

*Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate the full marks.*

Use separate answer sheets for Part I and Part II.

**Part I (Botany)**

**Group A**

Rewrite the correct options of each question in your answer sheet. (5×1=5)

1. The longest and smallest RNA respectively are:

- |                    |                    |
|--------------------|--------------------|
| a. m RNA and r RNA | b. m RNA and tRNA  |
| c. t RNA and rRNA  | d. r RNA and m RNA |

2. Nonsense codons are:

- |                |                |
|----------------|----------------|
| a. UGG and GAG | b. GUG and UCC |
| c. AUG and UAG | d. UAA and UAG |

3. Osmosis is the movement of:

- a. Solutes      b. Solvents      c. Solutions      d. None of them

4. In guard cell when sugar is converted into starch, stomatal pore:

- |                    |                     |
|--------------------|---------------------|
| a. Opens fully     | b. Close completely |
| c. Opens partially | d. Remains as such  |

5. Tissue present only in dicot shoot is:

- |                  |                 |
|------------------|-----------------|
| a. Parenchyma.   | b. Collenchyma. |
| c. Sclerenchyma. | d. Tracheids    |

**Group B**

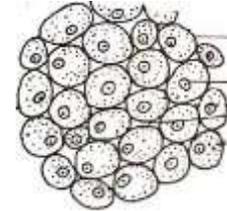
Give short answer to the following questions: (4×4 = 16)

- What is genetic code? Describe its features with suitable examples. (1+3)
- What are stomata and hydathode? "Transpiration is necessary for plants." Explain. (1+1+2)

OR

Define imbibitions. Describe the structure of stomata and their role in transpiration with diagram. (1+2+1)

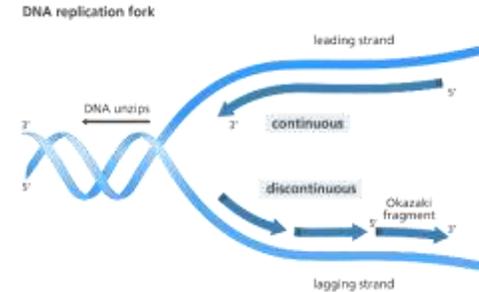
- Differentiate between DNA and RNA. (4)
- Identify the tissue given below. Describe its structure and types. (0.5+1.5+2.0)



**Group C**

Give long answer to the following questions. (2×8=16)

- Identify the diagram given below. Describe the steps of the process with necessary diagrams. (1+4+3)



- What is ascent of sap? Describe the transpiration pull theory regarding mechanism of ascent of sap with necessary diagram. (1+4+3)

OR

What is permanent tissue? Describe the structure and functions of different components of xylem and phloem with necessary diagrams. (1+5+2)

**Part II (Zoology)**

**Group: A**

Rewrite the correct options of each question in your answer sheet. (6×1=6)

1. Example of apocrine gland is:

- |                     |                    |
|---------------------|--------------------|
| a. Mammary gland    | b. Goblet cells    |
| c. Sebaceous glands | d. Skin of mammals |

2. Fat storing cell of liver is called:

- |                   |             |                 |                  |
|-------------------|-------------|-----------------|------------------|
| a. Kupffer's cell | b. Ito cell | c. Hepatic cell | d. Parietal cell |
|-------------------|-------------|-----------------|------------------|

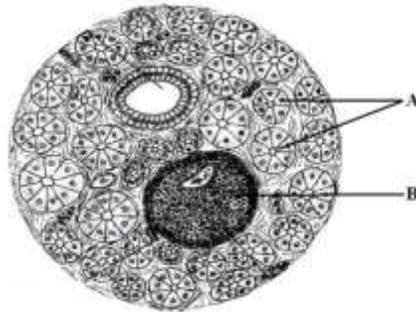
### Group C

3. **On high mountains, difficulty in breathing is due to:**  
a. Decrease in partial pressure in oxygen  
b. Decrease in amount of oxygen  
c. Decrease in CO<sub>2</sub> concentration  
d. All of the above
4. **Archenteron forms the future:**  
a. Respiratory system                      b. Reproductive system  
c. Alimentary canal                         d. Nervous system
5. **Sodium taurocholate aids in:**  
a. Defecation                                 b. Absorption  
c. Assimilation                                d. Emulsification
6. **An increase in the CO<sub>2</sub> concentration/ PCO<sub>2</sub> shifts the oxygen dissociation curve downwards is called:**  
a. Side effect                                 b. Bohr's effect  
c. Haldane's effect                         d. Hamburger's effect

### Group B

**Give short answer to the following questions: (4×4=16 )**

1. Identify the given figure. Label A and B. Write the function of A and B. (1+1+2)



2. Describe the process of spermatogenesis. What happens when spermiogenesis does not occur in mammals? (3+1)
3. Describe the histological structure of human lungs. Name the cell where the exchange of gases takes place. (3+1)
4. Why do frogs migrate towards the watery medium during fertilization? Describe the process of fertilization in frog. (1+3)

OR

Why is simple epithelium also known as tessellated epithelium? Describe the location, structure and function of simple squamous epithelial tissue. (1+3)

**Give long answer to the following questions. (2×8=16)**

5. Define digestion. Describe the structure of alimentary canal of human with well labelled diagram. What causes haemorrhoids? (1+6+1)
6. What does it mean by pulmonary ventilation? Explain the mechanism of breathing with necessary diagrams. (1+4+3)

OR

Give the origin of connective tissue. Mention its types. Describe in detail the connective tissue proper. (1+1+6)

### Best of Luck

*Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate the full marks.*

Use separate answer sheets for Part I and Part II.

**Part I (Botany)**

**Group A**

Rewrite the correct options of each question in your answer sheet. (5×1=5)

1. Two nucleotides join by:

- |                        |                   |
|------------------------|-------------------|
| a. Phosphodiester bond | b. Glyosidic bond |
| c. Hydrogen bond       | d. Covalent bond  |

2. Out of 64 codons, 61 codons for 20 amino acids. It is called:

- |                               |                          |
|-------------------------------|--------------------------|
| a. Degeneracy of genetic code | b. Overlapping of gene.  |
| c. Wobbling of code.          | d. Universality of codon |

3. Water will be absorbed by root hairs when the external medium is ?

- |             |            |               |              |
|-------------|------------|---------------|--------------|
| a. Isotonic | b. Viscous | c. Hypertonic | d. Hypotonic |
|-------------|------------|---------------|--------------|

4. Which of the following metal is involved in the stomatal regulation?

- |         |              |         |              |
|---------|--------------|---------|--------------|
| a. Iron | b. Magnesium | c. Zinc | d. Potassium |
|---------|--------------|---------|--------------|

5. Which of the following element is living?

- |                    |                |
|--------------------|----------------|
| a. Tracheids       | b. Vessels     |
| c. Wood Parenchyma | d. Wood fibres |

**Group B**

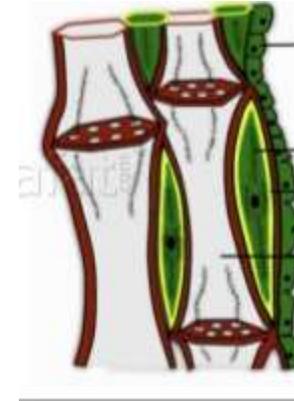
Give short answer to the following questions. (4×4=16)

- “The specific molecule is responsible for the transformation of genetic features from generation” to generation. What is the material called? Describe its criteria with other features. (1+3)
- What is wilting? Differentiate between Transpiration and Guttation. (1+3)

OR

Write short notes on Layering and Grafting. (2+2)

- Identify the tissue given below. Describe its structure and functions. (1+3)

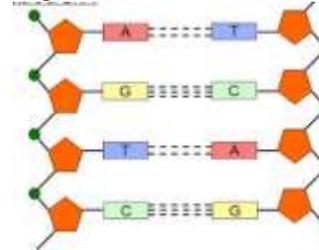


- Define RNA. Mention its types with its role in protein synthesis. Draw a well labelled diagram of the smallest RNA. (0.5+1.5+2)

**Group C**

Give long answer to the following questions. (2×8=16)

- Identify the diagram given below. Describe its structure with another diagram. (1+5+2)



- Define Antitranspirents. Describe the mechanism of stomatal transpiration with necessary diagram. (1+5+2)

OR

Name the types of permanent tissue. Describe various types of simple permanent tissues with necessary diagrams. (1+4+3)

**Part II (Zoology)**

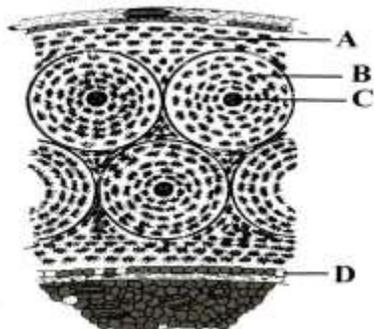
**Group A**

Rewrite the correct options of each question in your answer sheet. (6×1=6)

- Which one is the characteristic of epithelial tissue?
  - Tissue are highly vascularized
  - These cells never produce glands
  - There is the presence of large intracellular spaces
  - The cells will have a rapid rate of cell division
- How many cleavage divisions are completed in 32 celled stage of frog's egg?
  - 3
  - 4
  - 5
  - 6
- Pyloric sphincter is present between:
  - Oesophagus and stomach
  - Stomach and duodenum
  - Duodenum and ileum
  - Ileum and caecum
- Mark the true statement among the following with reference to normal breathing:
  - Inspiration is a passive process whereas expiration is active
  - Inspiration is an active process whereas expiration is passive
  - Inspiration and expiration are active processes
  - Inspiration and expiration are passive processes
- Peyer's patches are found in:
  - Stomach
  - Duodenum
  - Ileum
  - Rectum
- The exchange of gases between the blood and body cells through tissue fluid is called:
  - External respiration
  - Internal respiration
  - Cellular respiration
  - Counter current exchange

#### Group B

- Give short answer to the following questions: (4×4=16)
- What is meant by coeloblastula? Describe the process of blastulation in frog. (1+3)
  - Study the diagram of T.S. of bone and answer the following questions. (1+2+1)



- Label A, B, C and D.
- Mention any two differences between C and D.

iii. Write the function of B.

- In which form oxygen is transported in human body? Describe the process of oxygen transport in human. (1+3)
- Describe the structure of buccal cavity of human with a labeled diagram. (2+2)

**OR**

Describe the process of oogenesis. Write any two major differences between spermatogenesis and oogenesis. (3+1)

#### Group C

Give long answer to the following questions. (2×8=16)

- Draw a well labeled diagram of human lungs. Describe different parts of human respiratory system. (3+5)
- Mention the significance of digestive glands. Describe the structure and function of major digestive glands of human with necessary diagrams. (1+4+3)

**OR**

Mention the basic features of compound epithelial tissue. Describe various types of stratified epithelial tissues with suitable diagrams. (2+6)

**Best of Luck**



## The Times Secondary School

Dillibazar, Kathmandu

First Terminal Examination – 2079

Grade: - XII

Set A

Full Marks:-75

Stream: Science

Pass Marks:-30

Subject: - Chemistry

Time : 3hrs

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate the full marks.

### Group A

Choose the best alternative to the following questions.

[1×11=11]

- 0.4 gm of an acid of mol. wt. 90 was neutralized by 20 ml of 0.5 N caustic potash. The basicity of acid is  
a. 1                      b. 2                      c. 3                      d. 4
- When 50 ml of 5N H<sub>2</sub>SO<sub>4</sub> is mixed with 100 ml of 3N NaOH, the resulting solution will be  
a. acidic.                b. basic.                c. neutral.              d. Strongly acidic.
- In a standard Hydrogen electrode, the concentration of H<sup>+</sup> ion is  
a. 0.1M.                b. 1M                    c. 10M.                d. not fixed
- In a Galvanic cell, oxidation takes place at  
a. Electrolyte.        b. Cathode              c. Anode.              d. both a and b
- Which of the following is used for synthesis of secondary alkyl halide?  
a. Victor Meyer method    b. Williamson synthesis  
c. Antimarkonikovs synthesis    d. Wurtz synthesis
- Alkaline hydrolysis of ester is known as  
a. Alkalinization                      b. Esterification  
c. Acetylation                        d. Saponification
- Reduction of carboxylic acid results  
a. Ester.                b. Nitrocompounds    c. Alcohol.              d. Alkene
- While preparing acid from aldehyde, KMnO<sub>4</sub> is used in  
a. Acidic medium                      b. Alkaline medium  
c. Neutral medium                      d. No solvent medium
- Hydration of alkene is an example of  
a. Substitutions reaction              b. Addition reaction  
c. Elimination reaction                d. None.
- Which ion gives coloured solution?  
a. Zn<sup>++</sup>.                b. Fe<sup>++</sup>                      c. Ag<sup>+</sup>.                      d. Cu<sup>+</sup>
- In the first transition series, the element with highest melting point is  
a. Fe                      b. Mn                      c. Cu                      d. Cr

### Group B[8×5=40]

Short question answers group

- Volumetric analysis is one of the most common and commanding quantitative analysis used in laboratory, industry, pharmaceutical and

forensic technologies to prepare exact concentration of solution and to estimate weight of dissolved solute on solution with the fixed volume.



- Answer the following questions.
  - What are the major differences between end point and equivalence point. Write differential lines. [2]
  - Define seminormal and decimolar solution with one example of each.[1]
  - How can you prepare 500ml of decinormal Na<sub>2</sub>CO<sub>3</sub>.10H<sub>2</sub>O solution?[1]
  - Convert, g/L into % (w/v) and vice versa.[1]OR
  - Define titrant and titrand [1]
  - Derive mathematical relation between normality and molarity.[2]
  - Write an expression to evaluate equivalent weight of KMnO<sub>4</sub> in acidic medium. Convert 5MH<sub>3</sub>PO<sub>4</sub> into normality.[2]
- What volumes 12M NaOH and 2M NaOH should be mixed to get 2 litres of 9M NaOH solution? [2]
  - O. 8 gm of divalent metal was dissolved in 100 ml of 1.28N HCl solution and the solution was diluted to 200ml. 50 ml of this diluted solution required 54.6ml of 0.22N NaOH for complete neutralisation. Find the atomic mass of metal.[3]
- What is meant by standard Hydrogen electrode? Why it is called so? Describe working principles of SHE acting as both anode and cathode half cell. Draw an appropriate diagram of SHE. [1+1+3]  
Or  
Define single electrode potential. Why single electrode potential can not be measured? Write short note on standard cell potential (E) of electrochemical cell. [1+1+3]
- Can we store CuSO<sub>4</sub> solution in iron vessel? If not, why? (Given E<sup>0</sup><sub>Cu<sup>++</sup>/Cu = 0.34v and E<sup>0</sup><sub>Fe<sup>++</sup>/Fe = - 0.44v [2]  
The standard electrode potential(st.reduction potential) for the following electrodes are Ag = 0.80v Ni = - 0. 25v [1+1+1]
  - Represent suitable Galvanic cell indicating cathode and anode</sub></sub>

- b. Write reactions taking place at each electrode and overall redox reaction.
- c. Calculate standard emf of the cell.
6. Write functional isomer of propanol. Explain how alcohol is prepared starting from  
-haloalkanes  
-esters  
-primary aliphatic amines  
-carboxylic acids.  
Convert propan-1-ol to propan-2-ol [1+4]
7. What is decarboxylation reaction? Give an example. Consider a reaction  

$$A \xrightarrow{PCl_5} B \xrightarrow{Mg/dry\ ether} C \xrightarrow{CO_2} D \xrightarrow{H_2O/H^+} E$$
 The compound E is a carboxylic acid and calcium salt of it on distillation gives propanone. Identify A, B, C, D and E with required stepwise explanation. [1+4]
8. What are heavy metals? Write about computational list to describe important characteristics of heavy metals/coinage metals. [1+4]
9. Explain the following terms with necessary reactions and examples .  
 a. Grignards carbonation  
 b. Reduction of ketone  
 c. Lucas reagent and test  
 d. Markonikovs addition.  
 e. Ambidant nucleophiles. [1+1+1+1+1]

### Group C[8×3=24]

#### Long question answer group.

1. A voltaic or Galvanic cell is one which operates with different reactions mechanism than that of electrolytic cell. Luigi Galvani, Italian physicist discovered that, muscle and nerve cells produce electricity and became milestone to design Galvanic cell.
- a. Discuss about construction of Galvanic cell using the simple (Zn-Cu) electrodes. [2]
- b. Write the spontaneous reaction taking place at each electrodes and overall redox reaction. [2]
- c. What is salt bridge? Mention the important functions of salt bridge. [2]
- d. Write your short hand IUPAC representation of Zn-Cu Galvanic cell. [2]
2. Normally equation is applied to all cases of any complete reaction as well in dilution of same solution but molarity equation may not be possible in all cases. Give your complete information to the following questions.
- a. What reason would you expect to recommend that normality equation applies to all cases but not molarity equation? Explain with example reaction. [1]

- b. Derive normality equation starting from laws of chemical equivalence. [3]
- c. What volume of 0.2N solution of H<sub>2</sub>SO<sub>4</sub> is required to neutralize 50 ml of NaOH containing 15gm of NaOH in one litre solution? [2]
- d. 2 litres of NH<sub>3</sub> gas at 30 degrees Celsius and 0.9 atm pressure neutralize 134 ml of H<sub>4</sub>SO<sub>4</sub>. Calculate the molarity of acid. [2]

Or

- a. Write oxo process for conversion of ethene into propanol. [2]
- b. Write about explanatory note on large scale preparation of ethyl alcohol with reference to hydroboration oxidation and fermentation of sugar. [4]
- c. Define the following terms with examples [2]  
 i. Complex ion  
 ii. Ligands.  
 iii. Co-ordination number.  
 iv. Co-ordination sphere.
3. Answer the following question in brief.
- a. Complete the following reaction. [2]  

$$X \xrightarrow{PBr_3} Y \xrightarrow{Na/ether} C_2H_6 \xrightarrow{C\ l_2/h\nu} Z$$
- b. An organic compound (A) with molecular formula C<sub>4</sub>H<sub>9</sub>Br on treatment with alc. KOH gives two isomeric compounds (B) and (C) with formula C<sub>4</sub>H<sub>8</sub>. On ozonolysis (B) gives only one product C<sub>2</sub>H<sub>4</sub>O while (C) gives two different products. Identify compound A, B and C with IUPAC name and complete sequential explanatory reaction. [3]
- c. Draw structure of all possible structural isomeric alcohols of C<sub>4</sub>H<sub>10</sub>O with IUPAC names. How these isomers are distinguished by Victor Meyer method. Explain. [3]

The End



## The Times Secondary School

Dillibazar, Kathmandu

First Terminal Examination – 2079

Grade: - XII

Set B

Full Marks:-75

Stream: Science

Pass Marks:-30

Subject: - Chemistry

Time : 3hrs

*Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate the full marks.*

### Group A

Choose the best alternative to the following questions..

[1×11=11]

- Which ion gives coloured solution?  
a.  $Zn^{++}$ .      b.  $Fe^{++}$       c.  $Ag^+$ .      d.  $Cu^+$
- Which of the following is used for synthesis of secondary alkyl halide?  
a. Victor Meyer method      b. Williamson synthesis  
c. Antimarkonikovs synthesis      d. Wurtz synthesis
- While preparing acid from aldehyde,  $KMnO_4$  is used in  
a. Acidic medium      b. Alkaline medium  
c. Neutral medium      d. No solvent medium
- Hydration of alkene is an example of  
a. Substitutions reaction      b. Addition reaction  
c. Elimination reaction      d. None.
- In the first transition series, the element with highest melting point is  
a. Fe      b. Mn      c. Cu      d. Cr
- Alkaline hydrolysis of ester is known as  
a. Alkalinization      b. Esterification  
c. Acetylation      d. Saponification
- 0.4 gm of an acid of mol. wt. 90 was neutralized by 20 ml of 0.5 N caustic patash. The basicity of acid is  
a. 1      b. 2      c. 3      d. 4
- In a standard Hydrogen electrode, the concentration of  $H^+$  ion is  
a. 0.1M.      b. 1M      c. 10M.      d. not fixed
- When 50 ml of 5N  $H_2SO_4$  is mixed with 100 ml of 3N NaOH, the resulting solution will be  
a. acidic.      b. basic.      c. neutral.      d. Strongly acidic.
- In a Galvanic cell, oxidation takes place at  
a. Electrolyte.      b. Cathode      c. Anode.      d. both a and b
- Reduction of carboxylic acid results  
a. Ester.      b. Nitrocompounds      c. Alcohol.      d. Alkene

### Group B[8×5=40]

#### Short question answers group

1. Volumetric analysis, any method of quantitative chemical analysis in which the amount of a substance is determined by measuring the volume that it occupies or

in broader usage, the volume of second substance that combines with the first in known proportion more correctly called titrimetric analysis.



- Define titration and titrand in titrimetric analysis[2]
- What are primary and secondary standard solutions? Give examples [1]
- How can you prepare 250 ml decinormal standard solution of oxalic acid?[2]

Or

In the titration of acidified  $KMnO_4$  and oxalic acid,  $KMnO_4$  is reactant as well as indicator.

- Is the titration redox or acid - base? Why? [1]
  - Why does  $KMnO_4$  acts as self indicator? Write reaction involved in molecular form and ionic form of above titration. [2]
  - $KMnO_4$  is not primary substance, why? [1]
  - If 100ml of N/10  $KMnO_4$  solution is to be prepared, what mass of  $KMnO_4$  is required? [1]
- 2.
- Differentiate end point and equivalence point of titration. [2]
  - 4 gm of divalent metal was dissolved in 100 ml of 2. 02M  $H_2SO_4$ . The excess acid required 30 ml of 1N NaOH for complete neutralization. Find the atomic mass of the metal. [3]
- 3.
- What is standard oxidation potential and standard reduction potential of an electrode ? [1]
  - Can a solution of 1M copper sulphate be stored in a vessel made up of Nickel? If not why? Given : Standard reduction potential of Nickel and copper are - 0.25V, and 0.34V and respectively. [2]
  - Predict the feasibility of the following reaction. [2]  
 $2Fe^{3+} + Sn^{2+} \longrightarrow 2Fe^{2+} + Sn^{4+}$   
Given that:  $E_{Fe^{3+}/Fe^{2+}}^0 = 0.77v$  and  $E_{Sn^{4+}/Sn^{2+}}^0 = 0.13v$
4. Answer the questions in brief.

**Group C [8×3=24]**

- Oxo process is important method to prepare alcohols in industries. Write a chemical reaction for it. [1]
- Starting from  $\text{CH}_3\text{MgBr}$  how would you prepare - 2-methylpropan-2-ol? [1]
- Identify A and B in the following sequence of reaction. [2]  

$$\text{C}_2\text{H}_5\text{Cl} + \text{alcAgCN} \xrightarrow{\text{LiAlH}_4} \text{A} \xrightarrow{\text{LiAlH}_4} \text{B}$$
- What is the order of boiling point for n-propyl chloride, isopropyl chloride and tertiary butyl chloride? Give reason. [1]

OR

- How will you convert the following [1+2]
    - Ethyl ethanoate into ethanal
    - Propanoic acid into acetic acid.
  - What happens when methanoic acid is warmed with ammoniacal silver nitrate solution? [1]
  - Trichloroacetic acid is stronger than chloroacetic acid. Why? [1]
5. Write the structural formulae of isomeric alcohols having molecular formula  $\text{C}_4\text{H}_{10}\text{O}$  with their IUPAC names. How these isomers are distinguished by Victor Meyer's method? Explain. [2+3]
- 6.
- Write short note on Williamson's etherification synthesis? [1]
  - Consider a reaction. [4]  

$$\text{X} \xrightarrow{\text{PBr}_3} \text{Y} \xrightarrow{\text{KCN}} \text{Z} \xrightarrow{\text{H}_2\text{O}/\text{H}^+} \text{P} \xrightarrow{\text{P}_2\text{O}_5} \text{Q}$$

The compound Q smells pleasant with molecular formula  $\text{C}_4\text{H}_6\text{O}_3$  that gives ethyl alcohol on reduction. Identify X, Y, Z, P and Q giving complete reaction.
7. Treatment of 2-bromobutane with hot alcoholic KOH gives a mixture of two isomeric butenes A and B. Ozonolysis of the minor product gives methanal and another aldehyde C in equimolar proportion whereas major alkene gives single product D on ozonolysis. What are the structural formulae of A, B, C and D. Give equations for all steps. [5]
8. Transition elements are defined as elements that have partially filled d-orbitals.
- What is d-orbital degeneracy? [1]
  - Give a possible reason for a fact that transition metals have high heat of atomization. [1]
  - Transition metals form alloys with other transition metals easily, explain. [1]
  - $\text{K}_4[\text{Fe}(\text{CN})_6]$  is a complex salt formed by iron. Write the complex ion and ligand present in it. [1]
  - In  $\text{Ti}(\text{H}_2\text{O})_6\text{Cl}_3$  complex,  $\text{Ti}(\text{H}_2\text{O})_6^{3+}$  is violet in colour. Why? [1]

**Long question answer group.**

1. Normally equation is applied to all cases of any complete reaction as well in dilution of same solution but molarity equation may not be possible in all cases. Give your complete information to the following questions.

- Derive normality equation starting from laws of chemical equivalence. [3]
  - Write a concise account about pH indicators that are most commonly used in acid base titration. [3]
  - 10 ml of N/2 HCl, 30 ml of N/10  $\text{HNO}_3$  and 60 ml of N/5 NaOH are mixed together. Find the normality of the mixture. [2]
2. a. What is SHE? Why is it called so? Describe the working principle of SHE acting as both anode half and cathode half cell. [1+1+3]
- Standard electrode potential for the following electrodes are  $\text{Ag} = 0.80\text{V}$ ,  $\text{Ni} = -0.25\text{V}$  [3]
    - Represent suitable Galvanic cell indicating cathode and anode
    - Write reactions taking place at each electrode and overall redox reaction.
    - Calculate standard emf of the cell.
- 3.
- How is acetic acid prepared from acetylene? What is Hofmann's ammonolysis synthesis. [1+1]
  - Account for the fact that carboxylic acids do not give characteristic reaction of carbonyl compounds [1]
  - Complete the following reaction with reagents, conditions and stepwise chemical action for each. [5]
- |                            |                                 |   |
|----------------------------|---------------------------------|---|
| $\text{CH}_3\text{COOH} +$ | $\text{C}_2\text{H}_5\text{OH}$ | ? |
|                            | Conc. $\text{H}_2\text{SO}_4$   | ? |
|                            | $\text{LiAlH}_4$ in ether       | ? |
|                            | $\text{NH}_3$                   | ? |
|                            | $\text{PCl}_5$                  | ? |
- Or
- Write about explanatory note on large scale preparation of ethyl alcohol with reference to hydroboration oxidation and fermentation of sugar. [4]
  - Write short note on
    - Hell-Volhard-Zelinsky (HVZ) reaction.
    - Lucas reagent and test. [2]
  - Account for the fact that
    - Alkyl halides undergo nucleophilic substitution reaction.
    - Alkyl halides are insoluble in water though they contain polar C-X bond [2]

The End

## The Times Secondary School

Dillibazar, Kathmandu

First Terminal Examination – 2079

Grade: - XII

Set A

Full Marks:-50

Stream: Science

Pass Marks:-20

Subject: - Computer Science

Time : 2 hrs

*Candidates are required to give their answers in their own words*

*as*

*far as practicable. The figures in the margin indicate the full marks.*

### Group A

Tick the best alternatives.

[9×1=9]

- Primary key does not accept  
a. Text      b. Number      c. Null Value      d. All of the above
- Which of the following is not a database application?  
a. Oracle      b. FoxPro      c. MS-Access      d. MS-Excel
- Which one of the following is a loop construct that will always be executed once.  
a. for      b. while      c. switch      d. do while
- What is # include  
a. preprocessor directive      b. inclusion directive  
c. file inclusion directive      d. none of the mentioned
- Which is not the feature of OOP  
a. Code reusability      b. Modularity  
c. Redundant Data      d. Efficient Code
- What kind of transmission medium is most appropriate to carry data in a computer network that is exposed to electrical interferences?  
a. Unshielded twisted pair      b. Optical fiber  
c. Coaxial cable      d. Microwave
- Which loop is faster in c language?  
a. for      b. while  
c. do while      d. all work at same

speed

- What is the output of c program?  
int main()  
{ int k;  
for (k =1; k>= 5;k ++)

```
{  
printf (“%d”, k);  
return 0; }
```

- a. 12345      b. 1234      c. 6      d. null

- A relational database consists of a collection of  
a. Tables      b. Fields      c. Records      d. Keys

### Group B

Give short answer to the following questions.

[5×5=25]

- Why is Normalization needed? Explain the normalization process with examples.

Or

What is SQL? Demonstrate the basic DML statement with an example.

- What is data integrity? Explain different types of data integrity.
- Write a program to display factorial of any given number using JavaScript.

Or

Write a program to display simple interest using JavaScript.

- What is networking? Differentiate between peer to peer and client server network architecture.
- What is OOP? Explain application areas of OOP.

### Group C

Give long answer to the following questions

[2×8=16]

- What is transmission media? Explain guided transmission media with detail.
- What is array? Write a program to display matrix multiplication of two 3×3 matrix.

Or

What is function? Write a program to display area of circle and multiplication table of any number using function.

**The End**

- a. Oracle      b. Word processor      c. NO-SQL      d. MS-Excel

	<b>The Times Secondary School</b> Dillibazar, Kathmandu <b>First Terminal Examination – 2079</b>	
Grade: - XII	<b>Set B</b>	Full Marks:-50
Stream: Science		Pass Marks:-20
Subject: - Computer Science		Time : 2 hrs

*Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate the full marks.*

### Group A

**Tick the best alternatives.**

[9×1=9]

1. What will the result of num variable after execution of the following statements?  
int num = 58;  
num % = 11;  
a. 3      b. 5      c. 8      d. 11
2. Which of the following keywords is used to define a variable in JavaScript?  
a. Var      b. Let      c. both a and b      d. none of the above
3. JavaScript is interpreted by  
a. Client      b. Server      c. Object      d. None
4. Which of the following items is not used in local area network (LAN)?  
a. Cable      b. Printer      c. Modem      d. Computer
5. Which is not the feature of OOP  
d. Code reusability      b. Modularity  
c. Redundant Data      d. Efficient Code
6. Which normal form is used to remove the partial dependency?  
a. First      b. Second      c. Third      d. BCNF
7. Which SQL command is used to insert a row in a table?  
a. Select      b. Create      c. Insert      d. Drop
8. Primary key does not accept  
a. Text      b. Number      c. Null Value      d. All of the above
9. Which of the following is a database application?

### Group B

**Give short answer to the following questions.**

[5×5=25]

10. What is Database? Differentiate between centralized and distributed database system.

Or

What is SQL? Demonstrate the basic DDL statement with an example.

11. What is key? Explain different types of key attributes.  
12. Write a program to display Fibonacci series up to 10<sup>th</sup> term using JavaScript.

Or

Write a program to display sum of odd and even number up to n<sup>th</sup> term using JavaScript.

13. What is Transmission media? Differentiate between STP and UTP cable.  
14. What is OOP? Explain polymorphism and inheritance.

### Group C

**Give long answer to the following questions**

[2×8=16]

15. What is LAN topology? Explain different types of topologies with detail.  
16. What is function? Write a program to display sum, difference, product and division of any two numbers using functions.

Or

What is string handling functions? Explain any four string handling functions with example.

**The End**

	<b>The Times Secondary School</b>	
	Dillibazar, Kathmandu	
<b>First Terminal Examination – 2079</b>		
Grade: - XII	Set A	Full Marks:-75
Stream: Science		Pass Marks:-30
Subject: - English		Time : 3hrs

*Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate the full marks.*

**Attempt ALL questions.**

**1. Read the text and do the task.**

[15]

One of the most critically renowned paintings of the 19th-century modernist movement is the French painter Edouard Manet’s masterwork, *A Bar at the Folies*. Originally belonging to the composer Emmanuel Chabrier, it is now in the possession of The Courtauld Gallery in London, where it has also become a favourite with the crowds.

The painting is set late at night in a nineteenth-century Parisian nightclub. A barmaid stands alone behind her bar, fitted out in a black bodice that has a frilly white neckline, and with a spray of flowers sitting across her décolletage. She rests her hands on the bar and gazes out forlornly at a point just below the viewer, not quite making eye contact. Also on the bar are some bottles of liquor and a bowl of oranges, but much of the activity in the room takes place in the reflection of a mirror behind the barmaid. Through this mirror we see an auditorium, bustling with blurred figures and faces: men in top hats, a woman examining the scene below her through binoculars, another in long gloves, even the feet of a trapeze artist demonstrating acrobatic feats above his adoring crowd. In the foreground of the reflection a man with a thick moustache is talking with the barmaid.

Although the Folies (-Bergère) was an actual establishment in late nineteenth-century Paris, and the subject of the painting was a real barmaid who worked there, Manet did not attempt to recapture every detail of the bar in his rendition. The painting was largely completed in a private studio belonging to the painter, where the barmaid posed with a number of bottles, and this was then integrated with quick sketches the artist made at the Folies itself.

Even more confounding than Manet’s relaxed attention to detail, however, is the relationship in the painting between the activity in the mirrored reflection and that which we see in the unreflected foreground. In a similar vein to Diego Velazquez’ much earlier work *Las Meninas*, Manet uses the mirror to toy with our ideas about which details are true to life and which are not. In the foreground, for example, the barmaid is

positioned upright, her face betraying an expression of lonely detachment, yet in the mirrored reflection she appears to be leaning forward and to the side, apparently engaging in conversation with her moustachioed customer. As a result of this, the customer’s stance is also altered. In the mirror, he should be blocked from view as a result of where the barmaid is standing, yet Manet has re-positioned him to the side. The overall impact on the viewer is one of a dreamlike disjuncture between reality and illusion.

Why would Manet engage in such deceit? Perhaps for that very reason: to depict two different states of mind or emotion. Manet seems to be conveying his understanding of the modern workplace, a place – from his perspective – of alienation, where workers felt torn from their ‘true’ selves and forced to assume an artificial working identity. What we see in the mirrored reflection is the barmaid’s working self, busy serving a customer. The front-on view, however, bears witness to how the barmaid truly feels at work: hopeless, adrift, and alone.

Ever since its debut at the Paris Salon of 1882, art historians have produced reams of books and journal articles disputing the positioning of the barmaid and patron in *A Bar at the Folies*. Some have even conducted staged representations of the painting in order to ascertain whether Manet’s seemingly distorted point of view might have been possible after all. Yet while academics are understandably drawn to the compositional enigma of the painting, the layperson is always likely to see the much simpler, more human story beneath. No doubt this is the way Manet would have wanted it.

**A. The text has six paragraphs, A–F. Which paragraph contains the following information? Write the correct letter on your answer sheet**

- a. description of how Manet created the painting
- b. aspects of the painting that scholars are most interested in
- c. the writer’s view of the idea that Manet wants to communicate
- d. examples to show why the bar scene is unrealistic

**B. Complete each sentence with the correct beginning given in the box.**

Manet misrepresents the images in the mirror because he

Manet felt modern workers were alienated because they

Academics have re-constructed the painting in real life because they

- a. ....wanted to manipulate our sense of reality.
- b. ....wanted to find out if the painting’s perspective was realistic
- c. ....felt they had to work every hard at boring and difficult jobs.
- d. .... wanted to understand the lives of ordinary people at the time.
- e. ....felt like they had to become different people.

- e. a statement about the popularity of the painting

**C. Answer the following questions.**

- Who was the first owner of A Bar at the Folies?
- What is the barmaid wearing?
- Which room is seen at the back of the painting?
- Who is performing for the audience?
- Where did most of the work on the painting take place?

**2. Write short answers to the following questions.**

[5×2=10]

- How does Gaston disagree with his wife on Gouvernail's character?  
( **A Respectable Woman** )
- What does the line 'The news like squirrels ran' mean? ( **A Day** )
- Why do you think the author did not characterize the persons in the story with proper names?? ( **Neighbours** )
- Sketch the character of the Famous Actress. ( **A Matter of Husbands** )
- What, according to the poet is Milkwood? ( **Every Morning I Wake** )

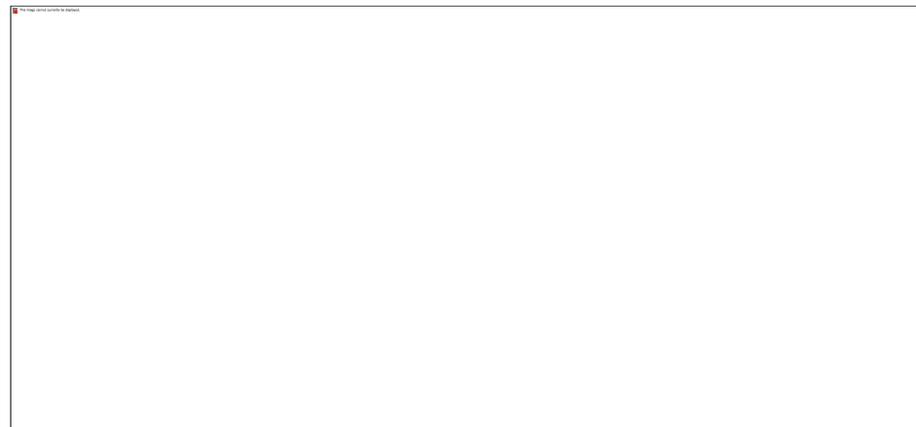
**3 . Write long answers to the following questions.**

[2×5=10]

- Discuss the late eighteenth-century Nepali society as portrayed in terms of the relation between the king and his subjects as portrayed in the play. ( **The Bull** )
- Dr. Rakesh is divided between a doctor and a son. As a son, he loves his father and worries about his weakening health but as a doctor he is strict on his father's diet and medicine. In your view, what else could Rakesh have done to make his father's final years more comfortable? ( **A Devoted Son** )

**4. The bar charts below show the number of hours each teacher spent teaching in different schools in four different countries in 2001. Summarize the information by selecting and reporting the main features, and make comparisons where relevant.**

[7]



**5. Write a news story based on the given information.**

[8]

Argentina beat Brazil to win Copa America  
by Reuters  
RIO DE JANEIRO, July 10  
first major title in 28 years  
first medal for Lionel Messi in a blue-and-white shirt  
Di Maria goal gave them a 1-0 win over Brazil  
15th Copa America equal to Brazil  
Brazil piled on the pressure but they could not get an equaliser  
Brazil - more aggressive in the second half  
Argentine defence - outstanding

**6. Write an essay on 'The Importance of Family'. In your essay, you can**

**use these guiding questions.**

- **Why family is important to you.**
- **Why family is or is not important for society.**
- **How you think families will change in the future.'**

[10]

**7. Do as indicated in brackets and rewrite the sentences.**

[10]

- Please read this letter for me. I ... see without my glasses. ( **Correct form of modal verb** )
- None ..... (has/ have) satisfaction in their life.( **Agreement** )
- Americans throw away around 2.5 million plastic bottles .... hour. ( **Use quantifier** )
- I love people laughing at me. ( **Change into passive** )
- To bell the cat ( **Meaning of the idiom** )
- Leap years occur.....four years.. ( **Put each or every** )

- g. Ramala is destroying her future. (**Underline determiner**)
- h. There is a village.... the Rara Lake. (**Put appropriate preposition**)
- i. Either the students or their English teacher .... responsible for the misinformation. (**Write Correct form of verb**)
- j. ....she spoke very fast, I understood what she meant to say. (**Use appropriate connective**).

**8. Do as instructed.**

[5]

- a. Listen carefully,.....? ( **Question Tag**)
- b. Romeo loves Juliet. ( **Change into the wh question**)
- c. I lost my way. (**Change into the passive form**)
- d. You are in short of money. (**Express your wish** )
- e. Belly laughs never come through the nose.(**Identify adverb of frequency**)

**The End**

<b>The Times Secondary School</b>		
Dillibazar, Kathmandu		
<b>First Terminal Examination – 2079</b>		
Grade: - XII	Set B	Full Marks:-75
Stream: Science		Pass Marks:-30
Subject: - English		Time : 3hrs

*Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate the full marks.*

**Attempt ALL questions.**

**1. Read the text and do the task.**

**[15]**

Open your eyes in sea water and it is difficult to see much more than a murky, bleary green colour. Sounds, too, are garbled and difficult to comprehend. Without specialised equipment humans would be lost in these deep sea habitats, so how do fish make it seem so easy? Much of this is due to a biological phenomenon known as electroreception – the ability to perceive and act upon electrical stimuli as part of the overall senses. This ability is only found in aquatic or amphibious species because water is an efficient conductor of electricity.

Electroreception comes in two variants. While all animals (including humans) generate electric signals, because they are emitted by the nervous system, some animals have the ability – known as passive electroreception – to receive and decode electric signals generated by other animals in order to sense their location.

Other creatures can go further still, however. Animals with active electroreception possess bodily organs that generate special electric signals on cue. These can be used for mating signals and territorial displays as well as locating objects in the water. Active electroreceptors can differentiate between the various resistances that their electrical currents encounter. This can help them identify whether another creature is prey, predator or something that is best left alone. Active electroreception has a range of about one body length – usually just enough to give its host time to get out of the way or go in for the kill.

One fascinating use of active electroreception – known as the Jamming Avoidance Response mechanism – has been observed between members of some species known as the weakly electric fish. When two such electric fish meet in the ocean using the same frequency, each fish will then shift the frequency of its discharge so that they are transmitting on different frequencies. Doing so prevents their electroreception faculties from becoming jammed. Long before citizens' band radio users first had to yell "Get off my frequency!" at hapless novices cluttering the air waves, at least one species had found a way to peacefully and quickly resolve this type of dispute.

Electroreception can also play an important role in animal defences. Rays are one such example. Young ray embryos develop inside egg cases that are attached to the sea bed. The embryos keep their tails in constant motion so as to pump water and allow them to breathe through the egg's casing. If the embryo's

electroreceptor's detect the presence of a predatory fish in the vicinity, however, the embryo stops moving (and in so doing ceases transmitting electric currents) until the fish has moved on. Because marine life of various types is often travelling past, the embryo has evolved only to react to signals that are characteristic of the respiratory movements of potential predators such as sharks.

Many people fear swimming in the ocean because of sharks. In some respects, this concern is well grounded – humans are poorly equipped when it comes to electroreceptive defence mechanisms. Sharks, meanwhile, hunt with extraordinary precision. They initially lock onto their prey through a keen sense of smell (two thirds of a shark's brain is devoted entirely to its olfactory organs). As the shark reaches proximity to its prey, it tunes into electric signals that ensure a precise strike on its target; this sense is so strong that the shark even attacks blind by letting its eyes recede for protection.

Normally, when humans are attacked it is purely by accident. Since sharks cannot detect from electroreception whether or not something will satisfy their tastes, they tend to "try before they buy", taking one or two bites and then assessing the results (our sinewy muscle does not compare well with plumper, softer prey such as seals). Repeat attacks are highly likely once a human is bleeding, however; the force of the electric field is heightened by salt in the blood which creates the perfect setting for a feeding frenzy. In areas where shark attacks on humans are likely to occur, scientists are exploring ways to create artificial electroreceptors that would disorient the sharks and repel them from swimming beaches.

There is much that we do not yet know concerning how electroreception functions. Although researchers have documented how electroreception alters hunting, defence and communication systems through observation, the exact neurological processes that encode and decode this information are unclear. Scientists are also exploring the role electroreception plays in navigation. Some have proposed that salt water and magnetic fields from the Earth's core may interact to form electrical currents that sharks use for migratory purposes.

**A. Choose the correct words from the text to complete the following sentences.**

- a. Shark is a very effective hunter. Firstly, it uses its ..... to smell its target.
- b. When the shark gets close, it uses ..... to guide it toward an accurate attack.
- c. Within the final few feet the shark rolls its eyes back into its .....
- d. Humans are not popular food sources for most sharks due to their .....
- e. Nevertheless, once a shark has bitten a human, a repeat attack is highly possible as salt from the blood increases the intensity of the .....

**B. The text has eight paragraphs, A–H. Which paragraph contains the following**

**information? Write the correct letter A–H on your answer sheet.**

- a. how electroreception can be used to help fish reproduce
- b. a possible use for electroreception that will benefit humans
- c. the term for the capacity which enables an animal to pick up but not send out electrical signals
- d. why only creatures that live in or near water have electroreceptive abilities
- e. how electroreception might help creatures find their way over long distances

**C. Answer the following questions.**

- a. How can electroreception be used to help fish reproduce?
- b. Why do only creatures that live in or near water have electroreceptive abilities?
- c. How might electroreception help creatures find their way over long distances ?
- d. How can some fish avoid disrupting each other's electric signals?
- e. What is central argument of the text? .

**2. Write short answers to the following questions.**

[5×2=10]

- a. How does Gaston disagree with his wife on Gouvernail's character? ( **A Respectable Woman**)
- b. Sketch the character of Veena .(**A Devoted Son**)
- c. Why do you think the author did not characterize the persons in the story with proper names? (**Neighbours** )
- d. How does the play make a satire on the feudal system? (**The Bull**)
- e. What, according to the speaker, is a day? (**A Day**)

**3. Write long answers to the following questions.**

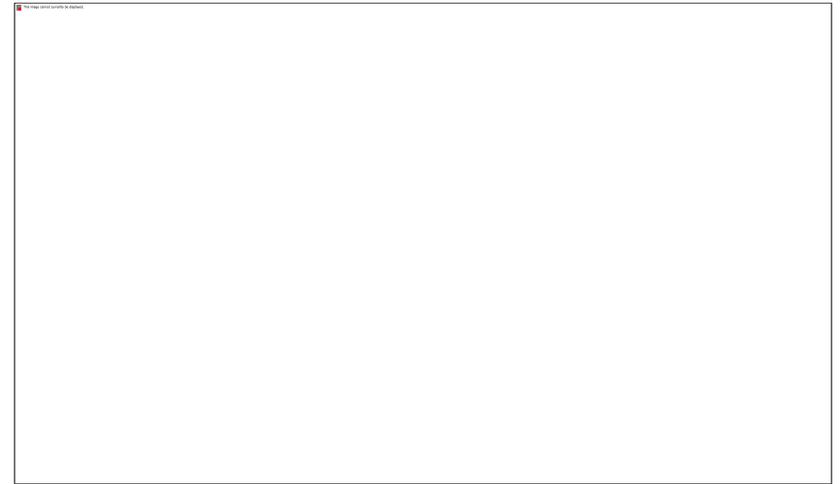
[2×5=10]

- a. In the poem '*Every Morning I Wake*', the speaker prays to the magnificent God to have mercy on ordinary inhabitants living under the Milk Wood. Elucidate this with the reference to the poem.
- b. A Nepali proverb says "Neighbors are companions for wedding procession as well as for funeral procession." Does this proverb apply in the story? Justify. (**Neighbours**)

**4. The charts below show the growth in the population in some of the world's largest cities as well as the population distribution in urban and rural areas.**

**Summarize the information by selecting and reporting the main features, and make comparisons where relevant.**

[7]



**5. Your school is going to organize a speech competition on coming Friday. The**

**subject of the speech is "Let's save the trees and protect our environment."**

**Draft a speech using the following prompts.**

[8]

Natural world – plants, elements and animals – billions of living beings and billions of trees- environment – entire air, soil, trees, water- co-existence of all good environment- human being - greedy/selfish/consumerist- thinking him owner- other things property- urbanization- industrialization- road construction canal/dam construction- airport construction- loss of trees- control greed/ appetite- good environment- quality life- bad environment- bad life.

**6. Garbage management is a big problem in most of the cities in Nepal.**

**Write a**

**letter to the editor to be published in the daily newspaper suggesting the ways**

**of 'Solving Garbage Problems.'**

[10]

**7. Do as indicated in brackets and rewrite the sentences.**

[10]

- a. My car is broken. I ..... ( **Correct form of modal verb**)
- b. I am not sure whether you or he... created the trouble. (**Use appropriate form of verb**)
- c. People have unethical justifications for ... their actions. (**Use quantifier**)

- d. I hate people laughing at me. (**Change in the passive**)
- e. Goose eggs (**Meaning of the idiom**)
- f. Leap years occur.....four years.. (**Put each or every**)
- g. Ramala is a gradually improving her health. (**Underline determiner**)
- h. There is a village.... the Fewa Lake(**Put appropriate preposition**)
- i. Does she like ice cream or sweets? (**Identify type of Question**)
- j. .... having all the qualifications, he did not get the job.(**Use appropriate connective**)

**8. Do as instructed.**

[5]

- a. She barely managed to reach the goal,.....? (**Question Tag**)
- b. After six hours' climbing, we were able to reach the summit.'**(Modal Verb)**
- c. Ram made the mistake. (**Change into the passive form**)
- d. You are chased by a band of robbers. (**Express your Regret**)
- e. She found that the less authentic tones are ... more nasal.(**Use Adverb of Frequency**)

**The End**



# The Times Secondary School

Dillibazar, Kathmandu

First Terminal Examination – 2079

Grade: - XII

Set A

Full Marks:-75

Stream: Science

Pass Marks:-30

Subject: - Mathematics

Time : 3hrs

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate the full marks.

### Group A (1 × 11 = 11)

Choose the correct answer.

1. How many numbers between 4000 and 5000 can be formed with the digits

2, 3, 4, 5, 6, 7?

- i) 40
- ii) 60
- iii) 90
- iv) 120

2. Sum of the all binomial coefficients in the expansion of  $(1+x)^n$  equals

- i) n
- ii)  $2^n$
- iii)  $n^2$
- iv)  $n!$

3. The total number of permutations of a set of n distinct objects arranged in a

circle is

- i)  $n!$
- ii)  $(n - 1)!$
- iii)  $(n - 1)$
- iv)  $\frac{(n-1)!}{2}$

4. The system of equations  $3x - 4y = 1$  ;  $6x - 8y = 7$  is

- i) Consistent and dependent
- ii) consistent and independent
- iii) inconsistent and dependent
- iv) inconsistent and independent

5. The eccentricity of the ellipse  $\frac{x^2}{9} + \frac{y^2}{16} = 1$  equals to

- i)  $\frac{\sqrt{3}}{2}$
- ii)  $\frac{\sqrt{7}}{4}$
- iii)  $\frac{1}{\sqrt{2}}$
- iv)  $\frac{2}{\sqrt{3}}$

6. If  $\cot^{-1}\frac{1}{x} + \cot^{-1}\frac{1}{y} = \frac{\pi}{4}$ , then the value of  $x + y + xy$  is equals to

- i) 0
- ii) -1
- iii) 1
- iv) 2

7. If x changes from 4 to 4.1, then approximate change in the function  $x^2 + x$  equals

- i) 0.4
- ii) 0.1
- iii) 0.90
- iv) 0.91

8. The derivative of  $\tan^{-1} \sinh x$  is

- i)  $\sinh x$
- ii)  $\coth x$
- iii)  $\operatorname{sech} x$
- iv)  $\cosh x$

9. The general solution of  $\cot bx = \tan ax$  equals to

$$\text{i) } x = \frac{2n-1\pi}{a+b} \frac{\pi}{2} \quad \text{ii) } x = \frac{2n+1\pi}{a-b} \frac{\pi}{2} \quad \text{iii) } x = \frac{2n+1\pi}{a+b} \frac{\pi}{2} \quad \text{iv) } x = \frac{n-1\pi}{a-b} \frac{\pi}{2}$$

10. The producer surplus for the supply function  $P = 3 + 2Q$  at  $P = 33$  equals

- i) 125
- ii) 175
- iii) 165
- iv) 225

OR

A body of mass 0.5 kg, and initially at rest, is subjected to a force of 2 newtons for 1 sec. The velocity acquired during the second equals

- i) 4m/s
- ii) 5m/s
- iii) 6m/s
- iv) 7m/s

11. The derivative of total revenue function is

- i) average revenue
- ii) marginal revenue
- iii) marginal cost
- iv) marginal profit

OR

The resultant of two like parallel forces P and Q equals

- i)  $P - Q$
- ii)  $P + Q$
- iii)  $PQ$
- iv)  $\frac{P}{Q}$

### Group B ( 5 × 8 = 40)

12. a) In how many ways can the letters of the word "COMPUTER" be arranged so that all the vowels may not be together ?

[3]

b) In how many ways can seven different coloured beads be made into a bracelet?

[2]

13. If  $(1 + x)^n = C_0 + C_1x + C_2x^2 + \dots + C_nx^n$ , prove that

$$C_0 + 4C_1 + 7C_2 + 10C_3 + \dots + (3n + 1)C_n = (3n + 2)2^{n-1}$$

14. Solve the system of equations  $2x - y + z = -1$ ,  $x - 2y + 3z = 4$ ,  $4x + y + 2z = 4$  by using inverse matrix method or row equivalent method.

15. Find, from first principle, the derivative of  $\log_{\cos}^{-1} x$ .

16 Given the following transaction matrix

Producing sector	Purchasing Sector		Final demand
	X	Y	
X	300	600	100
Y	400	1200	400

Find the total output to meet the final demand of 80 units of sector X and 320 units sector Y.

OR

P and Q ( $P > Q$ ) are two like parallel forces acting at A and B. Show that if they interchange their positions, the point of application of the resultant is

displaced a distance  $\frac{P-Q}{P+Q}AB$

[5]

17. a) If  $\tan^{-1}x + \tan^{-1}y + \tan^{-1}z = \frac{\pi}{2}$ , prove that  $xy + yz + zx = 1$

[2]

b) solve the equation  $\tan\theta + \tan2\theta + \tan3\theta = \tan\theta \tan2\theta \tan3\theta$

[3]

18 Find  $\frac{dy}{dx}$  i)  $y = x^m y^n = (x+y)^{m+n}$  ii)  $y = 2\tan^{-1}(\tanh\frac{x}{2})$  [3

+ 2]

19. In a competitive market, the demand and the supply function of fruits are  $Q_d = 240 - 1.4P$  and  $Q_s = -60 + 2.6P$  and the rate of price

adjustment proportional to the excess of demand is given by  $\frac{dP}{dt} =$

$0.2(Q_d - Q_s)$  with the initial price level of Rs 120. What will be  $P(t)$

when  $t = 3$ . In what time period would its price level of Rs 84?

OR

A mass of 5 kg falls 300cm from rest and is then brought to rest by penetrating 30cms into some sand; find the average thrust of the sand on it.

### Group C (8×3 = 24)

Q.No.20 i) From 6 gentlemen and 4 ladies, a committee of 5 is to be formed.

In how many ways this be done so as to include at least one lady?

[3]

ii) Apply Cramer's rule to solve the system of equations  $2x + 5y$

$= 24$

and  $2x + 3y = 12$ .

[2]

iii) Find the term independent of  $x$  in the expansion of  $(x^2 + \frac{1}{x})^{12}$ .

[3]

Q. No 21 i) Find the eccentricity, vertex and foci of the ellipse

$$\frac{(x-1)^2}{16} + \frac{(y-2)^2}{4} = 1$$

[3]

ii) The population of a certain city increases at the rate of 2% p.a. If the initial population of the city in the year 2010 be

1,50,000, what was the population of the city in 2020?

[3]

OR

A gun of mass 400 kg fires a shot of mass 3 kg, with a velocity of

$200\text{ms}^{-1}$ , find the constant forces which acting on the gun would stop it after a recoil of 2.5 meters.

iii) If  $\cos^{-1}x + \cos^{-1}y = \frac{\pi}{2}$ , prove that  $x^2 + y^2 = 1$

[2]

Q.NO. 22 i) Find the derivative of  $(\sin x)^{\cos x}$

[3]

ii) Using L Hospital's rule, evaluate  $\lim_{x \rightarrow 0} \frac{\tan x - x}{x - \sin x}$

[2]

iii) Show that the equation of tangent to the curve  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

at the

point  $(a, b)$  is  $\frac{x}{a} + \frac{y}{b} = 2$

[3]

The End



# The Times Secondary School

Dillibazar, Kathmandu

First Terminal Examination – 2079

Grade: - XII

Set B

Full Marks:-75

Stream: Science

Pass Marks:-30

Subject: - Mathematics

Time : 3hrs

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate the full marks.

### Group A (1 × 11 = 11)

Choose the correct answer.

1. How many three digits numbers less than 400 can be formed from the integers 1, 2, 3, 4, 5, 6?

- i) 60
- ii) 75
- iii) 120
- iv) 240

2. Sum of the coefficients of even terms in the expansion of  $(1+x)^n$  equals

- i)  $2^{n-1}$
- ii)  $2^n$
- iii)  $n^2$
- iv)  $n!$

3. The number of ways in which 4 letters can be posted in six letters boxes

- i) 144
- ii) 256
- iii) 900
- iv) 1296

4. The system of equations  $-6x + 4y = 10$  ;  $3x - 2y = -5$  is

- i) Consistent and dependent
- ii) consistent and independent
- iii) inconsistent and dependent
- iv) inconsistent and independent

5. The eccentricity of the ellipse  $\frac{x^2}{16} + \frac{y^2}{4} = 1$

- i)  $\frac{\sqrt{3}}{2}$
- ii)  $\frac{\sqrt{7}}{4}$
- iii)  $\frac{7}{\sqrt{2}}$
- iv)  $\frac{2}{\sqrt{3}}$

6 If  $\tan^{-1}x + \tan^{-1}y = \frac{\pi}{4}$ , then the value of  $x + y + xy$  is equal to

- i) 0
- ii) 1
- iii) -1
- iv) 3

7. If the radius of a circle increases from 5 to 5.1, the appromimate increase in

area in sq.cm is

- i)  $0.01\pi$
- ii)  $\pi$
- iii)  $0.5\pi$
- iv)  $0.3\pi$

8. The derivative of  $\log(\sinh \frac{x}{a})$  is

- i)  $\frac{1}{a} \coth \frac{x}{a}$
- ii)  $\coth \frac{x}{a}$
- iii)  $\tanh \frac{x}{a}$

iv)  $\frac{1}{a} \cosh \frac{x}{a}$

9. The general solution of  $\tan ax = \cot bx$  equals to

$$\text{i) } x = \frac{2n-1\pi}{a+b} \frac{\pi}{2} \quad \text{ii) } x = \frac{2n+1\pi}{a+b} \frac{\pi}{2} \quad \text{iii) } x = \frac{2n-1}{a+b} \frac{2}{\pi} \quad \text{iv) } x = \frac{n-1}{a-b} \frac{\pi}{2}$$

10. The consumer surplus for the demand function  $P = 12 - \frac{3}{2}Q$  at  $P = 6$

equals to

- i) 12
- ii) 15
- iii) 16
- iv) 22

**OR**

A body of mass 0.5 kg and initially at rest, is subjected to a force of 2 newtons for 1 sec. The velocity acquired during the second equals

- i) 4m/s
- ii) 5m/s
- iii) 6m/s
- iv) 7m/s

11. If the demand function of a product is  $Q = 125 - 5P$ , the graph of the revenue function has

- i) right concavity
- ii) left concavity
- iii) upward concavity
- iv) downward concavity

**OR**

The resultant of two like parallel forces P and Q equals

- i)  $P - Q$
- ii)  $P + Q$
- iii)  $PQ$
- iv)  $\frac{P}{Q}$

### Group B (5 × 8 = 40)

12. a) How many different words can be formed with the letters of the word "INTERNET" if each word is to begin with vowel ?

[3]

b) How many even numbers of 3 digits can be formed when

repetition of

digits is allowed?

[2]

13. If  $(1+x)^n = C_0 + C_1x + C_2x^2 + \dots + C_nx^n$ , prove that  $C_0 + 3C_1 + 5C_2 + \dots +$

$$(2n+1)C_n = (n+1)2^n$$

14. Solve the system of equations  $x - y + 2z = 0$ ,  $x - 2y + 3z = -1$ ,  $2x - 2y + z = -3$  by using inverse matrix method or row equivalent method.

15. Find, from first principle, the derivative of  $\log(\tan x)$

16. Given the following transaction matrix

Producing sector	Purchasing Sector		Final demand
	Agriculture	Industry	
Agriculture	300	600	100
Industry	400	1200	400

Find the total output to meet the final demand of 80 units of Agriculture Sector and 320 units of Industry Sector.

17. a) Prove that  $\tan^{-1}\left(\frac{1+\cos x}{\sin x}\right) = \frac{\pi}{2} - \frac{x}{2}$

[2]

b) Solve the equation  $\sin 2x \cdot \tan x + 1 = \sin 2x + \tan x$

[3]

18. Find  $\frac{dy}{dx}$     i)  $x^{\sin x} = y^{\sin y}$     ii)  $y = 2\tan^{-1}\left(\tanh\frac{x}{2}\right)$     [3]

+ 2]

19. In a competitive market, the demand and supply functions are given by the equations  $Q_d = 240 - 3P$  and  $Q_s = 5P - 150$ . Also, the rate of change of price adjustment proportional to the excess of demand is given by

$\frac{dP}{dQ} = 0.05(Q_d - Q_s)$  with the initial price level of Rs 50. Predict the price level for the time period 4. In how many time periods would its price level dropped by Rs.6 than the initial price.

**Group c (8×3 = 24)**

Q.No.20. i) Six men in a group of eight are skilled. Find the number of ways by which 5 men can be selected such that at least 3 of them may be skilled men.

[3]

ii) If the coefficient of  $x^{-1}$  in the expansion of  $\left(x + \frac{k}{x^2}\right)^5$  is 90, find the value of k.

[3]

iii) ) Apply Cramer's rule to solve the system of equations  $3x - 2y = 5$  and  $x + 3y = 9$

[2]

Q.No 21 i) Find the eccentricity , foci and vertices of the ellipse

$$\frac{(x+2)^2}{16} + \frac{(y-5)^2}{9} = 1.$$

[3]

ii) A finance company provides an interest at the rate of 9% p.a. compounded annually. If a man deposits Rs. 40,000 initially, how much will he get at the end of 3 years?

[3]

iii) If  $\sec^{-1}x = \operatorname{cosec}^{-1}y$ , show that  $\frac{1}{x^2} + \frac{1}{y^2} = 1$

[2]

Q.NO. 22 i) Find the derivative of  $(\sin x)^{\log x}$

[3]

ii) Using L Hospital's rule evaluate  $\lim_{x \rightarrow 0} \frac{x^2 - \sin^2 x}{x \sin x}$

[2]

iii) Prove that the tangents to the curve  $y = x^2 - 3x + 4$  at (1,2) and (2,1) are perpendicular to each other

[3]

The End



द टाइम्स माध्यमिक विद्यालय  
डिल्लीबजार, काठमाडौं  
प्रथम त्रैमासिक परीक्षा: २०७९

कक्षा: १२

समूह क

पूर्णाङ्क : ७५

सङ्काय: विज्ञान

उत्तीर्णाङ्क : ३०

विषय : नेपाली

समय : ३ घण्टा

(सबै प्रश्नको उत्तर दिनुहोस् । मौलिक उत्तरलाई प्राथमिकता दिइनेछ ।)

१. तलको अनुच्छेदमा रेखाङ्कन गरिएका शब्दको अक्षर संरचना र अक्षर सङ्ख्या देखाउनुहोस् :

(३)

शिक्षण सिकाइ क्रियाकलापमा सूचना तथा प्रविधिको प्रयोगमा जोड दिनु भनेको शिक्षकको भूमिका ज्ञानको हस्तान्तरणकर्ताबाट ज्ञान आर्जनमा सहयोग कर्ताको परिवर्तन हुन्छ । यो अवस्थामा शिक्षकमा प्रविधिको प्रयोग सम्बन्धी ज्ञानले मात्र पुग्दैन । प्रविधिको साधनको प्रयोगबाट सिकाइलाई जोड्दै सिकाइलाई अर्थपूर्ण बनाउनु र त्यसलाई विद्यार्थीको पूर्वज्ञानसँग जोड्दै त्यसको व्याख्या गर्न र विद्यार्थीलाई सिकाइको नेतृत्वकर्ता बनाइ सहयोगीको भूमिका निर्वाह गर्नु निकै चुनौतीपूर्ण छ ।

२. शुद्ध गरी पुनर्लेखन गर्नुहोस् :

(३)

म गतहप्ता भुक्तमण्डपमा विज्ञान प्रदर्शनी हेर्न गएँ । त्यहाँ धेरै किसिमका कम्प्युटर, ल्यापटप र मोबाइलहरू राखिएका थिए । त्यस प्रदर्शनीमा भर्खर कक्षा दश पूरा गरेर एघारमा पढ्दै गरेका विद्यार्थीदेखि एम. ए र पिएच्.डी गरेका प्राध्यापकहरू समेत आएका थिए ।

३. कुनै एक प्रश्नको उत्तर दिनुहोस् :

(२)

(क) दिइएका अंशबाट एकओटा पारिभाषिक शब्द र एकओटा अनुकरणात्मक शब्द पहिचान गरी वाक्यमा प्रयोग गर्नुहोस् :

कार्यालयको बेरुजु रकम बढेपछि ऊ मानसिक अन्तद्वन्द्वमा फस्यो । त्यसपछि कार्यक्षेत्रबाट जुरुक्क उठेर सुटुक्क घरतिर लाग्यो ।

(ख) दिइएको अनुच्छेदबाट एउटा उखान र एउटा टुक्का पहिचान गरी तिनलाई वाक्यमा प्रयोग गर्नुहोस् : गाउँमा एककासि महाविपत्ति पयो । यस्तो बेला पनि तमासा हेर्ने र कानमा तेल हालेर बस्नेको कमी भएन । तीमध्ये केहीले भने आफ्नो गाँस काटेर भए पनि बचाए । यो कुरा एक कान दुई कान मैदान भैं सबैतिर फैलियो । छिमेकी, इष्टमित्र सबैको सहयोगले एकले थुकी सुकी सयले थुकी नदी भने भैं हुँदै गयो । आफू भलो त जगत् भलो भन्ने भनाइलाई अन्ततः सहयोगी मनले चरितार्थ गरेरै छाडे ।

४. तलको अनुच्छेदमा रेखाङ्कन गरिएका शब्दको शब्दवर्ग पहिचान गर्नुहोस् :

(३)

आगामी केही वर्षहरूमा निश्चित महिनामा विद्युत् व्यापारको परिमाण भन् बढ्ने नेपाल विद्युत् प्राधिकरणले प्रक्षेपण गरेको छ, तापनि प्राधिकरणका अनुसार चालु आर्थिक वर्षमा भन्डै ८०० मेगावाट विद्युत् नेपालको कुल जडित क्षमतामा थप हुने अनुमान गरिएको नै छ ।

५. तलको अनुच्छेदबाट दुईओटा तत्सम शब्द र दुईओटा आगन्तुक शब्द पहिचान गरी लेख्नुहोस् :

(२)

अक्षता हेरे मै टपरीका फाइल हेर्दै हार्डडिस्कमा राख्दै गर्न थाल्यो एन्टिभाइरस गोर्खे । आधाजति पुगाएपछि राक्षस जस्तो घिनलाग्दो देखिने भाइरस भेट्यो । ती भाइरसले लगभग चार सय फाइलमा सङ्कमण गरेका थिए । थुप्रै फाइल मर्मत भए, मर्मत हुन नसकेकालाई एन्टिभाइरस गोर्खले डिलिट गर्ने सुझाव दियो ।

६. कुनै एक प्रश्नको उत्तर दिनुहोस् :

(३)

(क) तलको अनुच्छेदबाट तीनओटा उपसर्ग व्युत्पन्न शब्द र तीनओटा प्रत्यय व्युत्पन्न शब्द पहिचान गरी तिनको निर्माण प्रक्रिया देखाउनुहोस् :

ग्रामीण भेगको तुलनामा सहरिया मानिस विलासी हुन्छन् । सधैं परिश्रम गरेर बाँच्ने गाउँले जीवन कर्तव्यले भरिएको हुन्छ । सादा आचरण भएका उनीहरू सबैमा सहभाव राख्छन् ।

(ख) तलको अनुच्छेदबाट तीनओटा समस्त शब्द र तीनओटा द्वित्व शब्द पहिचान गरी समस्त शब्दको विग्रह र द्वित्व शब्दको दोहोरिएको अंश देखाउनुहोस् :

कोभिडका कारण बन्दावन्दीको समयमा घरबाहिर ननिस्कन निषेधाज्ञा जारी गरे तापनि आआफ्ना सुरमा सहरबजारका ठिठाठिठा ओहोरदोहोर गरिरहेका देखिन्थे । विश्व नै रोगग्रस्त भएका बेला यसरी बेकाममा लुखुरलुखुर गरी गल्लीडुलुवा भई हिँड्नु राम्रो होइन ।

७. तलको अनुच्छेदका वाक्यलाई उच्च आदरमा परिवर्तन गरी पुनर्लेखन गर्नुहोस् :

(४)

तँ बडो अचम्मकी छेस् । उसले पनि खास मिहिनेत गरेकी छैन । उसकी साँगीनी भने खुब अध्ययन गर्छ । तिमीहरू सुधेनौ ।

८. तलको अनुच्छेदका वाक्यलाई इच्छार्थमा परिवर्तन गरी पुनर्लेखन गर्नुहोस् :

(४)

नेताको बुद्धि फिछ्छ । उसले दुःखमा परेका मान्छेलाई सहयोग गर्ने छ । गाउँलेहरूले पनि उसलाई माफी दिन्छन् । नेतार गाउँलेहरूको सम्बन्ध राम्रो बनेको छ ।

९. तलको अनुच्छेदका वाक्यलाई प्रथम पुरुषमा परिवर्तन गरी वाक्यढाँचा समेत मिलाई पुनर्लेखन गर्नुहोस् :

(४)

उनीहरू पशुपति गएका थिए । उनीहरू यहाँ पनि आएका थिए । उनीहरूले भोला बोकेका थिए । उनीहरूले खाना खानमागेका थिएनन् ।

१०. दिइएको अनुच्छेद पढी अन्त्यमा सोधिएका प्रश्नको उत्तर दिनुहोस् :

( ५×१= ५)

विज्ञानले प्रकृतिको नियम बुझेर मानिसलाई प्रकृति र समयमाथि विजय प्राप्त गर्न सफल बनाएको छ । विज्ञानको कार्यरूप नै प्रविधि हो । विज्ञान अध्ययनद्वारा विकास भइसकेपछि यसले मानिसलाई भौतिक विपन्नताबाट सम्पन्नतातिर अवििकासको अँध्यारोबाट विकासको आलोकतिर अनि असभ्य मानव जीवनबाट सभ्यतातिर उन्मुख गराएको छ । दिनदिने नयाँ कुराको खोज र अनुसन्धानमा रुचि लिन मानिसको स्वभाव नै हो । मानव सभ्यताको मिर्मिरेदेखि नै विज्ञानको

मुना पलाएको मानिन्छ । जङ्गली जनावरसँग कुस्ती खेल्दै ओडारमा ओत बस्ने मानिस आज गगनचुम्बी महलमा बसेर सुख भोग गर्न सफल भएको छ । जीवन सरल र सहज बनाउन मानिसले गरेको यो कार्यले 'आवश्यकता नै आविष्कारको जननी हो' भन्ने उक्तिलाई मूर्तरूप दिएको छ । यसैक्रममा मानव सभ्यतालाई अभि प्रभावकारी बनाउन विज्ञान र प्रविधिको जन्म भएको हो । विज्ञान र प्रविधिमा भएको यो आशातीत प्रगति नै मानव सभ्यता र उत्थानको मूल कारक हो । विज्ञान र प्रविधिमा भएको प्रगतिले पाषाणयुगीन सभ्यतालाई मोडेर नवीन मानव सभ्यता र त्यसमा गतिशीलता प्रदान गरेको छ । यसको सकारात्मक पक्षको रूपमा यसले कृषि, उद्योग, यातायात, सञ्चार, शिक्षा, स्वास्थ्य र अन्य क्षेत्रमा गरेको प्रगतिलाई लिन सकिन्छ । भूमि मार्गमा गुड्ने बस, ट्रक, कार आदि मात्र नभई आकाशमा उड्ने वायुयान र जलमार्ग भई तर्ने वेडाले मानिसलाई विश्व भ्रमण गराएको छ । अत्याधुनिक प्रविधिले मानिसलाई आकाशमा चराभैँ उड्न र पानीमा माछाभैँ पौडिन सफल बनाएको छ । आजकल नेपालमा खाएर हड्कड्गमा चुट्न पुगिन्छ, बेलायतमा निदाएर क्यानबेरामा बिउँफिन पुगिन्छ । समयको महत्व बुझाइ विज्ञानले ठाउँको दूरी समाप्त पारी विश्व भूमण्डललाई साँघुरो बनाउँदै मानिसलाई विश्व

विचरण गराएको छ । हिजोका रहस्यका अनन्त कुरा चाहार्न विज्ञान सफल भएको छ । त्यसैले त चन्द्रमा पदार्पण गर्नहोस या पृथ्वीको अवलोकन गर्नहोस, मानिस चुकेको छैन । यसरी विज्ञान र प्रविधिले यातायातको क्षेत्रमा अभूतपूर्व क्रान्ति ल्याएको छ ।

#### प्रश्नहरू:

- विज्ञान र प्रविधिले मानिसलाई कता उन्मुख गराएको छ ?
- विज्ञान र प्रविधिको जन्म कसरी भएको हो ?
- विज्ञान र प्रविधिको सकारात्मक प्रभाव कुनकुन क्षेत्रमा कसरी परेको छ ?
- मानिसहरूले विज्ञान र प्रविधिको प्रयोग कसरी गरेका छन् ?
- 'पाषाणयुग' र 'भूमण्डल' शब्दको अर्थ लेख्नुहोस् ।

#### ११. दिइएको अनुच्छेद पढी मुख्य मुख्य चारओटा बुँदा टिपोट गरी सारांश लेख्नुहोस् : (२+३=५)

परापूर्वकालदेखि समाजमा प्रचलित कलालाई लोककला भनिन्छ । लोककला एक पुस्ताबाट अर्को पुस्तामा पुस्तान्तरण हुँदै जान्छ । नेपालमा थारु, मैथिली, पर्वते, नेवारी, जैती, अवधी, मुस्ताङ्गी, भोटे, खाम, किरात, राजवंशी आदिका लोककला प्रचलित छन् । यीमध्ये थारु लोककला पनि एक हो । थारु लोककला अन्तर्गत चित्रकला, मूर्तिकला, वास्तुकला, हस्तकला, भुट्टीकला, गोडैनाकला आदि पर्छन् । तिनमा पनि विशेष गरी चित्र र मूर्तिकला बढी प्रचलित छन् । चित्रकला भित्ता, प्रस्तर, डेहरी, हस्तकलाका सामान, भूमि, पट, वास्तु, काठ, कागज आदि माध्यमबाट बनाइन्छ । थारु समाजमा विशेष गरी पश्चिमातिर अस्टिम्की र मिथिला क्षेत्रतिर कोहवर/सितुवा र बाँसबासिनी चित्र बढी प्रचलित छन् । त्यस्तै सुदूरपूर्वमा मोखकला र सुदूरपश्चिममा सजावटीय चित्र तथा उद्भूत मूर्ति बनाउने चलन रहेको छ । कृष्णाष्टमीका दिन घरको भित्तामा बनाइने चित्रलाई अस्टिम्की भनिन्छ । प्रतीकात्मक ढङ्गले बनाइने यो चित्रले सत्य, त्रेता, द्वापर र कलियुगलाई समेटेको हुन्छ । विवाहका बेला थारुहरूले बनाउने चित्र 'सितुवा/कोहवर' भनिन्छ । ज्यामितीय आकारमा बनाइएका यस्ता चित्रमा पहेंलो, रातो, हरियो र कालो रङको प्रयोग अधिक मात्रामा गरिएको हुन्छ । यो चित्रको खास उद्देश्य वैवाहिक जीवनलाई सुमधुर बनाउनु हो । थारु समाजमा पूजाआजा तथा विभिन्न संस्कारजन्य कार्यमा विभिन्न खाले चित्र बनाइन्छ । बेहुली घर भित्र्याउने बेलामा सेलरोटी आकारको प्रतीकात्मक गोलो चित्र बनाइन्छ । देवदेवीको पूजापाठका बेला त्रिशूल, स्वास्तिक चिह्न, कमल, त्रिभुज, पट्कोणलगायतका प्रतीकात्मक चित्र बनाइने

गरिन्छ । चट्याङ नपरोस् भनेर सेतो माटाले घरको बाहिरपट्टिको भित्ताका विचमा रेखा तानिन्छ र त्रिशूल बनाइन्छ । थारु समाजमा प्रस्तर, काष्ठ तथा सेरामिक मूर्तिकला प्रचलनमा रहेका छन् । तीमध्ये पनि सेरामिक कलाको बढी प्रयोग भएको पाइन्छ । भाँडावर्तन, हात्ती, घोडा, बाघ, मयूर, जोखवा जोखिनियाँलगायतका माटाका मूर्ति थारु समाजमा प्रचलित छन्।

#### १२. कुनै एक प्रश्नको उत्तर लेख्नुहोस् :

(४)

(क) आफ्नो गाउँमा फोहोर मैला तथा लागुपदार्थ सेवनकर्ताका कारण वातावरण तथा सुरक्षा विरोको कुरालाई सम्बन्धित निकायसम्म पुऱ्याउनका लागि यस सम्बन्धमा समाचार सम्प्रेषण गरिदिनुहुन अनुरोध गर्दै कुनै राष्ट्रिय दैनिकका सम्पादकलाई चिठी लेख्नुहोस् ।

(ख) साभा प्रकाशनद्वारा प्रकाशित केही पाठ्यपुस्तक द टाइम्स माध्यमिक विद्यालयको पुस्तकालयलाई उपहारस्वरूप प्राप्त भएपछि पुस्तकालयले तयार पारिदिएको भरपाईको नमुना बनाउनुहोस् ।

#### १३. कुनै एक प्रश्नको उत्तर लेख्नुहोस् :

(५)

(क) आफ्नो विद्यालयमा हालसालै सम्पन्न कुनै एक कार्यक्रमका सबै कुरा समेटी १५० शब्दसम्मको एउटा प्रतिवेदन तयार गर्नुहोस् ।

(ख) 'नेपालको कृषि प्रणालीमा सुधारको आवश्यकता' शीर्षकमा १५० शब्दसम्मको टिप्पणी लेख्नुहोस् ।

#### १४. व्याख्या गर्नुहोस् :

(४)

(क) तिम्रो तोते बोलीमा त्यसैको मधुर ध्वनि

तर त्यो मिठो गीतले तिमीलाई

आफ्नो बाँसुरी बनाएनछ !

#### १५. तलको प्रश्नको उत्तर लेख्नुहोस् :

(४)

(क) दिइएको कथांश पढी सोधिएका प्रश्नको उत्तर लेख्नुहोस् :

कुनै अजरगर, कर्कोटक वा निषादयुवकले फेरि बलजपती गर्न नपाओस्, त्यस्ता कुनैले देखिहाल्यो भने पनि कुरूप र बौलाही ठानेर त्यस्ताले आक्रमण नगरुन् भन्ने विचार गर्दै दमयन्तीले आफ्नो केशलाई धुलाले मुसारेर जगल्टा जस्तो बनाइन् र आफ्नो रूपलाई हिलो दलेर विकृत तुल्याइन् । मानिसको परिचय उसको शरीरले भन्दा पनि उसको मस्तिष्क र हृदयले दिने हुँदा शरीरलाई जतिसुकै क्षतविक्षत तुल्याए पनि दमयन्तीको हृदय र बुद्धि भविष्यको उज्यालो आशामा नलप्रति भन् भन् बढी मुग्ध र कोमल हुँदै गयो ।

#### प्रश्नहरू

(अ) 'मानिसको परिचय शरीरले भन्दा पनि उसको मस्तिष्क र हृदयले दिन्छ' भन्नुको तात्पर्य के हो?

(आ) दमयन्तीले आफ्नो रूप किन बदलेकी हुन् ?

१६. अहिलेका महिलाहरूले आफ्नो प्रेम प्राप्तिको लागि दमयन्तीले गरे जस्तै सङ्घर्ष गरेका छन् ?  
आफ्नो प्रतिक्रिया लेख्नुहोस् ।

(४)

१७. समीक्षात्मक उत्तर दिनुहोस् :

(८)

(क) 'प्रकृतिसँग जुध्नु नै जीवनको रमाइलो पक्ष हो' भन्ने कुरालाई घनघस्याको उकालो काट्ता  
नियात्रामा कसरी देखाइएको छ ? नियात्राका आधारमा समीक्षात्मक उत्तर लेख्नुहोस् ।

१८. कुनै एक शीर्षकमा कम्तीमा २५० शब्दसम्मको निबन्ध लेख्नुहोस् :

(८)

- (क) देश विकासमा युवावर्गको भूमिका
- (ख) अर्थतन्त्र नै देश विकासको मेरुदण्ड
- (ग) शान्ति, समृद्धि र विकास

समाप्त



द टाइम्स माध्यमिक विद्यालय  
डिल्लीबजार, काठमाडौं  
प्रथम त्रैमासिक परीक्षा: २०७९

कक्षा: १२

समूह ख

पूर्णाङ्क : ७५

सङ्काय: विज्ञान

उत्तीर्णाङ्क : ३०

विषय : नेपाली

समय : ३ घण्टा

(सबै प्रश्नको उत्तर दिनुहोस् । मौलिक उत्तरलाई प्राथमिकता दिइनेछ ।)

१. तलको अनुच्छेदमा रेखाङ्कन गरिएका शब्दको अक्षर संरचना र अक्षर सङ्ख्या देखाउनुहोस् :

(३)

प्रविधिको साधनको प्रयोगबाट सिकाइलाई जोड्दै सिकाइलाई अर्थपूर्ण बनाउनु र त्यसलाई विद्यार्थीको पूर्वज्ञानसँग जोड्दै त्यसको व्याख्या गर्न र विद्यार्थीलाई सिकाइको नेतृत्वकर्ता बनाइ सहयोगीको भूमिका निर्वाह गर्नु निकै चुनौतीपूर्ण छ ।

२. शुद्ध गरी पुनर्लेखन गर्नुहोस् :

(३)

नेपाल प्राकृतिक सौन्दर्यका दृष्टिले अन्यन्त मनोहर छ । यसैले नेपाल संसारमै पर्यटनका लागि आकर्षक गन्तव्यका रूपमा परिचित छ । नेपाल प्राकृतिक सौन्दर्य, ऐतिहासिक, गौरव, सांस्कृतिक र पुरातात्विक सम्पदाले सम्पन्न देश भएकाले पर्यटनका लागि उत्कृष्ट गन्तव्यका रूपमा चिनिएको हो ।

३. कुनै एक प्रश्नको उत्तर दिनुहोस् :

(२)

(क) दिइएका अंशबाट एकओटा पारिभाषिक शब्द र एकओटा अनुकरणात्मक शब्द पहिचान गरी वाक्यमा प्रयोग गर्नुहोस् :  
हिसाबकिताब विगारेर बेरुजु निकालेको लेखापालले खुरुखुरु आफ्नो गलती महसुस गरेर प्रतिवेदन पेस गर्नुको सट्टा ल्याडल्याड गरेर समय खर्च गर्दै छ ।

(ख) दिइएको अनुच्छेदबाट एउटा उखान र एउटा टुक्का पहिचान गरी तिनलाई वाक्यमा प्रयोग गर्नुहोस् :

गाउँमा एककासि महाविपत्ति पत्थो । यस्तो बेला पनि तमासा हेर्ने र कानमा तेल हालेर बस्नेको कमी भएन । तीमध्ये केहीले भने आफ्नो गाँस काटेर भए पनि बचाए । यो कुरा एक कान दुई कान मैदान भै सबैतिर फैलियो । छिमेकी, इष्टमित्र सबैको सहयोगले एकले थुकी सुकी सयले थुकी नदी भने भै हुँदै गयो । आफू भलो त जगत् भलो भन्ने भनाइलाई अन्ततः सहयोगी मनले चरितार्थ गरेरै छाडे ।

४. तलको अनुच्छेदमा रेखाङ्कन गरिएका शब्दको शब्दवर्ग पहिचान गर्नुहोस् :

(३)

अमेरिकी अन्तरिक्ष निकाय नासाले एउटा ब्याक होल नजिकै रहेको क्षेत्रबाट उत्पन्न ध्वनि सार्वजनिक गरेको छ अनि वैज्ञानिकहरूका अनुसार यो आवाज पर्सिअस तारापुञ्जको केन्द्रमा रहेको तातो ग्यासयुक्त स्थानका कारण उत्पन्न भएकै तु हो ।

५. तलको अनुच्छेदबाट दुईओटा तत्सम शब्द र दुईओटा आगन्तुक शब्द पहिचान गरी लेख्नुहोस् :

(२)

डाक्टर, इन्जिनियरलगायतका प्राविधिक शिक्षा पढ्नेलाई नेपाली भाषाको किन आवश्यक छ र ? भनेर प्रश्न गर्ने ती विषय विशेषज्ञ होइनन् । तिनीहरू नेपाली भाषाप्रति प्रहार गर्ने

नियतले लागेका व्यक्तिहरू हुन । तिनीहरूलाई बेलैमा चिन्नुपर्ने देखिन्छ ।

६. कुनै एक प्रश्नको उत्तर दिनुहोस् : (३)

(क) तलको अनुच्छेदबाट तीनओटा उपसर्ग व्युत्पन्न शब्द र तीनओटा प्रत्यय व्युत्पन्न शब्द पहिचान गरी तिनको निर्माण प्रक्रिया देखाउनुहोस् :  
लडाइँमा विजय वा पराजय पनि हुन सक्छ भन्ने कुरामा सचेत रहनुहोस् । मुख्याईँ नगरी हार्दिकताका साथ जोसिलो जीवन बाँच्नुहोस्, शत्रु रहस्यमय ढङ्गले निस्तेज हुनेछन् । सडकटको सही समाधानका लागि तत्कालीन परिवेशलाई अध्ययन गर्न नविर्सनुहोस् ।

(ख) तलको अनुच्छेदबाट तीनओटा समस्त शब्द र तीनओटा द्वित्व शब्द पहिचान गरी समस्त शब्दको विग्रह र द्वित्व शब्दको दोहोरिएको अंश देखाउनुहोस् :  
कोभिडका कारण बन्दावन्दीको समयमा घरबाहिर ननिस्कन निषेधाज्ञा जारी गरे तापनि आफ्ना सुरमा सहरबजारका ठिठाठिठी ओहोरदोहोर गरिरहेका देखिन्थे । विश्व नै रोगग्रस्त भएका बेला यसरी बेकाममा लुखुरलुखुर गरी गल्लीडुलुवा भई हिँड्नु राम्रो होइन ।

७. तलको अनुच्छेदका वाक्यलाई उच्च आदरमा परिवर्तन गरी पुनर्लेखन गर्नुहोस् :

(४)

तँ बडो अचम्मकी छेस् । उसले पनि खास मिहिनेत गरेकी छैन । उसकी साँगीनी भने खुब अध्ययन गर्छ ।  
तिमीहरू सुधेनौ ।

८. तलको अनुच्छेदका वाक्यलाई इच्छार्थमा परिवर्तन गरी पुनर्लेखन गर्नुहोस् :

(४)

सुसनको बुद्धि फिर्छ । उसले दुःखमा परेका मान्छेलाई सहयोग गर्ने छ । गाउँलेहरूले पनि उसलाई माफी दिन्छन् । सुसन र गाउँलेहरूको सम्बन्ध राम्रो बनेको छ ।

९. तलको अनुच्छेदका वाक्यलाई प्रथम पुरुषमा परिवर्तन गरी वाक्यढाँचा समेत मिलाई पुनर्लेखन गर्नुहोस् :

(४)

उनीहरू गएका थिए । उनीहरू यहाँ पनि आएका थिए । उनीहरूले भोला बोकेका थिए ।  
उनीहरूले खाना खान मागेका थिएनन् ।

१०. दिइएको अनुच्छेद पढी अन्त्यमा सोधिएका प्रश्नको उत्तर दिनुहोस् :

(५×१=५)

कुल गार्हस्थ्य उत्पादनमा औद्योगिक क्षेत्रको योगदान बढाउनका लागि स्वदेशी तथा विदेशी पुँजीको परिचालन गर्नुपर्छ । एकल बिन्दु सेवा केन्द्रका माध्यमबाट वैदेशिक लगानी प्रवर्धन गर्न आवश्यक छ । उपलब्ध स्रोतसाधन र श्रमको उपयोग गरेर औद्योगिक उत्पादन र उत्पादकत्वमा अभिवृद्धि गर्न सकिन्छ । लघु, घरेलु तथा साना उद्योगको संरक्षण र प्रवर्धन गरी रोजगारी सिर्जना गर्न सकिन्छ । गरिबी न्यूनीकरण, नेपाली वस्तु तथा सेवाका लागि लगानीमैत्री वातावरण सिर्जना, आयात प्रतिस्थापन र निर्यात प्रवर्धनका माध्यमबाट अर्थतन्त्रलाई सुदृढ गर्न आवश्यक छ । तुलनात्मक लाभ तथा प्रतिस्पर्धी क्षमता भएका नेपाली वस्तु तथा सेवाको उत्पादन वृद्धि गर्नुपर्छ । निर्यात प्रवर्धन तथा आयात व्यवस्थापन गरी आन्तरिक माग पूर्ति गर्न सकिन्छ । द्विपक्षीय, क्षेत्रीय र बहुपक्षीय व्यापार प्रणालीबाट अधिकतम लाभ लिने गरी वैदेशिक व्यापारसम्बन्धी योजना तथा कार्यक्रम सञ्चालन गर्न आवश्यक छ । खाद्यान्न, औषधी तथा

पेट्रोलियम पदार्थ जस्ता अत्यावश्यक वस्तुको सरल र उचित मूल्यमा सहज उपलब्ध हुने व्यवस्था आवश्यक छ । यसका लागि आपूर्ति व्यवस्थापनमा सुधार ल्याई मूल्य स्थिरता कायम गर्नुपर्छ । गुणस्तरीय वस्तु तथा सेवामा सहज पहुँच पुऱ्याई उपभोक्ताको हकहित संरक्षण गर्नुपर्छ । खाद्यान्न तथा अन्य वस्तुमा हुने मिसावट, ठगी, कालोबजारी, नियन्त्रण गर्न बजार अनगुमनलाई तीव्र बनाउन आवश्यक छ । यसका लागि विद्यमान ऐन नियमको प्रभावकारी कार्यान्वयन गर्ने गरी कार्यक्रम कार्यान्वयन गर्नुपर्छ ।

#### प्रश्नहरू

- (क) केका लागि स्वदेशी तथा विदेशी पुँजीको परिचालन गर्नुपर्छ ?  
 (ख) गरिवी न्यूनीकरणका उपाय के के हुन् ?  
 (ग) अर्थतन्त्रलाई सुदृढ गर्न कस्ता उपाय अपनाउनुपर्छ ?  
 (घ) उपभोक्ताको हकहितको संरक्षण कसरी गर्न सकिन्छ ?  
 (ङ) 'कुल गार्हस्थ्य' र 'प्रवर्धन' शब्दको अर्थ लेख्नुहोस् ।

११. दिइएको अनुच्छेद पढी मुख्य मुख्य चारओटा बुँदा टिपोट गरी सारांश लेख्नुहोस् : ( २+३=५)

रुस-युक्रेन युद्धले पेट्रोलियम पदार्थको मात्र नभई दैनिक उपभोग्य वस्तु र सेवासमेतको मूल्य बढाएको छ । रुस प्राकृतिक ग्यास र पेट्रोलियम पदार्थको अग्रणी निर्यातकर्ता हो । यसले सन् २०२० मा २३८ बिलियन क्युबिक लिटर प्राकृतिक ग्यास, दैनिक २० लाख २० हजार ब्यारेल तेल र १० लाख २० हजार ब्यारेल तेलजन्य उत्पादन निर्यात गरेको थियो । रुस र युक्रेन दुवै ठूलो मात्रामा गहुँ, मकै र वनस्पतिजन्य तेलका निर्यातकर्ता हुन् । दुवैले विश्वको कुल गहुँ निर्यातको एक चौथाइ, मकै निर्यातको पाँच भागको एक भाग र सनफ्लावर तेलको दुईतिहाइ हिस्सा ओगटेका छन् । युद्धले उत्पादन र वितरण शृंखला विग्रिएको छ । विश्वभरि नै मूल्यवृद्धि गरेको छ । रुस-युक्रेन युद्धका कारण करिब ६० लाख मानिस विस्थापित भएका छन् । गत वर्षसम्म एक प्रतिशतको हाराहारीमा रहेको अमेरिकाको मुद्रास्फीति ४० वर्षयताकै सबैभन्दा धेरै (८.६ प्रतिशत) पुगिसकेको छ । ओईसीडीका ३८ मुलुकमा मुद्रास्फीति दर ९ प्रतिशतविरपरि पुग्ने अनुमान छ । ब्राजिल ११.३, क्यानडा ६.७, बेलायत ७ र अस्ट्रेलिया ५.१ प्रतिशतको मूल्यवृद्धिसँग जुधिरहेका छन् । यो आर्थिक वर्षमा नेपालको मुद्रास्फीति दर अहिले नै पाँच वर्षयताकै बढी ( ७.८७ प्रतिशत) छ र यो वर्ष दस प्रतिशतभन्दा माथि हुने निश्चित छ । रुस र युक्रेनले विश्वकै कुल खाद्यान्न खपतको ३३ प्रतिशत हिस्सा निर्यात गर्छन् । अतः रुस-युक्रेन युद्धका कारण विश्वभरि खाद्य संकट निम्तने देखिन्छ, यसैका कारण करिब ६० लाख मानिस विस्थापित भएका छन्, जसको असर खाद्यान्न उत्पादनमा पर्ने निश्चित छ । यसको सोभो अर्थ हुन्छ, सन् २०२३ मा पनि विश्वले खाद्य संकट वेहोनुपर्ने नै छ । अहिले छिमेकी भारतसहित विश्वका ५० देशले खाद्यान्न निर्यातमा प्रतिबन्ध लगाएका छन् । रुस विश्वको सबैभन्दा ठूलो रासायनिक मल उत्पादक हो । रुसमाथिको प्रतिबन्धका कारण रुसी रासायनिक मलमा भर परेका देशहरूको कृषि उत्पादन भन् कमजोर हुने देखिन्छ ।

१२. कुनै एक प्रश्नको उत्तर लेख्नुहोस् : (४)

(क) व्यापारिक सम्झौता गर्नको लागि ड्रागन कम्प्युटर निर्माण कम्पनी लिमिटेड, काठमाडौँले टिटन कम्प्युटर विक्री केन्द्र, पोखरालाई लेख्ने चिठीको नमुना तयार पार्नुहोस् ।

(ख) कुनै एउटा व्यक्तिले अर्को व्यक्तिसँग असी हजार रुपैयाँ ऋण सापटीस्वरूप लिएपछि तयार परेको तमसुकको नमुना बनाउनुहोस् ।

१३. कुनै एक प्रश्नको उत्तर लेख्नुहोस् : (५)

(क) आफ्नो विद्यालयमा हालसालै सम्पन्न रक्तदान कार्यक्रमका सबै कुरा समेटी १५० शब्दसम्मको एउटा प्रतिवेदन तयार गर्नुहोस् ।

(ख) 'नेपालको कृषि प्रणालीमा सुधारको आवश्यकता' शीर्षकमा १५० शब्दसम्मको टिप्पणी लेख्नुहोस् ।

१४. व्याख्या गर्नुहोस् : (४)

"मैले कसैको जुठो खान नपरोस्, कसैको पाउ दाब्न नपरोस् र कुनै परपुरुषसित बोल्न नपरोस् ।"

१५. दिइएको कथांश पढी सोधिएका प्रश्नको उत्तर लेख्नुहोस् : (४)

कालोनिनी आकाशमा उत्तरतिर ध्रुवतारा त्यसको दाहिनेतिर साततारा र देब्रेतिर पाँच ताराका उज्याला तारामण्डलले तिनलाई मोहित तुल्यायो । पूर्वदेखि पश्चिमतिर केही दक्षिणतिर ढल्किएको आकाशगङ्गा दमयन्तीका दृष्टिमा सङ्गीतमय हुन थाल्यो । आकाश र पृथ्वी यस्ता सुन्दर छन् । तिनका बिच आफू एकली विरहिणी अवस्थामा अनुभव गरेर दमयन्ती कोमल मधुर स्वरमा वियोग र पीडाको गीत गाउन थालिन् । कतिवेरसम्म तिनले गीत गाइन्, तिनले आफैँ थाहा पाइन् । आकाशमा विस्तारै विस्तारै उभ्रिएर आउँदै पातला बादलले त्यो सुन्दर आकाशलाई दमयन्तीका हृदयमा धूमिल तुल्याउँदै लग्यो ।

#### प्रश्नहरू

(अ) माथिको अनुच्छेदमा कस्तो परिवेशको चित्रण गरिएको छ ?

(आ) आकाश र दमयन्तीको हृदयका बिच के समानता छ ?

१६. 'घनघस्याको उकालो कट्टा' नियात्रामा नियात्राकारले यात्राको कस्तो अनुभूतिलाई उल्लेख गर्न खोजेका हुन जस्तो लाग्छ? तपाईंको आफ्नो प्रतिक्रिया दिनुहोस् ।

(४)

१७. 'आमाको सपना' कवितामा क्रान्तिलाई कसरी चित्रण गरिएको छ ? कविताको आधारमा समीक्षात्मक उत्तर लेख्नुहोस् । (८)

१८. कुनै एक शीर्षकमा कम्तीमा २५० शब्दसम्मको निबन्ध लेख्नुहोस् : (८)

(क) सिर्जनशीलता

(ख) देश विकासमा युवावर्गको भूमिका

(ग) नयाँ पुस्ताबाट राज्यले गरेको अपेक्षा



# The Times Secondary School

Dillibazar, Kathmandu

First Terminal Examination – 2079

Grade: - XII

Set A

Full Marks:-75

Stream: Science

Pass Marks:-30

Subject: - Physics

Time : 3hrs

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate the full marks.

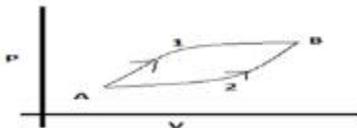
## Attempt all questions

### Group 'A'

Encircle the best alternative to the following questions.

(11×1 = 11)

1. A electric motor operates 20rpm. What will be the power delivered by motor it supplied the torque of 75Nm  
a. 750W                      b. 1500W                      c. 3000W                      d. 9400W
2. If there is no external torque acting on a body moving in elliptical path, which of the following quantities remain const.  
a. Kinetic energy                      b. potential energy  
c. linear momentum                      d. Angular momentum
3. The counterparts of mass in rotational motion is  
a. Torque                      b. angular momentum  
c. couple                      d. moment of inertia
4. If 315cal of heat is given to the system, and the system does 20cal of work, find the change in internal energy.  
a. 295cal                      b. 335cal                      c. 0 cal                      d. 335J
5. What is the relation between the internal energy and heat supplied in the process 1 & 2 shown in the diagram? Both paths start at A and end at B.



- a.  $U_1 > U_2, Q_1 > Q_2$                       b.  $U_1 < U_2, Q_1 > Q_2$   
c.  $U_1 = U_2, Q_1 = Q_2$                       d.  $U_1 = U_2, Q_2 > Q_2$ .
6. when a sound wave goes from one medium to another medium, the quantity that remains unchanged is  
a. speed                      b. amplitude                      c. frequency                      d. wavelength
7. Two sources of light are said to be coherent when both give out light waves of the same  
a. Amplitude and phase                      b. wavelength and phase difference  
c. intensity and wavelength                      d. Phase and speed.
8. In Kirchhoff's first law,  $\sum I = 0$  at the junction is based on the conservation of  
a. Energy                      b. Charge                      c. Momentum                      d. Speed
9. When currents are moving in the same direction in two conductors, then the force will be

- a. Attractive                      b. Repulsive                      c. Retracting                      d. Opposing
10. A strong magnetic field is applied on a stationary electron. Then the electron  
a. moves in the direction of the field.  
b. remained stationary.  
c. moves perpendicular to the direction of the field.  
d. moves opposite to the direction of the field.
11. A p-type semiconductor is  
a. a silicon crystal doped with arsenic impurity  
b. a silicon crystal doped with aluminum impurity  
c. a germanium crystal doped with arsenic impurity  
d. a germanium crystal doped with phosphorus impurity

### Group 'B'

Answer the following questions.  
(8 × 5 = 40)

12. a. Define torque. (1)  
b. A wrench of longer arm is preferred than a wrench of shorter arm, why? Explain.  
(2)  
c. A flywheel has moment of inertia of 4kg m<sup>2</sup> about an axis through its center and is rotating 120 revolution per minute. What constant opposing torque is required to bring it at rest in 5 second? (2)
13. a. Define simple harmonic motion. (1)  
b. Find expression for displacement, velocity, and acceleration of a particle describing SHM. (2)  
c. A mass m attached to a spring oscillates with the period of 2 seconds. If the mass is increased by 2kg, the period increase by 1 second. Find the initial mass m, assuming that Hooke's Law is obeyed. (2)  
OR  
a. What is moment of inertia? (1)  
b. A ballet dancer stretches her hands when she wants to come to rest. Why? (2)  
c. A constant torque of 200 Nm turns a wheel about its center. The moment of inertia about the axis is 100 kg m<sup>2</sup> Find the kinetic energy gained after 20 revolutions  
(2)
14. a. Define coherent sources of light. (1)  
b. Find the conditions for constructive and destructive interferences in Young's double slits experiment. (2)  
c. Two narrow slits are 50 micrometer apart are illuminated with a light of wavelength 500nm. What is the angle of the n= 2 bright fringe (2)
15. a. What do you mean by the isobaric process. (1)

- b. Derive relation to finding work done by the gas in the isothermal process. (2)
- c. 5 liters of gas compressed is suddenly to  $1/10^{\text{th}}$  of its original volume. Find the final temperature of gas when its initial temperature is  $32^{\circ}\text{F}$  (2)

16. a. State and explain Ampere circuital law. (2)
- b. use it to find the magnetic field due to a current carrying long solenoid. (3)
17. a. Write the working principle of moving coil galvanometer. (1)
- b. How can we increase its sensitivity. (2)
- c. An electron experiences a magnetic force of magnitude  $4.60 \times 10^{-15}$  N when moving at an angle of  $60.0^{\circ}$  with respect to a magnetic field of magnitude  $3.50 \times 10^{-3}$  T. Find the speed of the electron. (2)
18. a. The mass of proton is 1847 times the mass of an electron. An electron and a proton having same initial kinetic energy are projected in a uniform electric field. Whose path will have more curvature? Why? (2)
- b. An electron having 500eV of energy enters at right angle to a uniform magnetic field of  $10^{-4}$  Tesla. If its specific charge is  $1.75 \times 10^{11}$  C/Kg, Calculate the radius of its circular orbit. (3)
19. a. What do you mean by rectifier? (1)
- b. Explain the working principle of full wave rectifier using diodes. (3)
- c. What is the function of filter circuit. (1)

OR

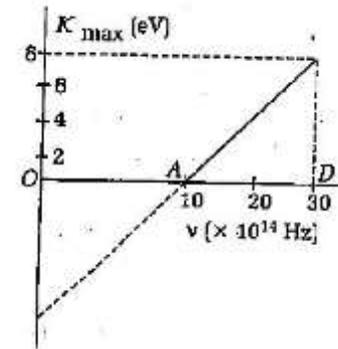
- a. What do you mean by specific charge of an electron? Is its value a universal constant for an electron? Explain (2)
- b. In an evacuated tube electrons are accelerated from rest through a potential difference of 3600 V and then travel in a narrow beam through a field free space before entering a uniform magnetic field of  $2 \times 10^{-4}\text{T}$ , the flux lines of which are perpendicular to the beam in the magnetic field the electrons describe a circular arc of radius 0.1 m. Calculate  $e/m$  of the electron (3)

### Group 'C'

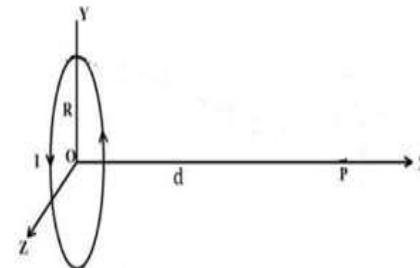
Give long answer to the following questions. (3 × 8 = 24)

20. a. What do you mean by quantum nature of radiation and define photons? (2)
- b. State and Derive Einstein's photo electric equation and define the terms involved in it. (3)
- c. A graph regarding photoelectric effect is shown between the maximum kinetic energy of electrons and the frequency of the incident light. On the

basis of the data as shown in the graph, calculate Plank's constant and the work function. (3)



21. According to Newton, when sound propagates through a gas temperature remains constant. On this assumption the result did not match with the experimental result.
- a. What correction was did by the Laplace to correct above assumption? (3)
- b. What is the effect of temperature on velocity of sound in air? explain. (2)
- c. Find the percentage change in speed of sound in a gas when the absolute scale of temperature is increased by 125%? (3)
22. a. State and explain Biot-Savart law. (2)
- b. Use this law to find the magnetic field at the center of current carrying circular coil. (3)
- c. Use the Biot-Savart law to determine the magnetic field (magnitude and direction) at point P that is located a distance  $d = 1.0$  m from the center of the current ring, as shown below. The ring (radius  $R = 30.0$  cm) is located in the  $yz$  plane and the center the of the ring is at the origin (point O). The current in the ring is  $I = 2.0$  A. (3)



OR

- a. Define shunt. (1)

- b. How can we convert a galvanometer into ammeter. (2)
- c. What is the reason of connection of an ammeter always in series ? Explain.  
(2)
- d. A galvanometer of resistance  $75\Omega$  measure a current up to  $5\text{mA}$ . How can it be converted to an ammeter reading up to  $3\text{A}$  and a voltmeter reading up to  $10\text{V}$ ?

(3)

The End

*Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate the full marks.*

Attempt all questions

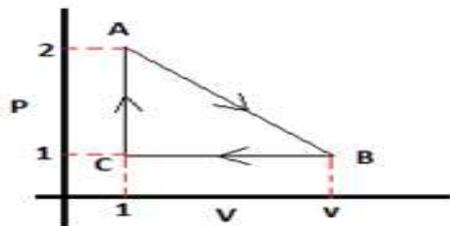
**Group 'A'**

**Encircle the best alternative to the following questions. (11×1 = 11)**

- If all the ice on the polar caps of the earth melts, due to global warming then the duration of the day will be  
a. 24 hours      b. more than 24 hours      c. less than 24 hours      d. 12 hours
- Which of the following types of circular bodies, Same mass and radius will have the largest moment of inertia ?  
a. Solid disc      b. Cylindrical disc      c. Ring      d. Annular disc
- A particle is initially at the centre and going towards the left. Let T be the time period of the SHM it is undergoing. What will be its position and velocity at time  $3T/4$ , if it starts from the centre at  $t=0$ ?



- At right extreme, zero velocity
  - at centre, maximum speed towards left
  - at centre, maximum speed towards right
  - Mid-way between centre and -A
- In the process A to B to C, 20J of heat is supplied from A to B. 20.5J of heat has been removed from B to C and 2J of heat has been added from C to A. Calculate the value of 'v' from the given conditions in the diagram. The values of pressure and volume given in the graph are in S.I. units.



- $4m^3$
  - $1.5m^3$
  - $3m^3$
  - $8m^3$
- When the heat transfer into a system is more than the work transfer out of the system, then  
a. the internal energy of the system remains constant

- the internal energy of the system decreases
  - the internal energy of the system increases
  - none of the above
- If the temperature of the atmosphere is increased the following character of the sound wave is effected  
a. Amplitude      b. Frequency      c. Velocity      d. Wavelength
  - What is the nature of wave front associated with a parallel beam of light?  
a. plane      b. spherical      c. elliptical      d. none
  - In a Wheatstone bridge if the position of battery and galvanometer are interchanged then balance condition  
a. will be changed      b. remains same  
c. depends on internal resistance of cell      d. depends on the value of resistance of bridge
  - Find the force that exists in an electromagnetic wave.  
a. Electrostatic force      b. Magneto static force  
c. Lorentz forced.      d. Electromotive force
  - If a charged particle moves through a magnetic field perpendicular to it  
a. both momentum and energy of particle change.  
b. momentum as well as energy are constant.  
c. energy is constant but momentum changes.  
d. momentum is constant but energy changes.
  - A reverse bias pn junction has  
a. Very narrow depletion layer      b. almost no current  
c. Very low resistanced.      d. large current flow

**Group 'B'**

**Answer the following questions. (8 × 5 = 40)**

- Define the term radius of gyration. (1)  
Establish the relation between torque and angular acceleration of rigid body(2)  
The angular velocity of a wheel increases from 1200 to 4500 rev/min in 10 sec..Compute its angular acceleration and number of revolution during this time.(2)
- Show that the motion of a simple pendulum is simple harmonic for small amplitude. Find an expression for its time period. (3)  
If the potential energy of a particle during SHM is 2.5J when displacement is half of amplitude , find the total energy. (2)  
OR  
You are provided with a light spring meter scale and a known mass. How will you find the time period of oscillation of the mass attached to the spring without the use of clock. (2)  
A particle executing SHM along a straight line has a velocity of 4m/s when its displacement from mean position is 3m and 3m/s when the displacement is 4m.Find the time taken to travel 2.5m from the positive extremity of its oscillation.  
(3)
- What is interference of light? (1)

b. A monochromatic light is partially reflected and partially refracted by an interface separated by two media. What will be the frequency of the reflected and refracted

light, and why? (2)

c. In a Young's double slit experiment the separation of first and fifth fringes is 2.5 mm

when the wavelength used is 620 nm. The distance from the slits to the screen is

80cm. Calculate the separation of slits. (2)

14. a. What is meant by a thermo dynamical variable? (1)  
 b. Derive the expression of work done in adiabatic process.(2)  
 c. If 5 moles of gas at 1 atm is expanded to 50 liter from 5 liter at constant temperature of 20 °C. Find the work done by the gas.(2)
15. When a current carrying conductor is moved in a magnetic field, it experiences the force,  
 a. What is the force called? (1)  
 b. Find the magnitude and direction of force that a current carrying conductor experiences. (1)  
 c. A coil consisting of 100 circular loop with radius 60 cm carries a current of 5A. Find the magnetic field at a point along the axis of the coil, 80 cm from the center. Where  $\mu_0 = 4 \times 10^{-7} \text{Hm}^{-1}$ . (3)
16. a. What is voltmeter? (1)  
 b. How can we convert a galvanometer into voltmeter? (2)  
 c. A galvanometer of resistance  $50\Omega$  measure a current up to 2mA. How can it be converted into a voltmeter reading up to 10V? (2)
17. a. A proton and an alpha particle with same kinetic energy enters a region of uniform magnetic field moving at right angle to the field. Compare radii of their circular paths (2)  
 b. An electric field of strength  $26.55 \text{Vm}^{-1}$  directed downwards holds a negatively charged oil drop of mass  $8.5 \times 10^{-15} \text{Kg}$  hanging stationary. Find the number of electrons carried by the oil drop? (3)
18. a. Draw a graph showing variation of stopping potential with frequency of the incident radiation. (2)  
 b. What does the slope of line with frequency axis indicate? (1)  
 c. Two metals X and Y have work functions 2 eV and 5 eV respectively. Which metal will emit electrons when irradiated with the light of wavelength of 400 nm and why? (2)

OR

- a. With the help of the circuit diagram, explain the forward characteristics of p-n junction diode. (2)

b. Define rectifier. Draw the waveforms of input and output of Full wave rectifier.

(3)

**Group 'C'**

**Give long answer to the following questions.**

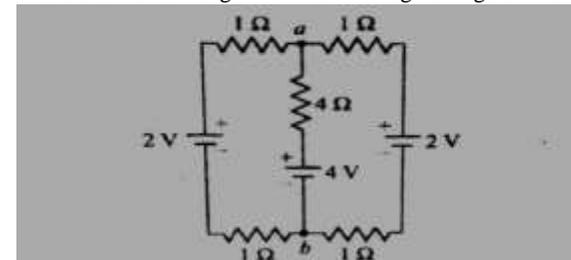
**(3 ×**

**8 = 24)**

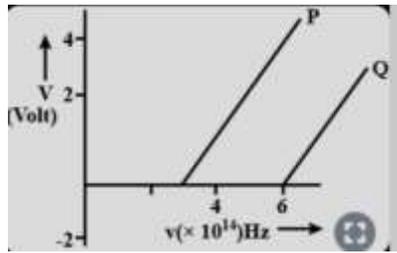
1. a. Distinguish between progressive and stationary wave. (2)  
 b. Show that distance between consecutive nodes is half of wavelength in a stationary wave. (3)  
 c. what is the change in frequency of a wave of 50Hz travelling from air to water (1)  
 d.  $y = 0.02 \sin 2\pi (3t - 5x)$  (here y in meter and t in second)  
 i) What is the wave length of wave? (1)  
 ii) What is the velocity of wave? (1)
2. a. What is Hall effect? (1)  
 b. Deduce the expression for Hall voltage. (3)  
 c. Hall voltage in a semiconductor is more than that in metals. Why? (1)  
 d. A semiconductor slab of thickness 0.50 mm with length 30 cm carrying current 2A placed in magnetic field 0.25T directed into the page, perpendicular to the flat surface of the slab carries  $7 \times 10^{24}$  electrons per  $\text{m}^3$ . Calculate the Hall voltage across the slab and indicate which edge (top or bottom) is at higher potential? (3)

OR

- a. State Kirchoff's current law and Voltage law (1+1)  
 b. use the law to verify balance condition of Wheatstone circuit. 3  
 c. find the current through each resistor in given figure 3



3. a. Define and write the properties of photons. (2)  
 b. describe Millikan's experiment to determine the value of Planks constant h. (3)  
 c. In the study of a photoelectric effect the graph between the stopping potential V and frequency  $\nu$  of the incident radiation on two different metals P and Q is shown below:



- (i) Which one of the two metals has higher threshold frequency?
- (ii) Determine the work function of the metal which has greater value.
- (iii) Find the maximum kinetic energy of electron emitted by light of frequency  $8 \times 10^{14}$  Hz for this metal.

The End