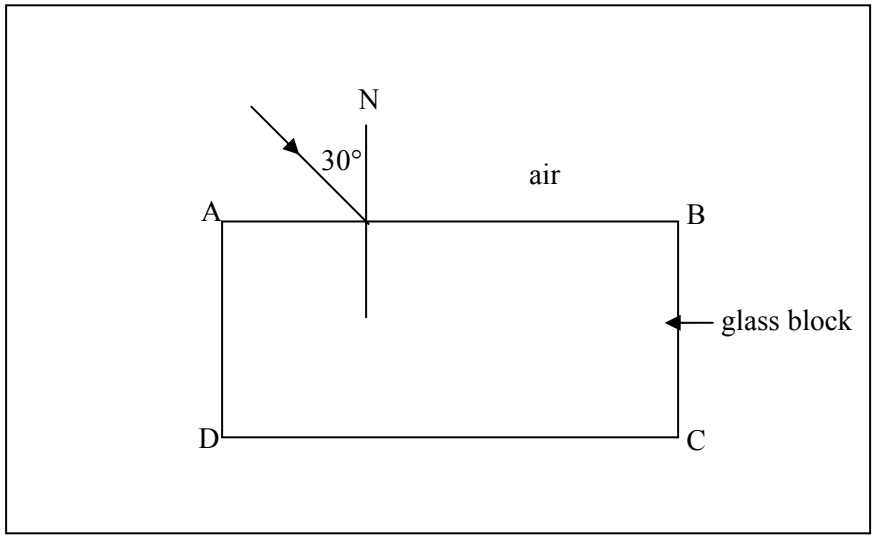
……

(b) (i) Complete the path of the incident ray from air through the glass block in the diagram given below.



(ii) How is the refractive index of a glass related to the angle 'i' and 'r' in part (i) above? **[1]**

(iii) What device other than a plane mirror can be used to turn a ray of light through 90°? Name *one* instrument in which this device is used. **[2]**

……

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……

(c) (i) Draw a diagram to illustrate the action of a convergent lens as a slide projector.

(ii) Write down *two* characteristics of the image formed in part (i) above. **[1]**

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……

Question 4

(a) (i) Name the lens used in a photographic camera. **[1]**

……

……

(ii) How is the intensity of light entering a camera controlled? **[1]**

……

……

(iii) Why is the inner side of the camera coated black? **[1]**

……

……

(iv) State *one* difference between the eye and a camera in the table given below.

Eye	Camera

(b) (i) A ship on the surface of water sends a signal and receives it back after 12 seconds from the floor of the sea. If the velocity of sound in water is 1500 m/sec, calculate the depth of the sea. **[2]**

(ii) Mention a condition required for resonance to occur. **[1]**

……

……

……

(iii) State *two* differences between musical sound and noise in the table given below. **[2]**

Musical sound	Noise

(iv) Why is the loudness of the sound from a vibrating tuning fork increased when it is placed on a larger board?

……

……

Question 5

(a) (i) A cell supplies a current of 2 A through 2 Ω resistors connected in parallel.

1. Draw a circuit diagram to show the arrangement and calculate the total resistance of the two resistors. **[3]**

2. Calculate the potential across the terminal of the cell. **[1]**

(ii) A given wire is stretched four times its length. How will its resistance chang

……

……

(b) (i) Karma uses 3 bulbs of 100W each for 5 hours daily and 3 fans of 60W each for 10 hours daily. If the cost per unit is Nu. 1.00, calculate the amount of money Karma has to pay to Bhutan Power Corporation in a month. **[3]**

(ii) In a 3 pin plug, why is the earth pin thicker and longer than the other two? **[2]**

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Question 6

(a) (i) Draw a diagram of a bar electromagnet showing its polarities. **[2]**

(ii) On what effect of an electric current does a galvanometer work?

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(iii) Name a devise where a step-up transformer and a step-down transformer are used. **[1]**

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(iv) State *one* advantage of an electromagnet over a permanent magnet. **[1]**

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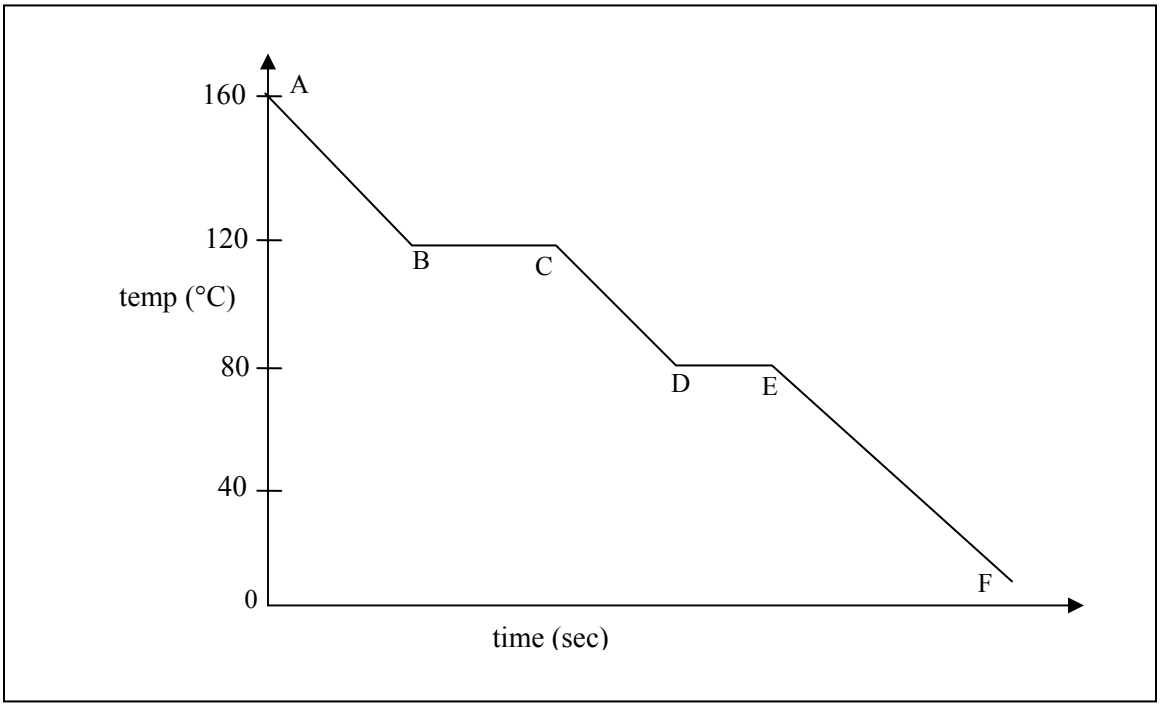
(b) The graph represents a cooling curve. Use the graph to answer the following questions:



(i) What is the boiling point of the substance?

……

(ii) What happens in the region DE? **[1]**

……

……

(iii) What is the freezing point of the substance? **[1]**

……

(iv) Why is the region DE shorter than region BC? **[1]**

……

……

……

(c) Write *one* advantage of the ring system of wiring over the tree system. **[1]**

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Question 7

(a) (i) Calculate the total amount of heat required to convert 100 g of water at +10°C completely into steam at 100°C. **[3]**

Given: Specific heat capacity of water = 4.2J/g°C

Specific latent heat of steam = 2260 J/g

(ii) Why is a piece of ice at 0°C more effective in cooling a drink than an equal mass of water at 0°C?

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(b) (i) Mention *one* harmful effect and *two* uses of radioactivity in the table given below. **[3]**

Harmful effect	**Uses**

(ii) Write *two* ways to increase the rate of thermionic emission of electrons from a metal surface. **[1]**

……

……

……

(iii) 1. Name the type of radiation which has a positive charge.

……**[½]**

2. Name the type of radiation which has a negative charge.

……**[½]**

3. Name the type of radiation which is not deflected by an electric field.

……**[½]**

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for Rough Work

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