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Mumbai, Maharashtra

ICSE BOARD SAMPLE PAPER - 1

SUBJECT: PHYSICS

Time: 2 Hrs. **Max. Marks: 80**

GENERAL INSTRUCTIONS:

- *Answers to this Paper must be written on the paper provided separately.*
- *You will not be allowed to write during first 15 minutes.*
- *This time is to be spent in reading the question paper.*
- *The time given at the head of this Paper is the time allowed for writing the answers.*
- *Section A is compulsory. Attempt any four questions from Section B.*
- *The intended marks for questions or parts of questions are given in brackets [ ]*
- *Use of calculator and mobile devices are not allowed.*

SECTION - A (40 MARKS)

(Attempt ALL Questions)

Question 1 **[15]**

Choose the correct answers to the questions from the given options.

(Do not copy the question, write the correct answers only.)

1. Out of the following which one is an example of dynamic equilibrium?

(1) Moon revolving around the earth

(2) A pebble fixed at the end of a string whirling in a circular path

(3) An aeroplane moving at a constant height

(4) A beam balance balanced in a horizontal position.

(a) (3) and (4) (b) (1), (2) and (3)

(c) (1) and (2) (d) (1) and (3)

2. A ball of mass 0.20kg is thrown vertically upwards with an initial velocity of 20 m/s. Calculate the maximum potential energy it gains as it goes up.

(a) 40J (b) 42J

(c) 47J (d) 50J

3. What is the correct energy transformation during burning of a candle?

(a) heat $\rightarrow$ kinetic + potential

(b) heat $\rightarrow$ chemical + light

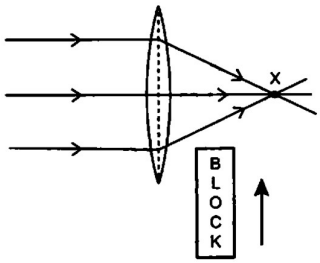
(c) chemical $\rightarrow$ heat + light

(d) mechanical $\rightarrow$ chemical + heat

4. A door lock is opened turning the lever (handle) of length 0.2m. If the moment of force produced is 1Nm, then the minimum force required is

(a) 5N (b) 10N (c) 20N (d) 0.2N

5. A block of glass is pushed into the path of the light as shown below. Then the converging point x will:



(a) Move away from the slab (b) Move towards the slab

(c) Not shift (d) Move towards the left side of the lens

6. In refraction of light through a prism, the light ray :

(a) suffers refraction only at one face of the prism

(b) emerges out from the prism in a direction parallel to the incident ray

(c) bends at both the surfaces of the prism towards its base

(d) bends at both the surface of the prism opposite to its base

7. Magnification produced by a rear view mirror fitted in vehicles:

(a) is less than one

(b) is more than one

(c) is equal to one

(d) can be more than or less than one, depending upon the position of the object in front of it

8. The correct order of angle of deviation of indigo, green, yellow and red colours is:

(a) $\delta_I > \delta_G > \delta_Y > \delta_R$ (b) $\delta_G > \delta_I > \delta_Y > \delta_R$

(c) $\delta_R > \delta_G > \delta_Y > \delta_I$ (d) $\delta_R > \delta_Y > \delta_G > \delta_I$

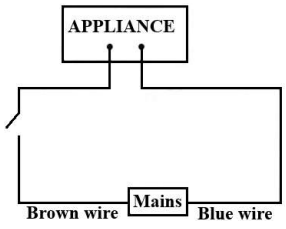
9. The speed V of a transverse wave is given by:

(a) $V = \sqrt{\frac{T}{m}}$ (b) $V = \sqrt{\frac{\gamma P}{d}}$

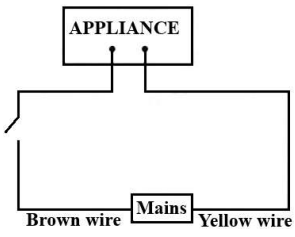
(c) $V = \sqrt{Tm}$ (d) $V = \frac{1}{d}\sqrt{\gamma P}$

10. Identify the option that displays the correct wiring with correct colour code:

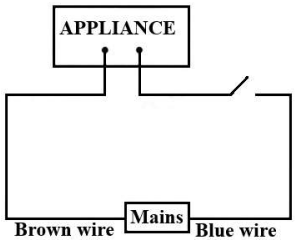
(a)



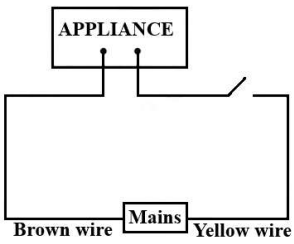
(b)



(c)



(d)



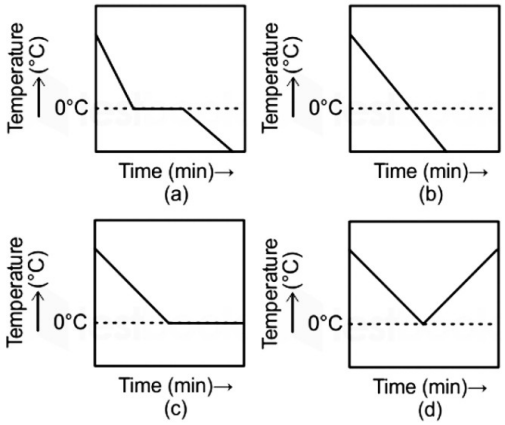
11. What is the maximum resistance which can be made using five resistors each of $\frac{1}{5\Omega}$?

(a) $\frac{1}{5\Omega}$ (b) 10Ω (c) 5Ω (d) 1Ω

12. In a a.c generator the coil makes n rotations per second. The magnitude of induced emf at any instant t is given by;

(a) $e = i_0 \sin 2\pi nt$ (b) $e = e_0 \sin 2\pi nt$ (c) $e = e_0 \sin 2\pi n / t$ (d) $e = e_0 \cos 2\pi nt$

13. A glass tumbler containing hot water is kept in the freezer compartment of a refrigerator (temperature < 0°C). If you could measure the temperature of the content of the tumbler, which of the following graphs (Fig.) would correctly represent the change in its temperature as a function of time.



(a) 1 (b) 2 (c) 3 (d) 4

14. $_{18}Ar^{40}$, $_{20}Ca^{40}$ and $_{19}K^{40}$ are

(a) Isomers (b) Isotopes (c) Isobars (d) Isotones

15. The SI unit of specific heat is _____ .

(a) kcal (b) cal (c) cal/g°C (d) J/kg°C

Question-2

(i) Complete the following by choosing the correct answers from the bracket: [6]

(a) A class 2 lever has the _____ in the middle. (fulcrum/load)

(b) _____ radiation is used for satellite communication. (Microwaves rays/ X rays)

(c) In cold countries, water in lakes and ponds does not freeze all at once because _____.
(Specific latent heat of fusion of ice is high/Specific latent heat of fusion of ice is low)

(d) The reciprocal of resistance is called _____. (inductance/capacitance/conductance).

(e) The particle used in nuclear fission for bombardment is _____ . (proton/neutron)

(ii) Answer the following **[2]**

(a) State the relationship between mechanical advantage, velocity ratio and efficiency.

(b) Name the term that will not change for a machine of a given design.

(iii) Answer the following **[2]**

(a) What is an echo?

(b) State two conditions necessary for the formation of an echo.

Question-3

(i) The wavelengths for the light of red and blue colours are nearly 7.8×10^{-7} m and 4.8×10^{-7} m respectively.

(a) Which colour has the greater speed in vacuum? **[2]**

(b) Which colour has the greater speed in glass?

(ii) An electric motor of power 3 kW is to be operated at mains of 220 V. Find the current rating of the fuse to be connected with the motor. **[2]**

(iii) What is the position of centre of gravity of a: **[2]**

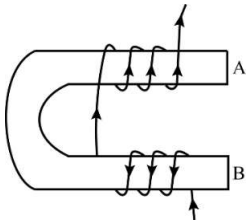
(a) rectangular lamina, (b) cylinder?

(iv) What do you mean by the following statements: **[2]**

(a) the heat capacity of a body is 50 JK^{-1}?

(b) the specific heat capacity of Copper is 0.4 J g^{-1} K^{-1}?

(v) Figure shows the current flowing in the coil of wire wound around the soft iron horse shoe core. **[2]**

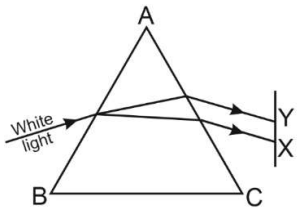


(a) State the polarities developed at the ends A and B.

(b) How will the polarity at the ends A and B change on reversing the direction of current.

(vi) Give two differences between the radioactive decay and nuclear fission. **[2]**

(vii) Figure shows a ray of white light that passes through a prism and produces a spectrum. **[3]**



(a) Name the phenomenon that is taking place.

(b) What colour would you see at X and Y?

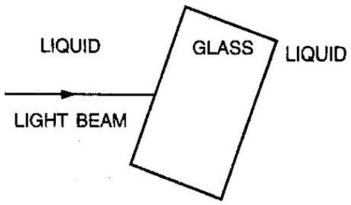
(c) What radiation would you detect above X and below Y?

SECTION - B (40 Marks)

(Attempt ANY FOUR questions from this Section)

Question-4

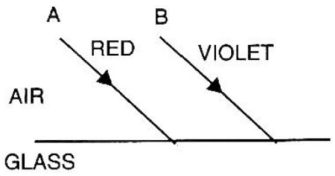
(i) The diagram below shows a glass block suspended in a liquid. A beam of light of single colour is incident from liquid on one side of the block. **[3]**



(a) Draw diagrams to show how does the light bend when it travels from liquid to glass and then to liquid if (i) the light slows down in glass, and (ii) the light speeds up in glass.

(b) State two conditions under which the light ray passing from liquid to glass travels straight without bending. Will the glass be visible then?

(ii) The diagram below shows two parallel rays A and B of red and violet light respectively incident from air on air-glass boundary. Complete the diagram showing the refracted rays for them in the glass. **[3]**

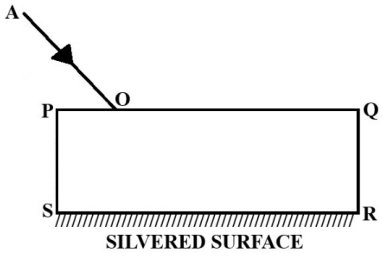


(a) How do the speeds of the rays differ in glass?

(b) Are the two refracted rays in glass parallel? Give a reason for your answer.

(c) How does the refractive index of glass differ for the two rays?

(iii) Figure shows a ray of light AO incident on a rectangular glass block PQRS, which is silvered at the surface RS. The ray is partly reflected and partly refracted. **[4]**



(a) Draw the path of the reflected and refracted rays.

(b) Show at least two rays emerging from the surface PQ after reflection from the surface RS.

(c) How many images are formed in the above case? Which image is the brightest?

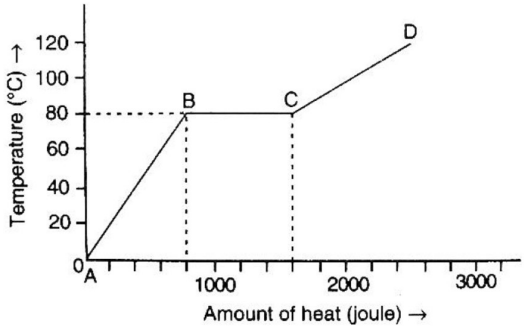
Question-5

(i) An object is placed at a distance of 10 cm in front of a concave lens of focal length 10 cm. Find: **[3]**

(a) the position of image, and (b) the size of image in relation to the object.

(ii) A substance initially in solid state at 0°C is heated. The graph showing the variation in temperature with the amount of heat supplied is shown in Figure. If the specific heat capacity of the solid substance is 500 J kg^{-1} $°C^{-1}$, use graph to find: **[3]**

(i) the mass of the substance, and (ii) the specific latent heat of fusion of the substance in the liquid state.



(iii) A vessel of negligible heat capacity contains 50 kg of water at 50°C. If 50 kg of ice at 0°C is added to it, find : **[4]**

(a) heat energy imparted by water in fall of its temperature from 50°C to 0°C,

(b) mass of ice melted,

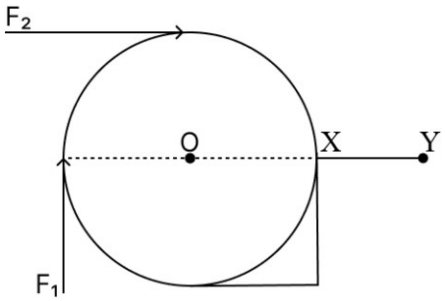
(c) final temperature of mixture, and

(d) mass of water at 0°C in mixture.

Given : specific heat capacity of water = 4200 J kg K^{-1}, specific latent heat of ice = 336 kJ kg^{-1}.

Question-6

(i) In Figure a roller of diameter 0.4 m is raised on the pavement XY by the forces F_1 and F_2 each of magnitude 10 N. Compare the torques produced by the two forces. **[3]**



(ii) A body, when acted upon by a force of 10 kgf, gets displaced by 0.5 m. Calculate the work done by the force, when the displacement is **[3]**

(a) in the direction of force, (b) at an angle of 60° with the force, and

(c) normal to the force. (g = 10 N kg^{-1})

(iii) A ball of mass 10 g falls from a height of 5 m. It rebounds from the ground to a height of 4 m. **[4]**

Find:

(a) the initial potential energy of the ball,

(b) the kinetic energy of the ball just before striking the ground,

(c) the kinetic energy of the ball after striking the ground, and

(d) the loss in kinetic energy on striking the ground. (Take g = 9.8 m s^{-2})

Question-7

(i) In a block and tackle system consisting of 3 pulleys, a load of 75 kgf is raised with an effort of 25 kgf. **[3]**

Find:

(a) the mechanical advantage,

(b) the velocity ratio, and

(c) the efficiency.

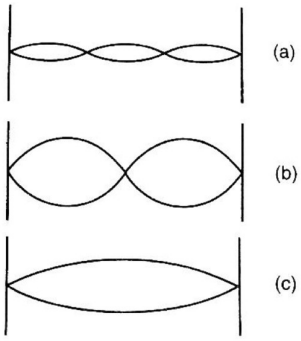
(ii) A man standing in front of a vertical cliff fires a gun. .He hears the echo after 3 s. On moving closer to the cliff by 82.5 m, he fires again and hears the echo after 2.5 s. **[3]**

Find:

(a) the distance of cliff from the initial position of man, and

(b) the speed of sound.

(iii) Figure shows three different modes of vibration of a string of length *l*. **[4]**



(a) Which of the vibration is of largest amplitude?

(b) Which of the vibration is of least frequency?

(c) What is the ratio of frequency between (a) and (c)?

(d) What is the ratio of wavelength between (b) and (a)?

Question-8

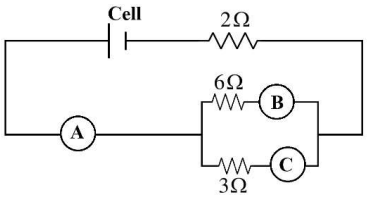
(i) When a potential difference of 2 volt is applied across the ends of a wire of 5 m length, a current of 1 A flows through it. **[3]**

Calculate: (a) the resistance per unit length of the wire,

(b) the resistance of 2 m length of the wire,

(c) the resistance across the ends of the wire if it is doubled on itself.

(ii) In the diagram given below in Fig., A, B and C are three ammeters each of negligible resistance. The ammeter B reads 0.5 A. [3]



Calculate: (a) the readings of the ammeters A and C,

(b) the total resistance of the circuit, and

(c) the e.m.f. of the cell.

(iii) State how are the two resistors joined with a battery in each of the following cases when: **[4]**

(a) same current flows in each resistor,

(b) potential difference is same across each resistor,

(c) equivalent resistance is less than either of the two resistances, and

(d) equivalent resistance is more than either of the two resistances.

Question-9

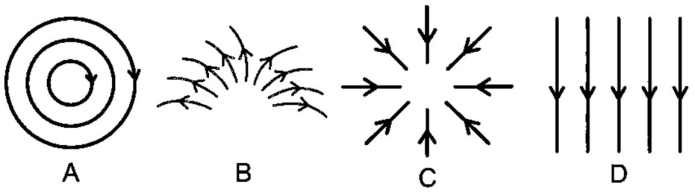
(i) A 6 V, 12 W lamp is connected in series with a resistor R and a source of voltage 12 V. **[3]**

(a) What is the purpose of the resistor R?

(b) Calculate the value of the resistor R, for the proper working of the lamp.

(c) What is the current flowing through the circuit?

(ii) The diagrams given below show some magnetic field patterns. **[3]**



(a) Which pattern shows uniform magnetic field lines?

(b) Which pattern is for a straight current carrying wire?

(c) Which pattern is depicted by current in a loop?

(iii) Complete the following nuclear changes. **[4]**

(a) ${}^{a}_{x}P \longrightarrow Q + {}^{0}_{-1}\beta$

(b) ${}^{238}_{92}U \longrightarrow {}^{234}_{90}Th + ... + \text{energy}$

(c) ${}^{238}_{92}P \xrightarrow{\alpha} Q \xrightarrow{\beta} R \xrightarrow{\beta} S$

(d) ${}^{A}_{Z}X \xrightarrow{\alpha} X_1 \xrightarrow{\gamma} X_2 \xrightarrow{2\beta} X_3$

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Time: 2 Hrs. **Max. Marks: 80**

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Section A (40 marks)

(Attempt ALL questions from this section)

Question 1

Choose the correct answers to the questions from the given options. **[15]**

(Do not copy the question, write the correct answers only.)

(i) The basicity of acetic acid is:

(a) 1 (b) 2

(c) 3 (d) 4

(ii) An aqueous solution of ammonia is:

(a) Neutral

(b) Acidic

(c) Basic

(d) Amphoteric

(iii) The product formed at the cathode in electroplating of an article with Nickel is:

(a) Hydrogen gas

(b) Nickel ions

(c) Nickel atoms

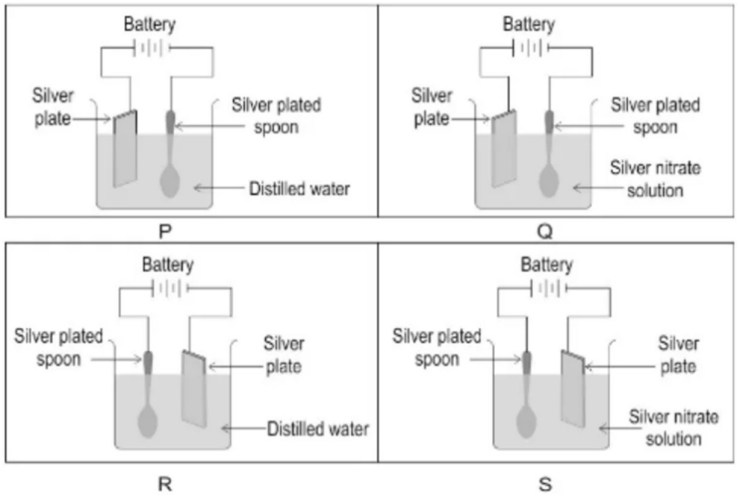
(d) Oxygen gas

(iv) Identify the molecule that contains two lone pair of electrons.

(a) H_2O (b) NH_3

(c) BF_3 (d) CCl_4

(v) In which of the following electrolytic cells [P, Q, R or S] will silver plating be done on the spoon?



(a) P (b) Q (c) R (d) S

(vi) When compound X reacts with dilute sulphuric acid, it releases a gas Y that turns acidified potassium dichromate solution from orange to green. The gas Y could be:

(a) O_2 (b) NH_3 (c) SO_2 (d) H_2

(vii) The volume occupied by 88 g of CO_2 is:

(a) 22.4 L (b) 2.24 L

(c) 44.8 L (d) 4.48 L

(viii) Identify from the following metal oxide which can react with an acid as well as an alkali

(a) Calcium oxide (b) Lead oxide

(c) sodium oxide (d) magnesium oxide

(ix) Unsaturated hydrocarbons undergo:

(a) Addition reaction (b) Substitution reaction

(c) Oxidation reaction (d) Redox reaction

(x) Electron affinity is maximum in:

(a) Mg (b) Ar (c) Li (d) Br

(xi) The acid which does not form acid salt by a basic radical:

(a) H_2CO_3 (b) H_3PO_4

(c) H_2SO_4 (d) CH_3COOH

(xii) An electrolyte that completely dissociates into its ions is:

(a) Alcohol (b) Carbonic acid

(c) Sucrose (d) Sodium hydroxide

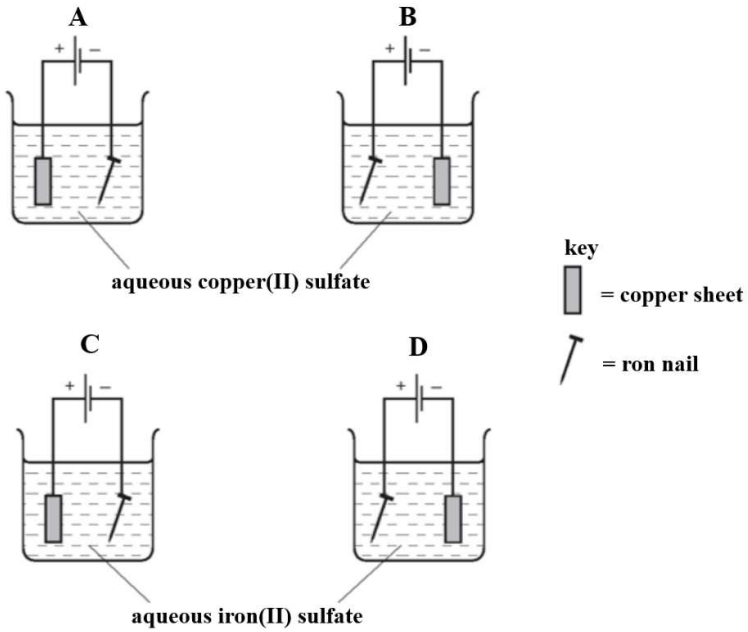
(xiii) The organic compound having a triple carbon-carbon covalent bond is:

(a) C_3H_4 (b) C_3H_6 (c) C_3H_8 (d) C_4H_{10}

(xiv) The vapour density of acetic acid is: (At. Wt. C=12, H=1, O=16)

(a) 60 (b) 30 (c) 120 (d) 90

(xv) Which of the following apparatus could be used to electroplate an iron nail with copper?



(a) A (b) B (c) C (d) D

Question 2

(i) Name the following: **[5]**

(a) product formed at the anode during electrolysis of acidified water using platinum electrodes

(b) the electrolyte used for electroplating an article with silver

(c) electrode used for purification of copper by electrorefining

(d) the gas liberated at anode during electrolysis of lead bromide using graphite electrode

(e) the gas liberated at anode during electrolysis of copper sulphate using platinum electrodes

(ii) From the formulae listed below, choose one in each case, corresponding to the salt having the given descriptions: **[5]**

$AgCl$, $CuCO_3$, $CuSO_4.5H_2O$, KNO_3, $NaCl$, $NaHSO_4$, $Pb(NO_3)_2$, $ZnCO_3$, $ZnSO_4.7H_2O$

(a) an acid salt

(b) an insoluble chloride

(c) on treating with concentrated sulphuric acid, this salt changes from blue to white

(d) on heating this salt changes from green to black

(e) this salt gives nitrogen dioxide on heating

(iii) Complete the following by choosing the correct answers from the bracket: **[5]**

(a) Metals are good _____. (oxidizing agents/reducing agents)

(b) Non-polar covalent compounds are _____ [good/bad] conductors of heat and electricity.

(c) Higher the pH value of a solution, the more _____ [acidic/alkaline] it is.

(d) _____ [Silver chloride/Lead chloride] is a white precipitate that is soluble in excess of Ammonium hydroxide solution.

(e) Conversion of ethyl alcohol to ethene is an example of _____.[dehydration/hydrogenation]

(iv) Match column A with column B [05]

Column A	Column B
(a) Acid Salt	1. Black in colour
(b) Copper oxide	2. Reddish brown
(c) Zinc hydroxide	3. Hydrogen chloride
(d) Copper metal	4. Sodium bicarbonate
(e) Polar compound	5. Soluble in excess sodium hydroxide

(v) (a) Draw structural formulae for each of the following: [05]

1. But-2-ene
2. Propanoic acid
3. 2-Methyl propanol

(b) Write the IUPAC name for the following compounds:

1. Acetylene, 2. Acetic acid

SECTION-B (40 Marks)

(Attempt any four questions)

Question 3

(i) (a) Calculate the percentage of nitrogen in ammonium nitrate (NH_4NO_3). **[2]**

[H=1, N=14, O=16]

(b) Under what conditions do nitrogen and hydrogen combine to form ammonia.

(ii) Give reasons: **[2]**

(a) Ammonia gas is not collected over water

(b) Quick lime is not used to dry hydrogen chloride gas.

(iii) The following table represents the elements and the atomic number. With reference to this, answer the following using only the alphabets given in the table: **[3]**

Element	Atomic Number
P	13
Q	7
R	10

(a) Which element combines with hydrogen to form a basic gas?

(b) Which element has an electron affinity zero?

(c) Name the element, which forms an ionic compound with chlorine.

(iv) Write balanced chemical equations for each of the following: **[3]**

(a) When excess of ammonia is treated with chlorine.

(b) action of concentrated nitric acid on sulphur

(c) oxidising action of concentrated sulphuric acid on carbon

Question 4

(i) Name the main ore for the extraction of following metals: **[2]**

(a) Aluminium

(b) Zinc

(ii) Write balanced chemical equations for the following: **[2]**

(a) preparation of hydrochloric acid using concentrated sulphuric acid and rock salt

(b) action of alcoholic KOH on bromoethane

(iii) Study the following observations and name the anions present in each of the reactions: **[3]**

(a) When a crystalline solid 'P' is warmed with concentrated H_2SO_4 and copper turnings a reddish brown gas is released.

(b) When few drops of dilute sulphuric acid is added to salt 'R' and heated, a colourless gas is released which turns moist lead acetate paper silvery black.

(c) When few drops of barium nitrate solution is added to the salt solution 'Q' a white precipitate is formed which is insoluble in HCl.

(iv) Give reasons: **[3]**

(a) Ethene undergoes addition reaction.

(b) Soda lime is preferred to sodium hydroxide in the laboratory preparation of methane.

(c) Hydrocarbons can be used as fuels.

Question 5

(i) Give a chemical test to distinguish between sodium chloride solution and sodium nitrate solution. **[2]**

(ii) The vapour density of a gas is 8. What would be the volume occupied by 24 g of the gas at STP? **[2]**

(iii) Mention the property of conc. H_2SO_4 exhibited in each of the following reactions with: **[3]**

(a) sugar

(b) metallic chloride

(c) non-metal such as carbon

(iv) Give balanced equation for the following: **[3]**

(a) complete combustion of ethane

(b) laboratory preparation of ethyne from calcium carbide

(c) ammonium nitrate is heated

Question 6

(i) State your observations when ammonium hydroxide solution is added drop by drop and then in excess to each of the following solutions: **[2]**

(a) copper sulphate solution

(b) zinc sulphate solution

(ii) Name the following: **[2]**

(a) a salt formed by incomplete neutralisation of an acid by a base

(b) an insoluble metal sulphate

(iii) Calcium nitrate decomposes as: **[3]**

$2Ca(NO_3)_2 \longrightarrow 2CaO + 4NO_2 + O_2$ [At. Wt: Ca=40, N=14, O=16]

If 82 g of calcium nitrate decomposes, calculate:

(a) the number of moles of calcium nitrate that undergoes decomposition

(b) the mass of calcium oxide formed

(c) the volume of nitrogen dioxide gas evolved at STP.

(iv) Name the following: **[3]**

(a) the process of coating of iron with zinc

(b) an alloy of lead and tin that is used in electrical circuit

(c) a metal oxide that can be reduced by hydrolysis

Question 7

(i) Give reasons for the following: **[2]**

(a) Inert gases do not form ions.

(b) Covalent compounds have a low melting and boiling point.

(ii) For each of the substance listed below, describe the role played in the extraction of aluminium: **[2]**

(a) Cryolite (b) Graphite

(iii) Give balanced equations for each of the following: **[3]**

(a) sodium carbonate reacts with dil. HNO_3

(b) laboratory preparation of nitric acid

(c) a mixture of ethene and hydrogen is passed over heated nickel

(iv) The pH values of three solutions A, B and C are 12, 2 and 7 respectively. **[3]**

(a) Which solution will have no effect on litmus solution?

(b) Which solution will liberate CO_2 when reacted with sodium carbonate?

(c) Which solution will turn colourless phenolphthalein pink?

Question 8

(i) (a) Name a yellow monoxide that dissolves in hot and conc. alkali. Write the chemical equation involved.

(b) Name a white metal oxide that dissolves when fused with caustic soda. **[2]**

(ii) Draw the electron dot structure of sodium chloride. [atomic no. Na=11, Cl=17] **[2]**

(iii) The following questions are related to Iron: **[3]**

(a) Name the acid with which iron is rendered passive

(b) Name an alloy of iron and carbon

(c) Name the process by which iron ore is concentrated

(iv) In period 3 of the periodic table, element B is placed to the left of element A. **[3]**

On the basis of this information, choose the correct word from the brackets to complete the following statement:

(a) The element B would have (lower / higher) metallic character than A.

(b) The element A would probably have (lesser / higher) electron affinity than B.

(c) The element A would have (greater / smaller) atomic size than B.

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ICSE BOARD SAMPLE PAPER - 1

SUBJECT: BIOLOGY

Time: 2 Hrs. **Max. Marks: 80**

GENERAL INSTRUCTIONS:

- *Answers to this Paper must be written on the paper provided separately.*
- *You will not be allowed to write during first 15 minutes.*
- *This time is to be spent in reading the question paper.*
- *The time given at the head of this Paper is the time allowed for writing the answers.*
- *Section A is compulsory. Attempt any four questions from Section B.*
- *The intended marks for questions or parts of questions are given in brackets [ ].*

SECTION-A (40 Marks)
(Attempt All Questions from this section)

Question 1

Choose the correct answers to the questions from the given options. [15]

(Do not copy the question, write the correct answers only.)

(i) A student study about heart sound when the LUBB sound is produced.

(a) First sound , closing of semilunar valve

(b) First sound, opening of atrio-ventricular valve

(c) Second sound , opening of semilunar valve

(d) First sound, closing of atrio-ventricular valve

(ii) If a plant is a dwarf, which hormone would be used to overcome this condition?

(a) Gibberellin (b) Cytokinin (c) Ethylene (d) Abscisic Acid

(iii) Assertion:- Starch is the form in which the products of photosynthesis are stored in plants.

Reason:- Starch is insoluble and therefore suitable for storage inside cells.

(a) Both A and R are true, and R is the correct explanation of A.

(b) Both A and R are true, but R is not the correct explanation of A.

(c) A is true, but R is false.

(d) A is false, but R is true.

(iv) A laboratory test shows high levels of glucose in a person's urine and blood. This condition is known as diabetes mellitus. It is primarily caused by an imbalance in the hormones produced by which gland?

(a) Thyroid (b) Pancreas (c) Adrenal (d) Pituitary

(v) The blood vessel without a muscular layer in its wall:

(a) Artery (b) Vein

(c) Capillary (d) Portal vein

(vi) Assertion: The liver is an endocrine gland.

Reason: The liver secretes hormones directly into the bloodstream.

(a) Both A and R are true, and R is the correct explanation of A.

(b) Both A and R are true, but R is not the correct explanation of A.

(c) A is false, but R is false.

(d) A is false, but R is true.

(vii) During an eye examination, a doctor discovers that the patient cannot distinguish between different colors in bright light. The problem is likely in the:

(a) Rod cells. (b) Cone cells.

(c) Optic nerve. (d) Retina's "blind spot"

(viii) A student is reading a book while listening to music. Which part of the brain is most active in coordinating both tasks, allowing them to remain aware of their surroundings?

(a) Cerebellum (b) Medulla oblongata

(c) Cerebrum (d) Pons

(ix) A rapid increase in the number of live births in a short period of time is called:

(a) Population explosion (b) Population growth rate

(c) Population decline (d) Population decrease

(x) Which one of the following correctly differentiates between identical twins and fraternal twins?

(a) Identical twins develop from two ova, fraternal twins develop from one ovum.

(b) Identical twins develop from one ovum which splits, fraternal twins from two fertilised ova.

(c) Identical twins always are of different sexes, fraternal twins always same sex.

(d) Identical twins have separate placentas, fraternal twins share one placenta.

(xi) The menstrual cycle is controlled by which system in the body?

(a) Nervous system (b) Circulatory system

(c) Digestive system (d) Endocrine system

(xii) In a human body cell, the total number of homologous chromosomes is:

(a) 23 pairs (b) 46

(c) 22 pairs (d) 44

(xiii) Cultural revolution favours a steep rise in human population. Identify the correct sequence of revolution:

(a) Tool making, Agricultural, Scientific and Industrial

(b) Agricultural, Tool making, Scientific and Industrial

(c) Scientific and Industrial, Agricultural, Tool making

(d) Tool making, Scientific and Industrial, Agricultural

(xiv) Match the phases of the menstrual cycle with their main events:

Column I (Phase)	Column II (Event)
1. Menstrual phase	(a) Formation of corpus luteum
2. Follicular phase	(b) Shedding of endometrium
3. Ovulatory phase	(c) Ovum released from ovary
4. Luteal phase	(d) Repair and thickening of endometrium

(a) 1-a, 2-d, 3-c, 4-b (b) 1-b , 2-c, 3-d, 4-a

(c) 1-b , 2-a, 3-c, 4-d (d) 1-b , 2-d, 3-c, 4-a

(xv) In the ear, when the air pressure inside the middle-ear cavity equals that outside, one function is fulfilled properly. Which structure is responsible?

(a) Semi-circular canal (b) Cochlea

(c) Eustachian tube (d)Oval window

Question 2

(i) Give a biological/technical terms for the following: [5]

(a) The phenomenon responsible for global warming.

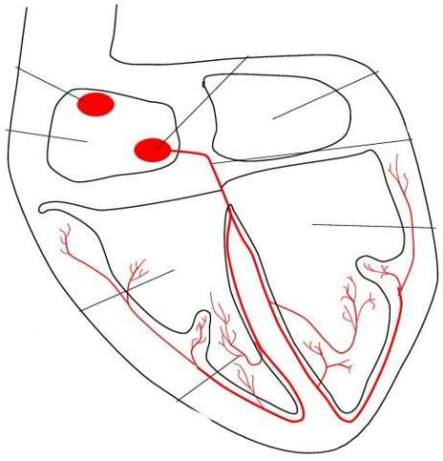
(b) The part of the sperm that contains enzymes to penetrate the ovum is _____.

(c) The type of solute transport in which ions move against their concentration gradient using energy.

(d) Membrane system that detoxifies drugs and metabolizes lipids.

(e) The system of nerves that lies outside the brain and spinal cord.

(ii) Study the given below is the diagram of a human heart and fill in the blanks: [5]



The Pacemaker(a) _____ is present near the opening of the (b)_____and the (c)_____ is found near the interauricular septum near the tricuspid valve. Bundle of HIS consists of branches of fibres running along the wall of the (d)_____ called (e)_____. All these together form a system which creates an impulse and conducts it to every part of the heart.

(iii) Choose the odd term out from each of the following set of terms. Mention the category to which the remaining three belong: [5]

(a) Carbon monoxide, Sulphur dioxide, Methane, Oxygen

(b) Cerebrum, Cerebellum, Spinal cord, Cochlea

(c) Prostate gland, Testis, Uterus, Epididymis

(d) Active transport, Diffusion, Osmosis, Transpiration

(e) Kidney, Ureter, Urinary bladder, Liver

(iv) Heena, a 12 year old girl, went to an Ear doctor to get his ear check up. She noticed a poster in the clinic with questions related to the parts of human ear. Help Heena answer the questions: [5]

(a) Which part of our ear is shaped like a snail shell?

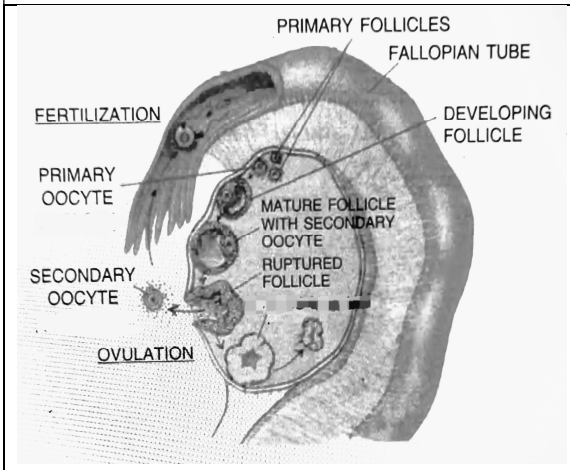
(b) What is the function of the semi-circular canals?

(c) What is the function of the Eustachian tube?

(d) What is the function of the auditory nerve?

(e) What are the three tiny bones in the middle ear?

(v) Study the diagram given below and answer the following questions related to diagram. [5]

STRUCTURE	Questions
	(a) What is the name for the structure that contains the secondary oocyte? (b) The primary oocyte is described as being what ploidy? (c) What is the hormone-producing tissue formed from the emptied follicle? (d) What is the name of the tube the released egg travels down? (e) What is the process shown in the diagram where the sperm and egg meet?

SECTION -B (40 marks)

(Attempt any four questions from this section)

Question 3

(i) Scenario: During a medical check-up, a male patient is found to have testes that did not descend into the scrotum before puberty.
Q: Will this male be able to produce sperms? Justify your answer. [2]

(ii) Give two external factors that increase the rate of transpiration. [2]

(iii) Memory and Thought: A student is sitting in an exam, thinking deeply about a question and recalling information they studied earlier. [2]

Q. (a) : Which part of the brain is the seat of intelligence, memory, and will power, enabling these actions?

Q. (b): Differentiate between the function of this part and the part responsible for controlling internal organ activities like heartbeat.

(iv) Describe the main chemical changes which occur during photosynthesis in [2]

(i) Light reaction; (ii) Dark reaction

(v) Draw a general plan of double circulation of blood in the human body. [2]

Question 4

(i) What is osmoregulation? [1]

(ii) Difference between hormone and enzyme with reference to secretion. [2]

(iii) In a certain species of animals, black fur (B) is dominant over brown fur (b). Predict the genotypic and phenotypic ratios of the offspring when both parents are 'Bb' or have heterozygous black fur. [2]

(iv) What is difference between flaccid and turgid? Give one example of flaccid condition in plants. [2]

(v) Read the Scenario in given question and answer it. [3]

(a) A plant is wilting during a hot summer day. Which hormone is responsible for the wilting and leaf fall during senescence (aging)?

(b) A gardener wants to encourage a plant to grow larger and branch out more. Which hormones should they use to promote cell division and shoot growth?

(c) A plant is exposed to light from a window on one side. How will the plant's stem grow, and which hormone is responsible for this directional growth?

Question 5

(i) List any two non-degradable medical wastes released from hospitals. [1]

(ii) What are the two aspects covered under family welfare? [2]

(iii) Arrange the following food chain in a proper sequence: [2]

(a) Heron, Insect Larva, Algae, Small Fish.

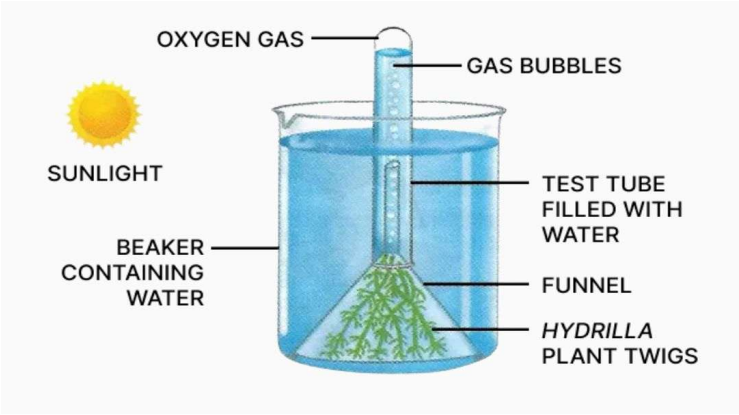
(b) Shark, Zooplankton, Large Fish, Small Fish, Phytoplankton.

(iv) Answer the following questions:- [2]

(a) Why are impulses conducted in only one direction across a synapse?

(b) How is the spinal cord adapted for its protective function?

(v) Given below is the diagram of an experimental set-up (final stage). Study the same and answer the following questions : [3]



(a) What is the main aim of the experiment?

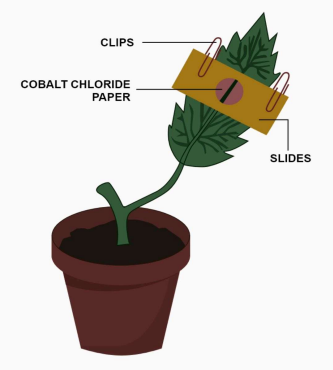
(b) Oxygen gas shown in the experiment is released from which of the raw materials ?

(c) How would you confirm the presence of oxygen gas?

Question 6

(i) State Mendel's law of segregation. [1]

(ii) Given ahead is the diagram of an experimental set up to study the process of transpiration in plants. Study the same and then answer the questions that follow. [2]



(a) After about half an hour what change, if any, would you expect to find in the cobalt chloride paper placed on the dorsal and ventral sides of the leaf? Give a reason to support your answer.

(b) Is the experimental leaf a monocot or a dicot? Give a reason to support your answer.

(iii) Expand the following abbreviations: [2]

(a) TSH (b) LH

(iv) Mention the characteristics of the image that falls on the retina of the eye. [2]

(v) A homozygous plant having round (R) and yellow (Y) seed is crossed with another homozygous plant having wrinkled (r) and green (y) seeds. Answer the following questions: [3]

(a) Give the genotype of the F_1 generation.

(b) Mention the phenotype of the F_1 offsprings.

(c) Give the possible combinations of gametes that can be obtained from F_1 hybrids.

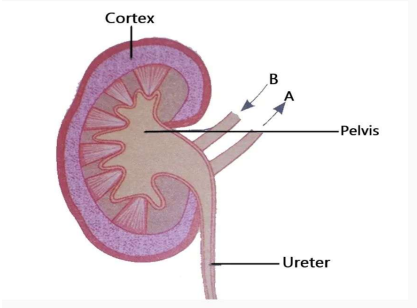
Question 7

(i) Explain the term demography and mortality. [2]

(ii) Mention where in human body are the following located and state their main functions: [2]

(a) Corpus callosum, (b) Central canal

(iii) Given below is a simplified diagram of the human kidney cut open longitudinally. Answer the questions that follow: [2]



(a) Define excretion.

(b) Write two differences in composition of the blood flowing through the blood vessels, 'A' and 'B'.

(iv) Difference between stomata and lenticels with reference to location and functions. [2]

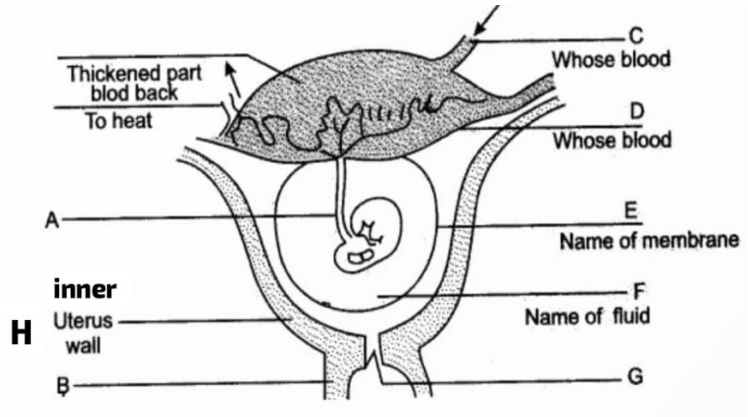
(v) Draw a cross-section of a part of a root showing by arrows the cell-to-cell conduction of water from a root hair to xylem. [2]

Question 8

(i) What does you mean by Euro/Bharat norms for vehicular standards? [1]

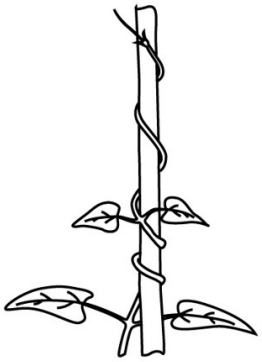
(ii) Mention two body features of neanderthal man. [2]

(iii) The diagram given below shows an embryo in the uterus of mammal. Label the parts indicated. [2]



(iv) A person complains of muffled hearing after using a sharp object to clean their ear and accidentally damaging a membrane. Name the damaged part and explain its normal function. [2]

(v) In plants, a tendril of a pea plant wraps around a support when it touches it. [3]



(a) Identify what kind of movement this is (tropism / nastic / other) and justify your answer.

(b) Which plant hormone(s) might be involved and how?

(c) Why is this movement advantageous for the plant's survival?

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ICSE BOARD SAMPLE PAPER - 1

SUBJECT: MATHEMATICS

Time: 2 Hrs. 30 MIN. **Max. Marks: 80**

GENERAL INSTRUCTIONS:

- ALL QUESTIONS ARE COMPULSORY.
- DISTRIBUTION OF MARKS ARE MENTIONED IN EACH QUESTION.
- YOU HAVE TO WRITE THE ANSWERS IN THE ANSWER SHEET PROVIDED TO YOU.
- USE OF CALCULATOR AND MOBILE DEVICES ARE NOT ALLOWED.

SECTION - A (40 MARKS)
(Attempt ALL Questions)

Q.1 Choose the correct answer to the questions from the given options:

Question-1 **[15]**

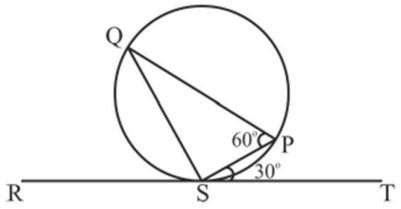
1. If $\begin{bmatrix} 2 & 0 \\ 0 & 4 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 2 \\ -8 \end{bmatrix}$, the value of x and y respectively are:

   (a) $1, -2$ (b) $-2, 1$ (c) $1, 2$ (d) $-2, -1$

2. If $x - 2$ is a factor of $x^3 - kx - 12$, then the value of k is:

   (a) 3 (b) 2 (c) –2 (d) – 3

3. In the given diagram RT is a tangent touching the circle at S. If $\angle PST = 30^\circ$ and $\angle SPQ = 60^\circ$ then $\angle PSQ$ is equal to:



   (a) 40° (b) 30° (c) 60° (d) 90°

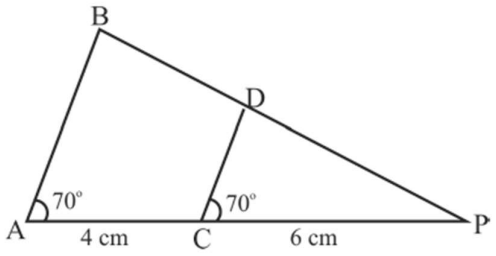
4. A letter is chosen at random from all the letters of the English alphabets. The probability that the letter chosen is a vowel, is:

   (a) $\frac{4}{26}$ (b) $\frac{5}{26}$ (c) $\frac{21}{26}$ (d) $\frac{5}{24}$

5. If 3 is a root of the quadratic equation $x^2 - px + 3 = 0$ then p is equal to:

(a) 4 (b) 3 (c) 5 (d) 2

6. In the given figure $\angle BAP = \angle DCP = 70^\circ$, PC = 6 cm and CA = 4 cm, then PD : DB is:



(a) 5 : 3 (b) 3 : 5 (c) 3 : 2 (d) 2 : 3

7. The printed price of an article is ₹3080. If the rate of GST is 10% then the GST charged is:

(a) ₹154 (b) ₹308 (c) ₹30.80 (d) ₹15.40

8. (1 + sin A) (1 – sin A) is equal to:

(a) $\text{cosec}^2 A$ (b) $\sin^2 A$ (c) $\sec^2 A$ (d) $\cos^2 A$

9. The coordinates of the vertices of ΔABC are respectively (–4, –2), (6, 2) and (4, 6). The centroid G of ΔABC is:

(a) (2, 2) (b) (2, 3) (c) (3, 3) (d) (0, –1)

10. The nth term of an Arithmetic Progression (A.P.) is 2n + 5. The 10th term is:

(a) 7 (b) 15 (c) 25 (d) 45

11. The mean proportional between 4 and 9 is:

(a) 4 (b) 6 (c) 9 (d) 36

12. Which of the following cannot be determined graphically for a grouped frequency distribution?

(a) Median (b) Mode (c) Quartiles (d) Mean

13. Volume of a cylinder of height 3 cm is 48π. Radius of the cylinder is:

(a) 48 cm (b) 16 cm (c) 4 cm (d) 24 cm

14. Naveen deposits ₹800 every month in a recurring deposit account for 6 months. If he receives ₹4884 at the time of maturity, then the interest he earns is:

(a) ₹84 (b) ₹42 (c) ₹24 (d) ₹284

15. The solution set for the in equation $2x + 4 \leq 14,\ x \in W$ is:

(a) {1, 2, 3, 4, 5} (b) {0, 1, 2, 3, 4, 5} (c) {1, 2, 3, 4} (d) {0, 1, 2, 3, 4}

Question-2

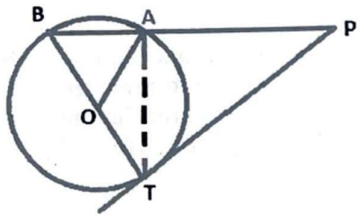
1. Amit has a recurring deposit account in a bank for 3 years at 7.5 % p.a. simple interest. If he gets. 8329 as interest at the time of maturity, find: **[4]**

(a) the monthly deposit

(b) the maturity value

2. Prove the identify: $\frac{1+(\sec A-\tan A)^2}{\cos ecA(\sec A-\tan A)}=2\tan A$ **[4]**

3. In the circle with centre O, PAB is a secant and PT is tangent to the circle point T. If BT is the diameter of the circle, $\angle AOT=80^o$, PA = 9cm and PT = 12cm, find:



(a) $\angle ABT$ (b) $\angle APT$ (c) length of AB **[4]**

Question-3

1. Using properties of proportion find x : y, given: $\frac{x^3+48x}{12x^2+64}=\frac{y^3+75y}{15y^2+125}$ **[4]**

2. The curved surface area of a right circular cone is 550 cm^2 **[4]**

(a) If the slant height is 25 cm, find the radius of the cone.

(b) If this cone is melted and recast into small spheres of diameter 2 cm, find the number of spheres formed.

3. Use graph sheet for this question. Use 1 cm = 1 unit on both the axes. **[5]**

(a) Plot A(0, 5), B (2, 5), C (5, 2), D (5, –2), E(2, –5) and F(0, -5)

(b) Reflect B, C, D and E on the y-axis and name them B', C', D' and E' respectively and write their coordinates.

(c) State the geometrical name for the figure BCDEE'D'C'B'

(d) Find the area of the figure.

(e) Name two points on the figure which are invariant on reflection in x-axis.

SECTION - B (40 Marks)

(Attempt Any FOUR Questions from this section)

Question-4

(i) Anita buys 500, ₹20 shares at a discount of 20% and receives a return of 10% on her money. **[3]**

Find

(a) the amount invested by her

(b) the rate of dividend paid by the company

(c) the annual dividend

(ii) Solve the following equation and give the answer correct to two significant figures: **[3]**

$x^2+7x=19$

3. Given $A=\begin{bmatrix}2 & 1\\ -3 & 4\end{bmatrix}$, $C=\begin{bmatrix}7\\ 6\end{bmatrix}$ and $AB = C$ **[4]**

(a) Write the order of matrix B

(b) Find the matrix B

Question-5

1. A manufacturer sells an article to a wholesaler with marked price ₹2000 at a discount of 20 % on the marked price. The wholesaler sells it to a retailer at a discount of 12 % on the marked price. The retailer sells the article to the customer at the marked price. If the GST paid by the wholesaler is ₹11.20, **[3]**

find the:

(a) Rate of GST

(b) GST paid by the retailer.

2. Solve the following in equation and represent the solution on the real line: **[3]**

$$-1\frac{2}{3} \le x + \frac{1}{3} < 2, x \in R$$

3. The first term and the common difference of an AP are 20 and 5 respectively. If the last term of the AP is 255, then find; **[4]**

(a) the number of terms of the AP

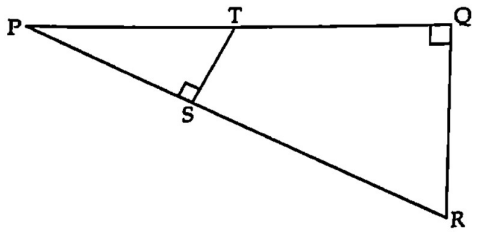
(b) sum of all its terms.

Question-6

(a) In the given figure, $\angle PQR = \angle PST = 90°$, PQ = 5 cm and PS = 2 cm. **[3]**

(i) Prove that $\Delta PQR \sim \Delta PST$. of quadrilateral

(ii) Find-Area of ΔPQR : Area of quadrilateral SRQT.



(b) The first and last term of a Geometrical Progression (G.P.) are 3 and 96 respectively. If the common ratio is 2, find : **[3]**

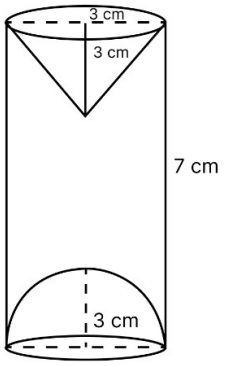
(i) 'n' the number of terms of the G.P.

(ii) Sum of the n terms.

(c) A hemispherical and a conical hole is scooped out of a solid wooden cylinder. Find the volume of the remaining solid where the measurements are as follows : **[4]**

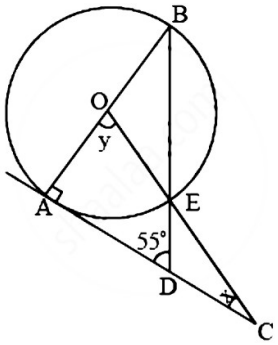
The height of the solid cylinder is 7 cm, radius of each of hemisphere, cone and cylinder is 3 cm. Height of cone is 3 cm.

Give your answer correct to the nearest whole number. $\left(\text{Take } \pi = \frac{22}{7}\right)$



Question-7

(a) In the given figure AC is a tangent to the circle with centre O. If $\angle ADB = 55°$, find x and y. Give reasons for your answer. **[3]**



(b) The model of a building is constructed with the scale factor 1 : 30. **[3]**

(i) If the height of the model is 80 cm, find the actual height of the building in meters.

(ii) If the actual volume of a tank at the top of the building is 27 m^3, find the volume of the tank on the top of the model.

(c) Given $\begin{bmatrix} 4 & 2 \\ -1 & 1 \end{bmatrix}$ M = 6 I, where M is a matrix and I is unit matrix of order 2 × 2. **[4]**

(i) State the order of matrix M.

(ii) Find the matrix M.

Question-8

(a) The sum of the first three terms of an Arithmetic Progression (A.P.) is 42 and the product of the first and third term is 52. Find the first term and the common difference. **[3]**

(b) The vertices of a Δ ABC are A (3, 8), B 1, 2 C(6, - 6). Find : **[3]**

(i) Slope of BC.

(ii) Equation of a line perpendicular to BC and passing through A.

(c) Using ruler and a compass only construct a semicircle with diameter BC = 7 cm. Locate a point A on the circumference of the semicircle such that A is equidistant from B and C. Complete the cyclic quadrilateral ABCD, such that D is equidistant front AB and BC. Measure ZADC and write it down. **[4]**

Question-9

(a) The data on the number of patients attending a hospital in a month are given below. Find the average (mean) number of patients attending the hospital in a month by using the shortcut method.

Take the assumed mean as 45. Give answer correct to 2 decimal places. **[3]**

Number of patients	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
Number of Days	5	2	7	9	2	5

(b) Using properties of proportion solve for x, given **[3]**

$$\frac{\sqrt{5x}+\sqrt{2x-6}}{\sqrt{5x}-\sqrt{2x-6}}=4$$

(c) Sachin invests ₹8500 in 10% ₹100 shares at ₹170. He sells the shares when the price of each share rises by ₹30. He invests the proceeds in 12% ₹100 shares at ₹125. Find . **[4]**

(i) the sale proceeds.

(ii) the number of ₹125 shares he buys.

(iii)the change in his annual income.

Question-10

(a) Use graph paper for this question. **[6]**

The marks obtained by 120 students in a English test are given below

Marks	Number of Students
0 – 10	5
10 – 20	9
20 – 30	16
30 – 40	22
40 – 50	26
50 – 60	18
60 – 70	11
70 – 80	6
80 – 90	4
90 – 100	3

Draw the ogvie and hence, estimate:

(i) the median marks.

(ii) the number of students who did not pass test if the pass percentage was 50.

(iii) the upper quartile marks.

(b) A man observes the angle of elevation of the top of the tower to be 45°. He walks towards it in a horizontal line through its base. On covering 20 m the angle of elevation changes to 60°. Find the height of the tower correct to 2 significant figures. **[4]**