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Mumbai, Maharashtra

ICSE BOARD SAMPLE PAPER - 2

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. When a force is applied at an angle θ to the direction of motion, the effective component of the force producing motion is:

   (A) F sin θ (B) F cos θ

   (C) F tan θ (D) F / cos θ

2. A body of mass m is lifted vertically to a height h in time t. The average power developed is:

   (A) mgh (B) $\frac{mgh}{t}$

   (C) $\frac{1}{2}mgh^2$ (D) mgh t

3. A spring of spring constant k is compressed by x. The potential energy stored in the spring is:

   (A) kx^2 (B) $\frac{1}{2}kx^2$

   (C) kx (D) $2kx^2$

4. Class II levers are designed to have :

   (A) M.A. = VR (B) M.A. > VR

   (C) M.A. > 1 (D) M.A. < 1

5. When a white light ray falls on a prism, the ray at its first surface suffers :

(A) no refraction (B) only dispersion

(C) only deviation (D) both deviation and dispersion

6. In a concave mirror, a real inverted image of the same size as the object is formed when the object is placed:

(A) At the focus (B) Between pole and focus

(C) At the center of curvature (D) Beyond the center of curvature

7. If the magnification produced by a lens is –0.5, the correct statement is -

(A) the lens is concave

(B) the image is virtual

(C) the image is magnified

(D) the image is real and diminished formed by a convex lens

8. If the frequency of a tuning fork is doubled, and its amplitude remains constant, then:

(A) Loudness doubles (B) Pitch remains unchanged

(C) Pitch doubles (D) Speed of sound doubles

9. Two resistors of 4 Ω and 6 Ω are connected in parallel. The equivalent resistance is:

(A) 10 Ω (B) 2.4 Ω (C) 4 Ω (D) 5 Ω

10. Which of the following is connected in parallel with the appliance in a household circuit?

(A) Main fuse (B) Switch (C) Earth wire (D) Electric meter

11. In an ideal step-up transformer, if the primary coil has 200 turns and the secondary has 1000 turns, and primary voltage is 220 V, then the secondary voltage is:

(A) 220 V (B) 440 V (C) 1100 V (D) 2200 V

12. When 100 g of copper at 100 °C is mixed with 100 g of water at 20 °C, the final temperature is nearer to 20 °C because:

(A) Water has higher specific heat capacity than copper

(B) Copper has higher specific heat capacity than water

(C) Both have same heat capacity

(D) Heat lost by water is more

13. If the specific heat capacity of a substance is high, it means:

(A) It heats up quickly

(B) It cools down quickly

(C) It requires a large amount of heat to change its temperature

(D) It requires less heat to change its temperature

14. Which of the following particles has the greatest ionizing power?

(A) Alpha particles (B) Beta particles (C) Gamma rays (D) Neutrons

15. A certain nucleus emits a beta particle. The atomic number of the daughter nucleus will:

(A) Increase by 1 (B) Decrease by 1

(C) Remain the same (D) Increase by 2

Question 2

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

1. The mechanical advantage of an ideal machine is equal to its ___ (velocity ratio / efficiency / load).
2. The loudness of a sound depends on the ___ of vibration of the source. (amplitude / frequency / wavelength)
3. Heat always flows from a body at a ___ temperature to a body at a ___ temperature. (higher, lower / lower, higher / equal, equal)
4. The pitch of a sound depends on its ___ (frequency / amplitude / intensity).
5. In an electric circuit, the reciprocal of resistance is called ___ (conductance / inductance / impedance).
6. The penetrating power of radiation is maximum for ___ rays. (alpha / beta / gamma)

(ii) Match the movement of the body part in Column A to the class of lever in Column B. **[2]**

	Column A – Movement of Body Part		**Column B – Class of Lever**
a	Movement of the neck	i	Second class lever
b	Movement of the forearm	ii	Third class lever
c	Movement of the foot while standing on toes	iii	First class lever

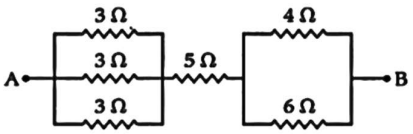
(iii) Define echo and mention the minimum distance between the source and the reflecting surface for an echo to be heard clearly. **[2]**

Question 3

(a) (i) Define the power of a lens. **[2]**

(ii) A lens has focal length 25 cm. Calculate the power of lens.

(b) Find the resistance between points A and B. **[2]**



(c) Two bodies, A and B of equal mass are kept at heights 20 m and 30 m respectively. Calculate the ratio of their potential energies. **[2]**

(d) A piece of iron of mass 100 g kept inside a furnace for a long time and then put in a calorimeter of water equivalent 10 g containing 240 g of water at 20°C. The mixture attains an equilibrium temperature of 60°C. Find the temperature of the furnace-specific heat of iron = 470 J/kg-K. **[2]**

(e) Draw a labelled diagram to make an electromagnet from a soft iron AB. Mark the polarity at its ends A and B. State one precaution which you will observe. **[2]**

(f) Show by equations, the effect on the proton number Z and mass number A of the parent nucleus brought about by the two types of radioactive decay. **[2]**

(g) A submarine produces a ultrasonic waves of velocity 1500 m/s in water. The officer receives signal after 50s of emission of ultrasonic waves. Find the distance of object which is present in the bottom of sea. **[3]**

SECTION - B (40 Marks)

(Attempt ANY FOUR questions from this Section)

Question-4

1. (a) What do you understand by free vibration of a body? **[3]**

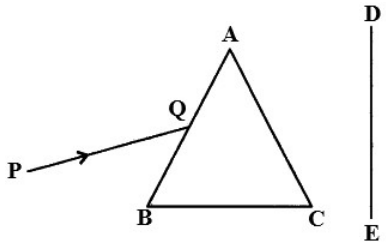
   (b) Why does the amplitude of a vibrating body continuously decreases during damped vibration.

2. A scientist lowers a metallic ruler vertically into a transparent oil tank. The ruler touches an object placed at the bottom of the tank and gets wet up to the 25 cm mark. If the refractive index of the glycerine is 1.25:

   (a) up to which mark will the ruler get wet, if the scientist lowers it up to the image of the object? **[3]**

   (b) how will this length in (a) change if another liquid of $\mu > 1.25$ is used?

3. A narrow beam of wite light is passing through a glass prism ABC as shown in the diagram. **[4]**



   Trace it on your answer sheet and show the path of the emergent beam as observed on the screen DE.

   (a) Write the name and cause of the phenomenon observed.

   (b) Where else in nature is this phenomenon observed?

   (c) Based on this observation state the conclusion which can be drawn about the constituents of white light.

Question-5

1. Draw a ray diagram to illustrate the action of a convergent lens as a reading lens or a magnifying glass. **[3]**

2. (a) Define calorimetry. **[3]**

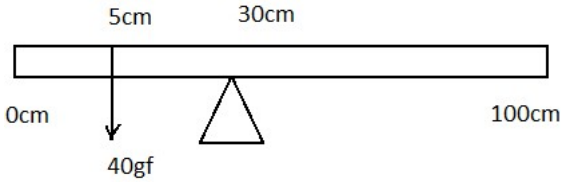
   (b) Name the material used for making a Calorimeter.

   (c) Why is a Calorimeter made up of thin sheets of the above material answered in (b).

3. 2 kg of ice melts when water at 100°C is poured in a hole drilled in a block of ice. What mass of water was used? Given : specific heat capacity of water = 4200 J kg^{-1} K^{-1}, specific latent heat of ice = 336 × 10^3 J kg^{-1}. **[4]**

Question-6

1. A uniform meter scale is in equilibrium as shown in the diagram: **[3]**



   (a) Calculate the weight of the meter scale.

   (b) Which of the following option is correct to keep the ruler in equilibrium when 40 gf wt is shifted to 0 cm mark? F is shifted towards 0 cm. or F is shifted to wards 100 cm.

2. If a man raises a box of 50 kg mass to a height of in 2 min, while the other man raises the same box to a same height in 5 min. Compare **[3]**

(a) the work done.

(b) the power developed by them.

3. A truck driver loads some oil drums into a truck by lifting them directly. Each drum has a mass of 80 kg and the platform of the truck is at a height of 0.8 m above the ground. **[4]**

(a) What force is needed to lift a drum into the

(b) How much energy is used up in lifting a drum?

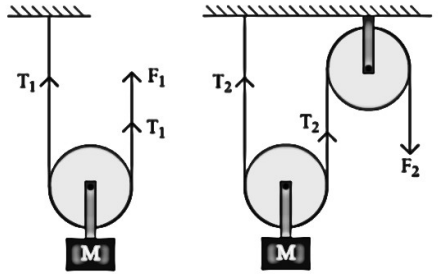
(c) After the truck is loaded, the driver drives off. List the major energy changes that take place in moving the truck.

(d) The driver stops the truck at the factory gate. What happens to the kinetic energy of the truck?

Take $g = 10\ m\ s^{-2}$.

Question-7

1. A load M = 200 kg is supported in two different ways shown in the given figure. F_1 and F_2 are the forces needed in two cases. Calculate $\frac{F_1}{F_2}$. **[3]**



2. The stem of a vibrating tuning fork is pressed against a table top. **[3]**

(a) Will it produce an audible sound?

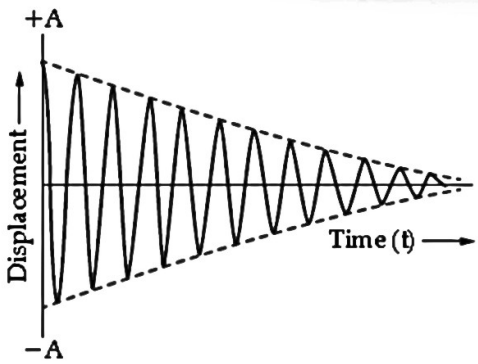
(b) Does it cause the table top to set in vibrations? If yes, what type of vibrations are they?

(c) Under what condition does it lead to resonance?

3. The following diagram shows the displacement time graph for a vibrating body. **[4]**

i. Name the type of vibration produced by the vibrating body.

ii. Give one example of a body producing such vibrations.



iii. Why is the amplitude of the wave gradually decreasing?

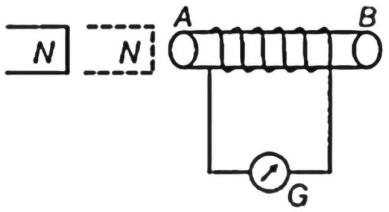
iv. What will happen to the vibrations of the body after sometime?

Question-8

1. A circuit is made from a combination of 4 cells, a resistor of 1.8 an unknown resistor X and an ammeter, all connected in series. Draw a diagram of this circuit. If the cells are of emf 1.5 V each and internal resistance 0.05 each, find the total resistance of the circuit. If the ammeter reads 1 A, find the value of X and the p.d. across it. **[3]**
2. i. Write one advantage of connecting electrical appliances in parallel combination. **[3]**

   ii. What characteristics should a fuse wire have?

   iii. Which wire in a power circuit is connected to the metallic body of the appliance?
3. The diagram shows a coil connected to a centre zero galvanometer G. The galvanometer shows a deflection to the right, when the N-pole of a powerful magnet is moved to the right as shown in below figure. **[4]**



   i. Explain, why the deflection occurs in the galvanometer?

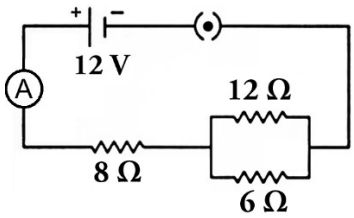
   ii. Does the direction of the current on the coil appear clockwise or anti-clockwise, when viewed from the end A?

   iii. State the observation in G, when the coil is moved away from N.

   iv. State the observation in G, when both the coil and the magnet are moved to the right at the same speed.

Question-9

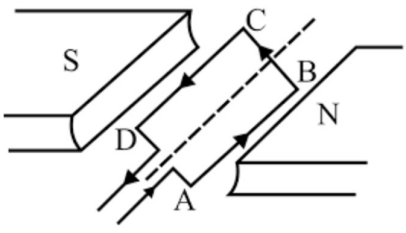
1. Three resistors 8 Ω, 12 Ω and 6 Ω are connected to a 12 V battery as shown in figure below. **[3]**



   (a) the current through the 8 Ω resistor

   (b) the potential difference across the parallel combination of 6 Ω and 12 Ω resistor, and

   (c) the current through the 6 Ω resistor.
2. A coil ABCD mounted on an axle is placed between the poles N and S of a permanent magnet as shown in Figure. **[3]**



(a) In which direction will the coil begin to rotate when current is passed through the coil in direction ABCD by connecting a battery between the ends A and D of the coil?

(b) Why is a commutator necessary for the continuous rotation of coil?

(c) State the principle on which the working of an electric generator is based.

3. A nucleus of stable phosphorus has 15 protons and 16 neutrons. **[4]**

(a) What is its atomic number and mass number?

(b) The nucleus of radio phosphorus has one neutron more than the stable nucleus. What will be its atomic number and mass number?

(c) What will be the atomic number and mass number of new nucleus formed by the decay of a ß—particle by the radio phosphorus in part (b)?

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ICSE BOARD SAMPLE PAPER - 2

SUBJECT: CHEMISTRY

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 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) Which of the following will contain only ions as its constituent particles?

(a) Acetic acid

(b) Oxalic acid

(c) Ammonium hydroxide

(d) Sodium hydroxide

(ii) The salt which in solution gives a pale green precipitate with sodium hydroxide solution and a white precipitate with barium chloride solution is :

(a) Iron (III) sulphate

(b) Iron (II) sulphate

(c) Iron (II) chloride

(d) Iron (III) chloride

(iii) Assertion (A): Aqueous solution of potassium chloride can conduct electricity.

Reason (R): Conduction of electric current is due to the presence of free ions.

(a) (A) is true and (R) is false.

(b) (A) is false and (R) is true.

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

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

(iv) Element Y is in Group IIA of the Periodic Table. Y reacts with element Q to form an ionic compound. Which equation shows the process that takes place when Y forms ions?

(a) $Y + 2e^- \longrightarrow Y^{2+}$ (b) $Y - 2e^- \longrightarrow Y^{2-}$

(c) $Y + 2e^- \longrightarrow Y^{2-}$ (d) $Y - 2e^- \longrightarrow Y^{2+}$

(v) Carbon dioxide and sulphur dioxide can be distinguished by using:

(a) Moist blue litmus paper (b) Lime water

(c) Aqueous sodium carbonate solution (d) Acidified potassium dichromate

(vi) The metallic nitrate which does not give a reddish brown gas on heating is:

(a) Copper (II) nitrate (b) Zinc nitrate

(c) Potassium nitrate (d) Lead (II) nitrate

(vii) 0.2 g atom of silicon combined with 21.3 g of chlorine. Find the empirical formula of the compound formed. [Si = 28 ; Cl = 35.5]

(a) $SiCl_4$ (b) $SiCl_3$ (c) SiCl (d) Si_2Cl_6

(viii) Hydroxide of this metal is soluble in excess sodium hydroxide solution:

(a) Magnesium (b) Lead (c) Silver (d) Copper

(ix) Which of the following is the correct IUPAC name of acetylene?

(a) Propane (b) Propyne (c) Ethene (d) Ethyne

(x) Which of the following is a weak alkali?

(a) Sodium hydroxide (b) Ammonium hydroxide

(c) Calcium hydroxide (d) Barium hydroxide

(xi) When aluminium hydroxide is strongly heated it forms:

(a) AlO (b) AlO_2 (c) Al_2O_3 (d) AlO_4

(xii) The equation below shows the reaction between element 'X' and dilute sulphuric acid.

$$X(s) + H_2SO_4\ (aq.) \longrightarrow XSO_4\ (aq.) + H_2\ (g)$$

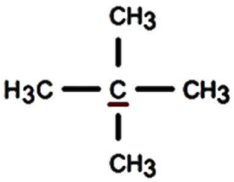
Which particles are responsible for conducting electricity in dilute sulphuric acid and compound XSO_4?

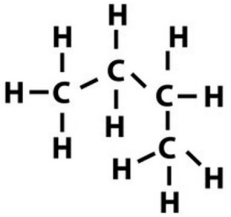
(a) Electrons (b) Only positive ions

(c) Only negative ions (d) Both positive and negative ions

(xiii) Which of the following structures represent the formula C_4H_{10}?

(a) $CH_3 - CH_2 - CH_2 - CH_2 - CH_3$ (b) 

(c) 

(d) 

(xiv) If the empirical formula of a compound is CH_2O, then its molecular formula will be:

(a) $C_2H_4O_6$ (b) C_2H_4O (c) C_3H_6O (d) $C_6H_{12}O_6$

(xv) If electrolysis of Copper (II) sulphate is done using copper electrodes, the product formed at the anode is:

(a) Copper ions (b) Copper atoms (c) Oxygen (d) Hydrogen

Question 2

(i) Fill in the given boxes according to the experiment conducted when electricity is passed through molten lead (II) bromide and aqueous copper (II) sulphate solution. **[5]**

Electrolyte	Temperature	Cathode reaction	Anode reaction
Copper (II) sulphate [copper electrodes]	Room temperature	$Cu^{2+} + 2e^- \rightarrow Cu$	(a)
Copper (II) sulphate [platinum electrodes]	Room temperature	$Cu^{2+} + 2e^- \rightarrow Cu$	(b)
Lead (II) bromide [Molten]	(c)	(d)	(e)

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

1. A solution of copper (II) sulphate in sodium hydroxide solution forms a _____ (*pale blue / green*) precipitate.
2. The electron affinity of element X is greater than that of element Y. The oxidising power of X is likely to be _____ (*more / less*) than that of element Y.
3. Alkanes undergo _____ (*addition/ substitution*) reactions.
4. If an element has one electron in the outermost shell then it is likely to have the _____ (*smallest/ largest*) atomic size amongst all the elements in the same period.
5. An _____ (*alkaline/acidified*) $KMnO_4$ solution changes colour from purple to colorless when it reacts with SO_2.

(iii) Identify the following: **[5]**

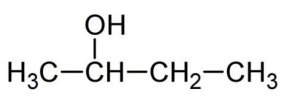
1. A bond formed between two atoms by sharing a pair of electrons, with both electrons being provided by the same atom.
2. A reaction in which the hydrogen of an alkane is replaced by a halogen.
3. The energy required to remove an electron from a neutral gaseous atom.
4. Reaction by which alkane can be obtained on heating sodium salt of alkanoate in the presence of soda lime.
5. Substance added to the electrolytic mixture to reduce the fusion temperature while obtaining aluminium during Hall Heroult's process.

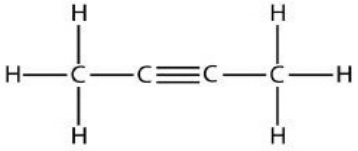
(iv) Match Column A with Column B: **[5]**

	Column-A		Column-B
1	Substance used to increase the ion concentration during aluminium extraction	A	Contact process
2	The element have zero electron affinity in period 1	B	Carbonate ore
3	Carbon tetrachloride	C	Fluorspar
4	Calcination	D	Covalent compound
5	Sulphuric acid	E	Helium

(v)

(a) Give the IUPAC name of the following organic compounds: **[5]**

(i) 

(ii) 

(b) Draw the structural diagram for the following compounds:

(i) 2- Methylpentane

(ii) 1, 2 -Dichloroethane

(iii) Pent-2-yne

SECTION-B (40 Marks)

(Attempt any four questions)

Question 3

1. Give reason for the following: **[4]**

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

(b) Vanadium pentoxide is a preferred catalyst for the contact process.

(c) Cryolite is added to the electrolytic mixture during Hall heroult's process

(d) Electron affinity of noble gases is zero

2. Differentiate between the two substances by using a chemical test [mention suitable chemical equations]:

(a) Lead (II) nitrate and Copper (II) nitrate **[4]**

(b) Zinc sulphate and Ferrous sulphate

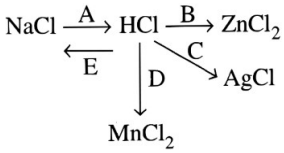
3. State your observation when – **[2]**

(a) Sugar crystals are added to a hard glass test tube containing conc. sulphuric acid.

(b) Conc. H_2SO_4 is added to a crystal of hydrated copper sulphate.

Question 4

1. Study the flow chart and give balanced equations with conditions for the conversions A, B, C D and E. **[5]**



2. Give chemical equation for: **[2]**

(i) The laboratory preparation of methane from sodium acetate.

(ii) The preparation of ethyne from 1,2-dibromoethane.

3. Solve the following : **[3]**

Ethane burns in oxygen according to the chemical equation:

$$2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O$$

If 80 ml of ethane is burnt in 300 ml of oxygen, find the composition of the resultant gaseous mixture when measured at room temperature.

Question 5

1. State a relevant reason for the following : **[2]**

(a) Acidified $KMnO_4$ is Decolorised by SO_2

(b) Ammonia gas is not collected over water

2. Identify the cation in each of the following cases: **[2]**

(a) Ammonium hydroxide solution when added to solution B gives a white precipitate which does not dissolve in excess of ammonium hydroxide solution.

(b) Sodium hydroxide solution when added to Solution C gives a white precipitate which is insoluble in excess of sodium hydroxide solution.

3. Arrange the following as per the instruction given in the brackets: **[3]**
   (a) Al, K, Mg , Ca (decreasing order of its reactivity)
   (b) N, Be, O, C (increasing order of non metallic character)
   (c) P, Si , F, Be (decreasing order of valence electrons)
4. Write balanced chemical equations for the following reactions: **[3]**
   (a) Ammonium chloride reacts with calcium hydroxide.
   (b) Nitric acid reacts with zinc carbonate.
   (c) Write the balanced chemical equation for the laboratory preparation of hydrochloric acid using sodium chloride and concentrated sulphuric acid.

Question 6

1. Complete and balance the following equations: **[3]**
   (i) $NH_4Cl + Ca(OH)_2 \rightarrow$
   (ii) $CuSO_4 + NH_4OH \rightarrow$
   (iii) $Cu + \text{Conc. } HNO_3 \rightarrow$
2. Write balanced chemical equations for the following: **[2]**
   (i) Laboratory preparation of hydrochloric acid from a less volatile acid.
   (ii) Bromine gas is passed over ethene in the presence of carbon tetrachloride.
3. Calculate the percentage of water of crystallization in $CuSO_4.5H_2O$. [Cu-63.5; S-32; O-16; H-1] **[2]**
4. Write balanced chemical equations for the following: **[3]**
   (i) Methane reacts with chlorine in the presence of diffused sunlight
   (ii) Ethene is prepared from ethanol
   (iii) Preparation of ethyne from calcium carbide

Question 7

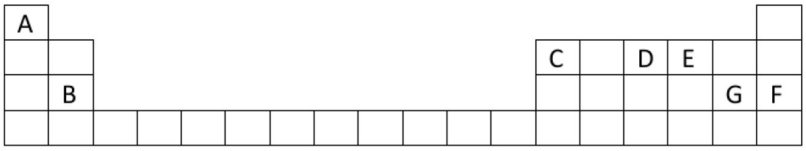
1. A gaseous hydrocarbon contains 82.76% of carbon. Given that its vapor density is 29, find its molecular formula. [C = 12, H= 1] **[2]**
2. Convert the following: **[4]**
   (a) Ethylene dibromide from ethene
   (b) Ethyl ethanoate from ethanoic acid
   (c) Manganese chloride from Manganese dioxide
   (d) Calcium carbide to ethyne
3. Some properties of sulphuric acid are listed below. Write a suitable balanced equation to depict each property. **[4]**
   (a) Acid
   (b) Dehydrating agent
   (c) Non-volatile acid
   (d) Oxidizing agent

Question 8

1. Complete the following equations: **[3]**
   (i) $S + \text{conc. } HNO_3 \rightarrow$
   (ii) $C + \text{conc. } H_2SO_4 \rightarrow$
   (iii) $Cu + \text{dil. } HNO_3 \rightarrow$

2. Study the extract of the Periodic Table given below and answer the questions that follow. Give the alphabet corresponding to the element in question. **[4]**

DO NOT repeat an element.



(i) Which element forms electrovalent compound with G?

(ii) The ion of which element will migrate towards the cathode during electrolysis?

(iii) Which non-metallic element has the valency of 2?

(iv) Which is an inert gas?

3. Convert the following reactions into a balanced chemical equation: **[3]**

(a) Ammonia to nitric oxide using oxygen and platinum catalyst.

(b) Sodium hydroxide to sodium sulphate using sulphuric acid.

(c) Ferrous sulphide to hydrogen sulphide using hydrochloric acid.

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ICSE BOARD SAMPLE PAPER - 2

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) The artery with the highest amount of nitrogenous wastes is:

(a) Hepatic artery

(b) Renal artery

(c) Pulmonary artery

(d) Coronary artery

(ii) A higher concentration of ethylene is found in :

(a) Green banana

(b) Ripe banana

(c) Fresh potato tuber

(d) Green apple

(iii) Assertion – A plant is kept in a dark cupboard for about 48 hours before conducting any experiment on photosynthesis.

Reason – This removes chlorophyll from the leaf of the plant.

(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) Athira is suffering from over secretion of a hormone which causes obesity, hyperglycemia, osteoporosis, weakness, salt and water retention. Identify the gland and the hormone secreted.

(a) Pancreas, insulin (b) Adrenal, cortisone

(c) Adrenal, adrenaline (d) Pituitary, TSH

(v) While recording the pulse rate, where exactly does a doctor press on our wrist?

(a) Nerve (b) Vein (c) Artery (d) Capillary

(vi) Assertion (A) : Antidiuretic hormone (ADH), produced by the hypothalamus and released by the pituitary gland, regulates water balance in the body.

Reason (R) : ADH promotes the excretion of water by the kidneys.

(a) A is false and R is true (b) Both A and R are true

(c) A is true and R is false (d) Both A and R are false

(vii) Aqueous humour is present between the :

(a) Lens and Retina (b) Iris and Lens (c) Cornea and Iris (d) Cornea and Lens

(viii) Which of the following is an example of conditioned reflex?

(a) Sneezing (b) Blushing

(c) Constriction of pupil (d) Knitting without looking

(ix) _____ refers to number of individuals added per thousand individuals of a population per year.

(a) Growth Rate (b) Growth curve

(c) Population density (d) Exponential Phase

(x) When pregnancy does not occur, the life of corpus luteum is about:

(a) 4 days (b) 0 day (c) 14 days (d) 28 days

(xi) The sex cells is also known by the term of:

(a) Gametes (b) Urethra (c) Scrotum (d) Eggs

(xii) A homozygous pea plant having purple flowers is crossed with a homozygous pea plant bearing white flowers. The phenotypic ratio of the offspring obtained in F2 generation is:

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

(xiii) Identify the correct sequence of human evolution :

(a) Australopithecus, Neanderthal, Cro – Magnon Man, Home Habilis

(b) Homo Habilis, Homo Erectus, Neanderthal, Cro – Magnon Man

(c) Homo sapiens, Neanderthal Man, Homo Habilis, Homo Erectus

(d) Australopithecus, Homo Erectus, Cro-Magnon Man, Neanderthal

(xiv) Match the following structures with their function:

Column I (Structure)	**Column II (Function)**
1.Corpus Luteum	(a) Ovulation
2.Leydig cells	(b) Releases progesterone
3.Placenta	(c) Releases testosterone
4.Graafian follicle	(d) Helps provide nutrition to foetus

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

(c) 1 – b, 2 – c, 3 – d. 4 – a (d) 1 – c, 2 – b, 3 – d, 4 – a

(xv) Rani is performing a classical dance for her school annual day function. Which structures help her to maintain her body balance?

(a) Sclera, Cerebellum, Vestibule

(b) Cerebellum, Semicircular canals, Vestibule

(c) Malleus, Vestibule, Stapes

(d) Semicircular canals, Cochlea, Vestibule

Question 2

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

(a) The part of the eye responsible for its shape.

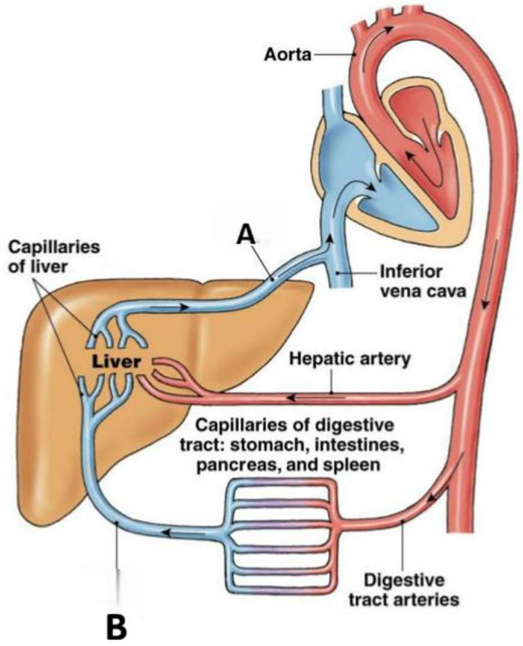
(b) Main pollutant responsible for ozone layer depletion.

(c) The canal through which the testes descend into the scrotum just before birth.

(d) The part of chloroplast where light reaction occurs.

(e) The growth movements occurring in response to unidirectional external stimuli in a plant part.

(ii) Study the below diagram and fill in the blanks: [5]



A ____(a)_____ is that which begins and ends in capillaries. It carries blood from one organ to another, other than heart. The labelling B shown above is _____(b)_____ which carries the blood laden with _____(c)_____ absorbed from the gastrointestinal tract to the liver. The liver monitors these substances before they pass into general circulation. For example, excess amino acids are broken down in liver by process called _____(d)_____. Finally the capillaries of liver reunite to form _____(e)_____ which joins the inferior vena cava.

(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) Detergents, Sewage, X- rays, Oil spills

(b) Spinal cord, Cerebrum, Pons, Cerebellum

(c) Vulva, Ureter, Uterus, Vagina

(d) Root pressure, Transpirational pull, Capillarity, Plasmolysis

(e) Auxin, Oxytocin, Gibberellin, Cytokinin

(iv) Shreya, a 9 year old girl, went to an Ophthalmologist to get her eyes tested. She noticed a poster in the clinic with questions related to the parts of human eye. Help her answer the questions: [5]

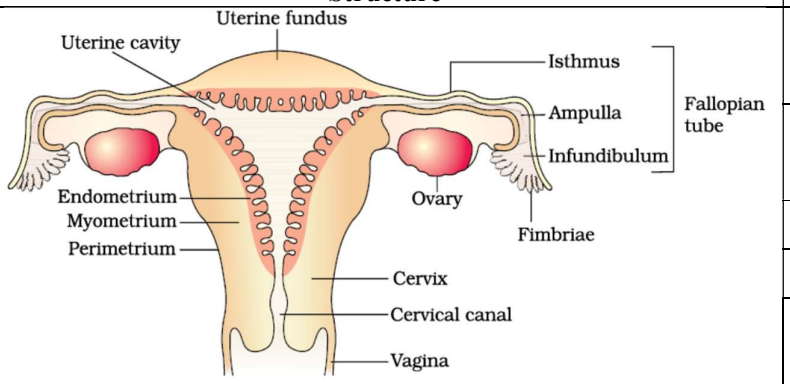
(a) What is the pigment present in cones? (1)

(b) Name the region of the eye where no image is formed and why this happens. (2)

(c) Which is the fluid that lubricates the eye? (1)

(d) Name the eye defect caused due to shortening of the eye ball from front to back. (1)

(v) Study the diagram given below and match the structure with its function: [5]

Structure	Functions
	(a) Produces female gamete (b) Constricted part of uterus (c) Site of fertilisation (d) Site of copulation (e) Site of implantation

SECTION -B (40 marks)

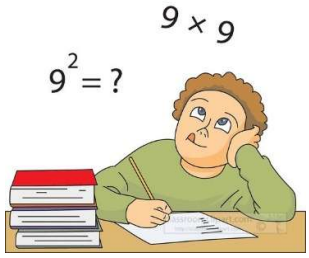
(Attempt any four questions from this section)

Question 3

(i) Explain the term menopause. [1]

(ii) Distinguish between guttation and bleeding. [2]

(iii) Kartik is appearing for his Mathematics board exam. He is focussing keenly to solve numerical problems correctly. [2]



(a) Which part of the brain helps Kartik to focus on his paper?

(b) Name the part of the brain that co-ordinates his muscles while writing the answers.

(iv) How is cell wall different from plasma membrane in terms of permeability? [2]

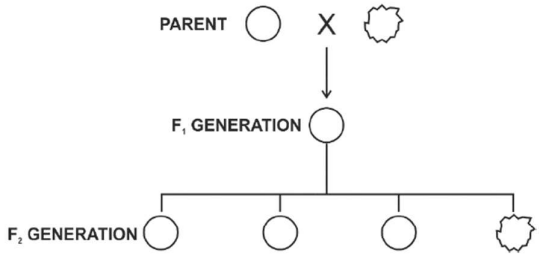
(v) Draw a neat labelled diagram of human heart. [3]

Question 4

(i) Define micturition. [1]

(ii) Differentiate between function of ADH and function of Insulin with reference to diabetes. [2]

(iii) Given below is a schematic representation of the inheritance of a certain feature of seeds of garden pea. Study it carefully and answer the questions that follow: [2]



(a) What is the seed character shown?

(b) Is it a monohybrid or dihybrid cross? Give a logic reason.

(iv) What type of osmosis happens in isotonic solution and hypertonic solution? Why? [2]

(v) Given below are some changes seen in plants due to the action of phytohormones. Read the changes and identify the phytohormone responsible for it. [3]

(a) A rose stem cutting is planted in a pot and hormone X promotes root initiation. Identify X.

(b) Seeds are sown in well watered soil and hormone Y promotes seed germination. Identify Y.

(c) Roots are growing away from the sunlight in presence of hormone Z. Identify Z.

Question 5

(i) Name any two particulate pollutants in air. [1]

(ii) Describe any two methods of contraception. [2]

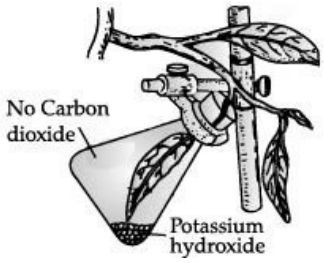
(iii) Arrange the following food chain in a proper sequence: [2]

(a) Earthworm, Hawk, Rat, Fallen leaves

(b) Starfish, limpets, algae, shark

(iv) Differentiate between cranial nerve and spinal nerve. [2]

(v) Given below is the diagram of an experimental set-up: [3]



(a) What is the aim of this experiment?

(b) Will it work satisfactorily? Give reason.

(c) What is the first step taken before any photosynthesis related experiment? Explain.

Question 6

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

(ii) How is transpiration important to plants? [2]

(iii) Expand the following abbreviations: [2]

(a) IAA (b) NADP

(iv) How do our eyes adapt in the dark. [2]

(v) Aadarsh crossed pure-breed tall plants with dwarf pea plants and obtained pea plants of F1 generation. He then performed two types of experiments.

Experiment A - In the first, he self-crossed the plants of F1 generation

Experiment B - In the second, he crossed the F1 generation with dwarf plants. [3]

(a) What is the genotype of parent pea plants?

(b) What would be the genotype of the offspring in case of experiment A and experiment B?

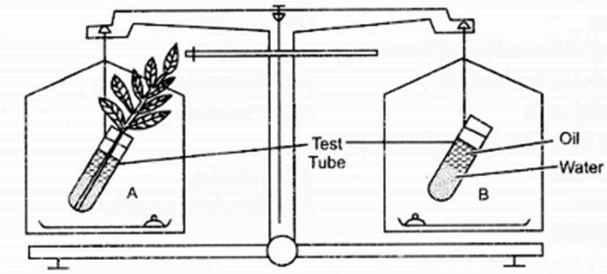
(c) What will be the phenotypic ratio of F2 generation in Experiment A?

Question 7

(i) Explain the term Mortality. [1]

(ii) Give the location of sympathetic and parasympathetic nervous system in our body. [2]

(iii) The figure given below represents an experimental setup with a weighing machine to demonstrate a particular process in plants. The experimental setup was placed in bright sunlight. Study the diagram and answer the following questions: [2]



(a) Name the process intended for study and define it.

(b) When the weight of the test tubes A and B is taken before and after the experiment, what change is observed? Justify.

(iv) Draw a neat, labelled diagram of Malpighian capsule. [2]

(v) Explain the factors responsible for ascent of sap. [3]

Question 8

(i) What are the effects of global warming? [1]

(ii) Mention two body features of Homo Erectus. [2]

(iii) Name two substances that diffuse into and two substances that diffuse out of the placenta. [2]

(iv) Rita is diagnosed with a condition in which she has been asked to wear glasses having minus "–" power.

(a) Name the condition that she is suffering from. [2]

(b) Draw a diagram to show its correction.

(v) Study the following diagram and answer the following questions: [3]

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

(b) Write 2 differences between tropic movement and nastic movement.

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ICSE BOARD SAMPLE PAPER - 2

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)

Question-1 **[15]**

Choose the correct answer to the questions from the given options:

1. The polynomial $x^3 - 2x^2 + ax + 12$ when divided by (x + 1) leaves remainder 20, then 'a' is equal to

   (a) –31 (b) 9

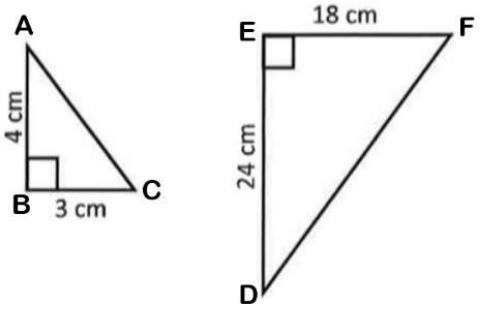
   (c) 11 (d) –11

2. If Roshani opened a RD account in a bank and deposited ₹1100 per month for $1\frac{1}{2}$ years, then the total money deposited in the account is:

   (a) ₹15,400 (b) ₹17,800

   (c) ₹19,800 (d) None of these

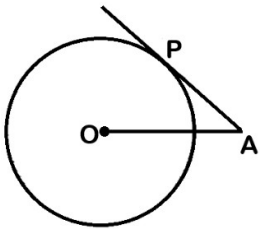
3. In the given diagram, the ΔABC is similar to ADEF by the axiom:



   (a) SSS (b) SAS

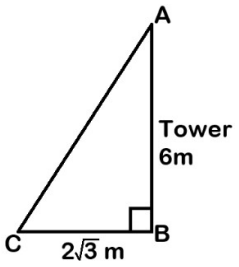
   (c) AAA (d) RHS

4. The radius of a circle is 8 cm. Calculate the length of a tangent drawn to this circle from a point at a distance of 10 cm from the centre.



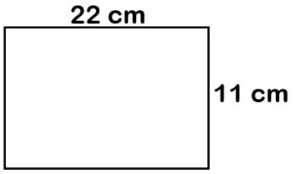
(a) 6 cm (b) 7.5 cm (c) 9 cm (d) 12 cm

5. If a pole 6m high casts the shadow $2\sqrt{3}$ m long on the ground, then the sun's elevation is θ. Which of the following condition is satisfied?



(a) $0° \le \theta \ge 30°$ (b) $30° \le \theta \ge 45°$ (c) $45° \le \theta \le 90°$ (d) $90° \le \theta \ge 120°$

6. If a rectangular sheet having the dimensions 22cm × 11cm is rolled along its shorter side to form a cylinder. Then



Statement-1: The curved surface area of the cylinder so formed is 242 cm^2.

Statement-2: The volume of the cylinder so formed 232 m^3.

Which of the statement is valid?

(a) Only Statement 1. (b) Only Statement 2.

(c) Both statement 1 and statement 2. (d) Neither statement 1 nor statement 2.

7. Which of the following is/are a Geometric Progression (G.P.)?

(1) 2, 4, 6, 8, 10, ...

(2) 2, 4, 8, 16, 32, ...

(3) $\frac{1}{2}$, 1, 2, 4, 8, ...

(a) Only (1) (b) Only (2) (c) Only (2) and (3) (d) All of these

8. A box contains some black balls and 30 white balls. If the probability of drawing a black ball is two-fifths of a white ball, find the number of black balls in the box.

(a) 10 (b) 15 (c) 12 (d) 20

9. Assertion(A): If $\begin{bmatrix} 6 & 7 & -6 \\ 5 & -7 & 5 \\ -6 & 5 & -5 \end{bmatrix}$ is a matrix of order 3×3, then the transpose of matrix Z is $Z^T = \begin{bmatrix} 6 & 5 & -6 \\ 7 & -7 & 5 \\ -6 & 5 & -5 \end{bmatrix}$

Reason(R): If $A = [a_{ij}]_{m\times n}$ be a m × n matrix, then the matrix obtained by interchanging the rows and columns of matrix A is said to be a transpose of matrix A.

The transpose of A is denoted by A' or A^T or A^C.

(a) A is true and R is false.

(b) A is false and R is true.

(c) Both A and R are true and R is the correct explanation for A.

(d) Both A and R are true and R is not the correct explanation for A.

10. The third proportional to $6\frac{1}{4}$ and 5 is:

(a) $5\frac{1}{4}$ (b) 4 (c) 3 (d) None of these

11. The SGST paid by a customer to the shopkeeper for an article which is priced at ₹500 is ₹15. The rate of GST charged is:

(a) 1.5% (b) 3% (c) 5% (d) 6%

12. The sum invested to purchase 15 shares of a company of nominal value ₹75 available at a discount of 20% is:

(a) ₹60 (b) ₹90 (c) ₹1350 (d) ₹900

13. If $x^2 + kx + 6 = (x-2)(x-3)$ for all values of x, then the value of k is:

(a) –5 (b) –3 (c) –2 (d) 5

14. From which of the following points, the line 4x – 3y = 10 passes through?

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

15. The solution set for the given inequation $3x + 6 \le 15, x \in W$ is

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

Question-2

1. Using remainder and factor Theorem, factorise the given polynomial completely: **[4]**

$2x^3 - 9x^2 + 7x + 6$

2. The line joining (–2, 5) and (–5, –6) is divided by the line 2x + y = –4. The ratio in which this line is divided is (I : 1). Hence, find: **[4]**

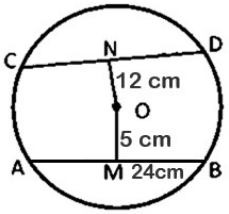
(a) the abscissa in terms of I

(b) the ordinate in terms of I

(c) the ratio in which line is divided by 2x + y = –4

(d) the point of intersection

3. In the figure given below, O is the centre of the circle. AB and CD are the two chords of the circle. OM is perpendicular to AB and ON is perpendicular to CD. AB = 24 cm, OM = 5 cm, ON = 12 cm. **[5]**



Find the : (a) radius of the circle.

(b) length of the chord CD.

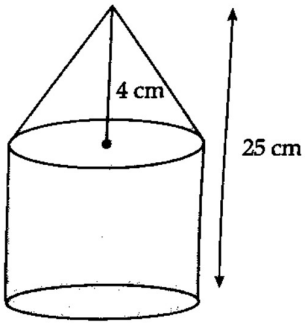
Question-3

1. If the 6^{th} term of an A.P. is equal to four times its first term and the sum of first six terms is 75, find

(a) the first term

(b) the common difference. **[4]**

2. The given solid figure is cylinder surmounted by a cone. The diameter of the base of the cylinder is 6cm. The height of the cone is 4 cm and the total height of the solid is 25 cm. Find the volume of the solid and curved surface area of the solid. Give your answer to the nearest whole number. $\left(\text{Use } \pi = \frac{22}{7}\right)$ **[4]**



3. Use the graph paper to answer the following questions. (Take 2 cm = 1 unit on both axis) **[5]**

(a)Plot the points A(–4, 2) and B(2, 4).

(b)A' is the image of A when reflected in the Y-axis. Plot on the graph paper and write the coordinates of A'.

(c) B' is the image of B when reflected in the line AA'. Write the coordinates of B'

(d) Write the geometric name of the figure ABA'B'

(e) When a point is reflected in the origin, what happens to its coordinates?

SECTION - B (40 Marks)

(Attempt Any FOUR Questions from this section)

Question-4

(i) A man wants to buy 62 shares available at ₹132 (per value being ₹100) **[3]**

(a) How much he will have to invest?

(b) If the dividend is 7.5%, what will be his annual income?

(c) If he wants to increase his annual income by 150, how many extra shares should he buy?

(ii) Solve the following inequalities and write the solution set and represent it on the real number line

$3-2x \geq x+\frac{1-x}{3} > \frac{2x}{5}, x \in R$ **[3]**

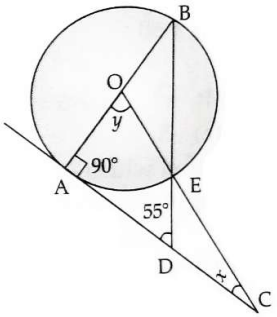
(iii) Prove the following identities: **[4]**

(a) $(\sin\theta+\cos\theta)(\tan\theta+\cot\theta)=\sec\theta+\operatorname{cosec}\theta$

(b) $\frac{(1+\sin\theta)^2+(1-\sin\theta)^2}{2\cos^2\theta}=\sec^2\theta+\tan^2\theta$

Question-5

(i) 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 answers. **[3]**



(ii) Manish has a recurring deposit account in a bank for 2 years. He deposited ₹3000 p.m. **[3]**

At the time of maturity he got ₹2,16,000.

Find: (a) the total money deposited by Manish in 2 years

(b) the total interest earned by Manish

(c) the rate of interest per annum.

3. The following table gives the price of rice per kg for a period of 60 days. **[4]**

Price (`) per kg	85 – 90	90 – 95	95 – 100	100 – 105	105 – 110
No. of days	15	15	10	15	5

Find the mean price of rice per kg to the nearest rupee using step-deviation method.

Question-6

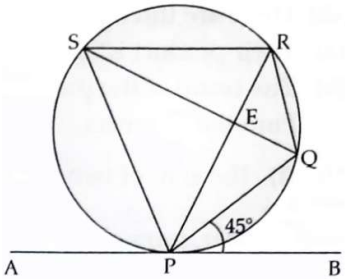
(i) The line through A(7, 5) intersect y-axis at B (0, 10). **[3]**

(a) Write the slope of the line.

(b) Write the equation of the line.

(c) Find $\ell(AB)$

(ii) In the given figure, AB is a tangent to the circle at A. PQ and PS are the bisectors of ∠RPB and ∠RPA respectively. If ∠QPB = 45° prove that: **[3]**



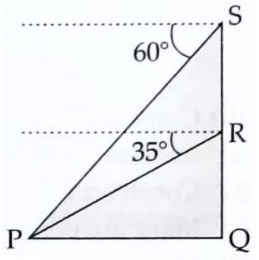
(a) SQ is the diameter of the circle.

(b) PQR is an isosceles triangle.

(iii) Let Amar, Ram and Rahim be three dealers belonging to same states. Dealer Amar sells some products/services to the dealer Ram for ₹1000 and dealer Ram sells the same products/services to the dealer Rahim at a profit of ₹300. Calculate the tax liability of Ram, if the rate of GST is 12%. **[4]**

Question-7

(i) A drone camera is used to shoot an object P from two different positions R and S along the same vertical line QRS. The angle of depression of the object P from these two positions are 35° and 60° respectively as shown in the diagram. If the distance of the object P from point Q is 50 m, **[5]**



(a) Find the distance between R and S.

(b) Give your final answer correct to the nearest whole number.

(Use mathematical tables for this question) (tan 35° = 0.700)

(ii) A mathematical aptitude test of 50 students was recorded as follows : **[5]**

Marks	Number of Students
50 – 60	4
60 – 70	8
70 – 80	14
80 – 90	19
90 – 100	5

Use the graph sheet for this question. Take 1 cm = 10 marks along one axis and 1 cm = 4 students along the other axis.

(a) Draw a histogram representing the above distribution.

(b) Estimate the mode of the data.

Question-8

(i) Cards bearing number 2, 4, 6, 8, 10, 12, 14, 16, 18 and 20 are kept in bag. A card is drawn at random from the bag. Find the probability of getting a card bearing **[3]**

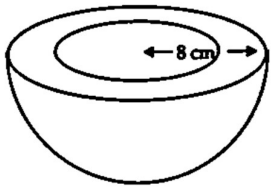
(a) a number divisible by 4.

(b) a number that is a multiple of 6.

(c) an odd number.

(ii) If $\frac{8a-5b}{8c-5d}=\frac{8a+5b}{8c+5d}$, then prove that $\frac{a}{b}=\frac{c}{d}$. **[3]**

(iii) The inner circumference of the rim of a circular metal tub is 44 cm. **[4]**



Find the volume of circular metal tube.

Give your answer correct to three significant figures.

Question-9

(i) The total number of observations in the following distribution table is 120 and their mean is 50. Find the values of missing frequencies f_1 and f_2. **[3]**

Class	Frequency
0 – 20	17
20 – 40	f_1
40 – 60	32
60 – 80	f_2
80 – 100	19

(ii) The first term of an A.P. is 5, the last term is 85 and the sum of all its terms is 405. Find the number of terms and the common difference of the A.P. **[3]**

(iii) There are three positive numbers in a Geometric Progression (G.P.) such that: **[4]**

(a) Their product is 729.

(b) The result of the product of first and second number added to the product of second and third number is 270. Find the numbers.

Question-10

(i) The sum of two natural numbers is 8 and the difference of their reciprocals is $\frac{2}{15}$. Taking x to be one natural number, form a quadratic equation in x and solve it to find the value of x. Hence, find the number. **[3]**

(ii) Find the value of 'x' and 'y' if: $2\begin{bmatrix} x & 7 \\ 9 & y-5 \end{bmatrix}+\begin{bmatrix} 6 & -7 \\ 4 & 5 \end{bmatrix}=\begin{bmatrix} 10 & 7 \\ 22 & 15 \end{bmatrix}$ **[3]**

(iii) Construct a triangle ABC with AB = 5.5 cm, AC = 6 cm and ∠BAC = 105°. Hence . **[4]**

(a) Construct the locus of a point equidistant from BA and BC.

(b) Construct the locus of point equidistant from B and C.

(c) Mark the point which satisfies the above loci as P.

(d) Measure and write the length of PC.