

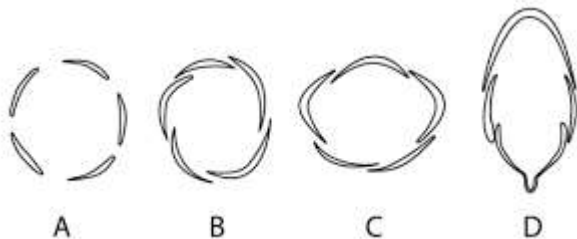
Candidates are required to give their answer in their own words as far as practicable. The figures in the margin indicate the full marks.

Part I Botany – 38 Marks

Group A

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

1. Which of the following is valvate aestivation?



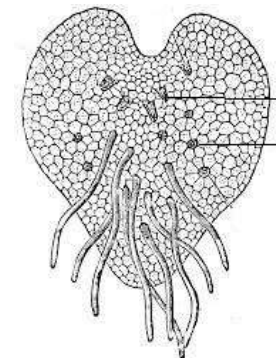
2. Which of the following organelle is not surrounded by membrane?
a) Ribosome b) Nucleus c) Mitochondria d) Lysosomes
3. Gametophyte of *Marchantia* is
a) Haploid b) Triploid c) Diploid d) Polyploid
4. Foliage leaves or needle of pines are borne on
a) Branches of unlimited growth
b) Branches of limited growth
c) Both a & b
d) None of these
5. Which part of potato is eaten?
a) Leaf b) Fruit c) Stem d) Flower
6. The amphibians of plant kingdom are
a) Thallophyta b) Bryophyta
c) Pteridophyta d) Gymnosperm

Group B

Give short answers to following questions

[4×4=16]

7. Why is lysosome call suicide bag? Describe different types of lysosome with suitable diagram. (1+3)
8. Observe the figure and answer following questions



- a) Identify the figure
 - b) Label P & Q
 - c) Write two differences between sporophyte and gametophyte
 - d) What is the role of P & Q
9. Define inflorescence. Describe the types of racemose inflorescence. (1+3)
 10. Describe the process of amitosis cell division.

Or

Describe male cone of *Pinus*.

Group C

Give long answer to the following questions

[2×8=16]

11. Describe floral characters of family Solanaceae with floral formula, floral diagram and identifying features. Write botanical name of any two plant belonging to the family with edible value. (4+1+1+1+1)

Or

Describe the vegetative structure and sexual reproduction in *Marchantia* with suitable diagrams.

12. Devine mitosis. Describe the process of mitosis with necessary diagrams. (1+7)

Biology (2011) Set 'A'
Part II Zoology – 37 Marks
Group - 'A'

Circle the correct answer from the given alternatives [5×1=5]

- Branch of biology which is related to those diseases which can outbreak easily all over the areas is.....
 - Epidemiology
 - Psychology
 - Helminthology
 - Pathology
- Which form of *Plasmodium* escapes during digestion in alimentary can of mosquito....
 - Sporozoites
 - Gametocyte
 - Trophozoite
 - Merozoite
- Defence organ of *Paramecium* is.....
 - Cilia
 - Trichocyst
 - Contractile vacuole
 - Food vacuole
- Pharyngeal nephridia are.....
 - Metanephridia and enteronephric nephridia
 - Protonephridia and exonephric nephridia
 - Protonephridia and enteronephric nephridia
 - Metanephridia and exonephric nephridia
- All the following are muscles involved during breathing process in frog except.....
 - Sternohyal muscles
 - Petrohyal muscles
 - Submental muscles
 - Intercostal muscles

Group - 'B'

Give short answers to the following questions [4×4=16]

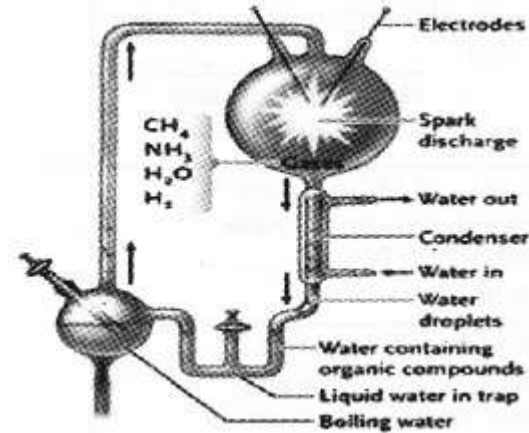
- At what conditions and how asexual reproduction occurs in *Paramecium*? (1+1.5+1.5=4)
- How earthworm plays important roles in our economy? (2+2=4)

OR

Biology (2011) Set 'A'

What are oocysts? Describe the sporogony cycle of *Plasmodium vivax* in mosquito. (1+2+1)

- At what conditions and how frog respire through the skin surface? (2+2)
- Carefully observe the given figure and answer the following questions.



- What is the name of this figure? (1)
- What is the function of electrodes? (1)
- Write the conclusion of this labeled figure. (2)

Group - 'C'

Give long answers to the following questions [2×8=16]

- What is glycogenesis? Describe the alimentary canal of frog with well labeled diagram. (1+5+2)
- Describe the life cycle of *Plasmodium vivax* in human host. (4+4)

OR

What are enteronephric nephridia? Describe the structure and location of septal nephridia in earthworm. (1+4+3)

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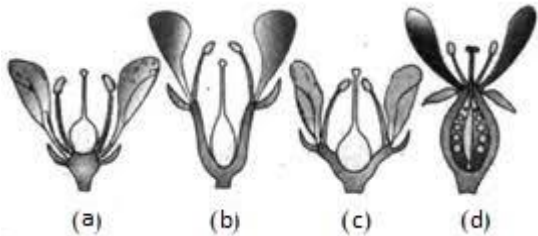
Candidates are required to give their answer in their own words as far as practicable. The figures in the margin indicate the full marks.

Part I Botany – 38 Marks

Group A

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

- The ovuliferous scale of *Pinus* contain how many ovules?
a) 1 b) 2 c) 3 d) 4
- Phyllotaxy is
a) Mode of leaf arrangement on stem
b) Types of root
c) Types of stem
d) Arrangement of sepals and petals
- Stilt roots are found in
a) Sugarcane b) Maize c) Mango d) Both a &
- Ribosomes are the centre for
a) Respiration b) Protein synthesis
c) Photosynthesis d) Fat synthesis
- Which of the following is hypogynous flower?

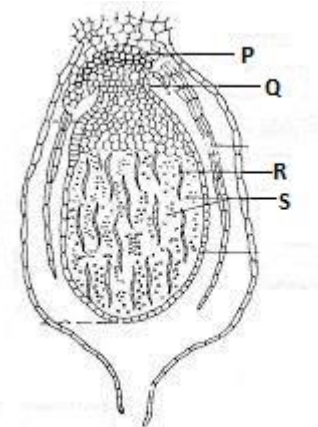


- The thick tissue around the jacket of capsule in fern is called
a) Elaters b) Annulus c) Placents d) Stomium

Group B

Give short answers to following questions (4×4=16)

- Describe the structure of nucleus with diagram.
- Observe the figure and answer following questions



- Identify the figure
 - Label P . Q. R. S
 - Write two differences between sporophyte and gametophyte
 - What is the role of P & S
- Compare and contrast gymnosperm and angiosperm. (2+2=4)
 - What is placentation? Describe any four types of placentation. (1+3)

Or

Write down the significances of mitosis.

Group C

Give long answer to the following questions [2×8=16]

- Describe floral characters of family Brassicaceae with floral formula, floral diagram and identifying features. Write botanical name of any two plant belonging to the family with edible value. (4+1+1+1+1)

Or

What is alternation of generation. Describe it with reference with reference to life cycle of *Dryopteris* with necessary diagrams. (1+7)

- The mitotic cell division is also termed as equational type of division, why? Mention the distinguishing features of different stages of mitosis with suitable diagrams that support your answer. (1+7)

Biology (2011) Set 'B'

Part II Zoology – 37 Marks

Group - 'A'

Circle the correct answer from the given alternatives (5×1=5)

1. Science related to mental disorder is
a) Anthropology b) Psychology
c) Neurology d) Psychiatry
2. Ookinete is elongated, spindle shaped and motile form of *Plasmodium vivax*. It formed induring its life cycle.
a) RBCs b) Liver cells c) Stomach d) Cyst wall
3. The representatives of class sporozoa of phylum protozoa are generally characterized by.....
a) Flagella b) Chlorophyll c) Parasitism d) Cilia
4. In earthworm the pre-typhlosolar intestine is situated between segments.....
a) 10-14 b) 15-26 c) 26-40 d) 26-last
5. Contraction of which muscles increase the volume of Buccopharyngeal cavity in frog?
a) Petrohyal muscles b) Sternohyal muscles
c) Sub-mental muscles d) Intercostal muscles

Group - 'B'

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

6. Why and how cocoon formation occurs in earthworm? (1+3=4)

OR

What is glycogenolysis? Write the histology of pancreas of frog.

(1+2+1=4)

7. Describe the process of liver schizogony cycle of *Plasmodium vivax* in human.
8. At what conditions and how frog respire through the skin surface?
(1+3=4)
9. Draw a well labeled diagram of conjugation in *Paramecium*.
(No description is required)

Biology (2011) Set 'B'

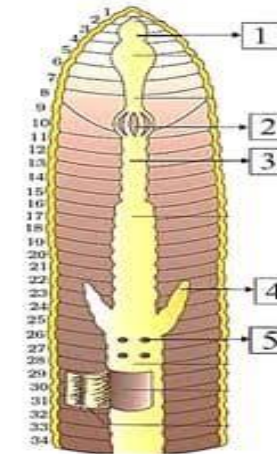
Group - 'C'

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

10. What is sinus venosus? Describe the internal structure of frog's heart with well labeled diagram. (1+5+2=8)
11. Which was the first form of life? Describe the Oparin-Haldane theory of origin of life in the earth. (1+7)

OR

Carefully observe the given diagram and answer the following questions.



- a) What is the name of this figure? (1)
- b) Label 1, 2, and 3 with their locations. (3)
- c) Describe the structure and function of 2 and 3. (3)
- d) Write the location and function of 4? (1)

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Chemistry (3011) Set 'A'
Nightingale International Boarding Secondary School

Kupondole, Lalitpur

Second Term Exam – Grade XI (Science)

Time: 3 hrs.

2082 (2026)

F. M: 75

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

Attempt all questions.

Group A

Multiple choice questions

[11×1=11]

Rewrite the correct options of each question in your answer sheet

- The correct order of increasing ionization energy is
a. $\text{Li} > \text{Be} > \text{B} > \text{C}$ b. $\text{C} < \text{B} < \text{Be} < \text{Li}$
c. $\text{Li} < \text{Be} > \text{B} < \text{C}$ d. $\text{Li} < \text{Be} > \text{B} > \text{C}$
- The element having least electronegativity is
a. O b. F c. N d. Br
- The value of x and y in the following reaction:
 $x\text{Cl}_2 + 6\text{OH}^- \rightarrow \text{ClO}_3^- + y\text{Cl}^- + 3\text{H}_2\text{O}$
a. $x=5, y=3$ b. $x=2, y=4$ c. $x=3, y=5$ d. $x=4, y=2$
- The oxidation number of Mn in MnO_4^- is
a. +7 b. +5 c. +6 d. -7
- Which of the following compound is functional isomers of $\text{C}_2\text{H}_5\text{OH}$?
a. CH_3CHO b. $(\text{CH}_3)_2\text{O}$ c. CH_3COOH d. HCOOCH_3
- Iso-octane, benzene, ethyl acetate etc. are added to gasoline
a. To increase octane number
b. To increase cetane number
c. To increase cetane number
d. To increase ignition property
- Anode and cathode in Down's cell is made up of
a. Iron + graphite b. Graphite + iron
c. Platinum + iron d. Iron + platinum
- Maximum number of orbitals in a shell is given by:
a. $2n^2$ b. n^2 c. $2n+1$ d. $n+1$

Chemistry (3011) Set 'A'

- What is the possible set of three quantum numbers for 4p orbital?
a. $n=4, l=2, m=-2$ b. $n=4, l=1, m=-1$
c. $n=1, l=0, m=0$ d. $n=4, l=2, m=+1$
- Which of the following illustrate the law of reciprocal proportion?
a. $\text{CH}_4, \text{C}_2\text{H}_4$ and C_2H_2 b. $\text{N}_2\text{O}, \text{NO}$ and N_2O_3
c. $\text{H}_2\text{S}, \text{SO}_2$ and H_2O d. $\text{H}_2\text{O}, \text{H}_2\text{O}_2$ and OH
- Presence of chlorine in an organic compound causes
a. -I effect b. +I effect c. Resonance d. None of them

Group B

Short Question Answer

[8×5=40]

- Define oxidation and reduction in terms of electronic concept. [1]
You are given the equation;
 $\text{Zn} + \text{HNO}_3 \rightarrow \text{Zn}(\text{NO}_3)_2 + \text{N}_2\text{O} + \text{H}_2\text{O}$
a. Identify which substance is oxidized and which is reduced?
b. Balance the equation by ion-electron or oxidation number method.
c. Indicate the number of HNO_3 molecules acting as an oxidant and an acidic agent. [1+2+1]
- State law of multiple proportion with suitable example. Nitrogen forms five oxides in which 1.01g of nitrogen combines with 0.572g, 1.14g, 1.73g, 2.28g and 2.85g of oxygen respectively. Which law of stoichiometry is illustrated by these data? [2+3]
- a. Differentiate between orbit and orbitals.
b. Explain the shape of s and p-orbitals. Give the possible values of n, l and m for the 17th electron of chlorine. [2+2+1]
- Generally an organic consists of two parts :- alkyl group and functional group. What is meant by functional group? Write the functional group of [1+4]
a. amide b. ester c. acid anhydride and
d. aldehyde

Chemistry (3011) Set 'A'

16. Give the structure of the following organic compounds: [5]
- i) 2-methylpropan-1-ol ii) 2-chloro-2,3-dimethylpentane
 iii) Ethylethanoate iv) 3-methylbutanoic acid
 v) Ethane-1,2-dioic acid
17. a. Differentiate between Calcination and Roasting.
 b. Describe smelting process in the extraction of metal from their ores. What is meant by slag? Why is it important in metallurgy?
 [1+2+1+1]
18. For filling electrons into orbitals of equal energies, Hund's rule is applied.
- a. State Hund's rule.
 b. Why is it called maximum multiplicity rule?
 c. Write the electronic configuration of nitrogen applying the rule, Indicate degenerate orbitals in it.
 d. What do you mean by degenerate orbitals?
 e. What is the theoretical reason for obeying Hund's rule by an element? [1+1+1+1+1]
19. Ernest Solvay, a Belgian industrial chemist, known for developing and industrializing the solvay process, a revolutionary method to produce sodium carbonate from salt, limestone, ammonia.
- a. Write the principle of manufacture of sodium carbonate by solvay process. [3]
 b. What happens sodium carbonate treated with
 (i) water (ii) carbon dioxide [2]

Group C**Long questions****(3×8=24)**

20. What do you mean by limiting reagent? 5 gram of pure CaCO_3 is treated with 5 gram of HCl to produce CaCl_2 , H_2O and CO_2 .
- a. Find the limiting reagent and why?
 b. Calculate the number of moles of excess reactant left over.
 c. Calculate the mass of CaCl_2 formed.
 d. Calculate the volume of CO_2 produced at NTP.
 e. Calculate the number of molecules of water produced.

Chemistry (3011) Set 'A'

- f. What mass of NaOH is required to absorb whole CO_2 produced in the reaction? [2+1+1+1+1+2]
21. Qualitative analysis of organic compound includes detection of hetero (foreign) elements in organic compound.
- a. What is meant by hetero elements?
 b. Write the most common hetero elements present in the organic compound.
 c. Why is Na metal chosen for preparation of sodium extract of organic compound?
 d. What is the reason for preparation of sodium extract?
 e. Can Li or K be used instead of Na Lassaigne's extract preparation?
 f. Write the reaction involved for the detection of Nitrogen and Sulphur. [1+1+1+1+1+3]

OR

The $\text{C}_6 - \text{C}_{10}$ fraction of petroleum is called gasoline or petrol.

- a. Why is petroleum also called black gold.
 b. Which quantity is used to measure the quality of gasoline.
 c. Define the quantity.
 d. Isooctane is considered as best gasoline. Draw the structure and write the IUPAC name of it.
 e. What is meant by octane number of fuel is 75?
 f. Write the name of fuel having octane number greater than 100.
 g. Suggest any two idea to improve octane number of fuel.
 [1+1+1+2+1+1+1]
22. The α ray scattering experiment of Rutherford and co-workers lead to discovery of nucleus.
- a. Draw the sketch of Rutherford's α -ray scattering experiment and label different parts of sketch.
 b. What were the observation in the experiment.
 c. What conclusion led Rutherford to discover nucleus of an atom.
 d. Mention major points of nuclear model of an atom.
 e. Write the limitations of nuclear model of an atom. [1+2+2+2+1]

Chemistry (3011) Set 'B'
Nightingale International Boarding Secondary School

Kupondole, Lalitpur

Second Term Exam – Grade XI (Science)

Time: 3 hrs.

2082 (2026)

F. M: 75

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

Attempt all questions.

Group A

Multiple choice questions

[11×1=11]

Rewrite the correct options of each question in your answer sheet

- Which of the following pairs of compounds illustrate the law of multiple proportion?
a. P_2O_3 and P_2O_5 b. P_2O_3 and B_2O_3
c. H_2S and H_2O d. MO and Mo
- Find the number of electrons present in 1.6 gram of methane
a. 6.023×10^{22} b. 3.023×10^{23}
c. 2.023×10^{23} d. 6.023×10^{23}
- Which of the following set of quantum number is not possible?
a. $n=2, l=1, m=0$ and $s=+1/2$
b. $n=2, l=2, m=-1$ and $s=+1/2$
c. $n=3, l=2, m=-2$ and $s=-1/2$
d. $n=4, l=1, m=0$ and $s=-1/2$
- Which of the following compound is assigned the octane no. 100
a. 2,2,3-trimethyl pentane b. 2,2,4-trimethyl pentane
c. 2,3,3-trimethyl pentane d. 2,4,4-trimethyl pentane
- The total number of electrons in sub-shell having azimuthal quantum 'l' is
a. $2l + 1$ b. l^2 c. $4l + 2$ d. $l + 1$
- In the redox reaction,
 $xKMnO_4 + NH_3 \rightarrow yKNO_3 + MnO_2 + KOH + H_2O$
a. $x = 4, y = 6$ b. $x = 3, y = 8$
c. $x = 8, y = 6$ d. $x = 8, y = 3$
- The oxidation number of Cr in $Cr_2O_7^{2-}$ is
a. +6 b. -6 c. +7 d. -7
- Why is $CaCl_2$ added along with $NaCl$ in Down's process?
a. To facilitate the ionization of $NaCl$
b. To lower the melting point of $NaCl$
c. To produce chlorine as a byproduct
d. All of the above

Chemistry (3011) Set 'B'

- The element having highest electronegativity is
a. N b. O c. F d. Cl
- The electron affinity order of halogens is
a. $F < Cl < Br < I$ b. $F < Cl > Br > I$
c. $F > Cl > Br > I$ d. $F < Cl < Br > I$
- But-1-ene and But-2-ene are
a. Chain isomers b. Position isomers
c. Functional isomers d. metamers

Group B

Short Questions Answer

[8×5=40]

- Define oxidizing and reducing agent in terms of oxidation number. [1]
For a given reaction;
 $KMnO_4 + H_2SO_4 + KI \rightarrow K_2SO_4 + MnSO_4 + H_2O + I_2$
a. Find O.N. of oxidized and reduced species.
b. Identify oxidant and reductant with reason.
c. Balance the equation by oxidation number or ion-electron method. [1+1+2]
- Write the IUPAC name of following organic compound
a. $CH_3-CH_2-CH_2-CH(CH_3)_2$ b. $CH_3-CH_2-C(CH_3)_3$
c. $CH_2=CH-CH_2-CH=CH-CH_3$ d. $CH \equiv C-CH_2-CH_2-CH=CH_2$
e. $CH_3-CH(Br)-CH=CH-CH_2-COOH$ [1×5]
- A series of organic compounds belonging to the same family are called homologous series
a. Define the term homologue and homology.
b. Write any four characteristics of homologous series?
c. Write the homologous series of alcohol upto four members with their IUPAC names. [1+2+2]
- State law of reciprocal (equivalent) proportion with suitable example. CO_2 contains 27.27% of C, CS_2 contains 25.97% C and SO_2 Contains 50% S. How these data illustrate law of equivalent proportions. [2+3]
- An element has electronic configuration $[Kr] 4d^{10}; 5s^2, 5p^5$
a. In which block in the periodic table does the element belongs to?
b. In which group does it belong to? Identify the element.
c. What is the valency of the element?
d. Is the element metal or non-metal?
e. Comment about the reactivity of this element. [1+1+1+1+1]

Chemistry (3011) Set 'B'

17. Consider a heavy metal that occurs as a sulphide ore
- Outline the steps involved in the concentration of its ore using the froth floatation method.
 - Explain why the froth floatation method is particularly suitable for this type of ore.
 - Name any two chemicals used in the froth floatation process.

[2+2+1]

18. How sodium metal is extracted from Down's process? What are the difficulties of extracting it from Down's cell? Why it cannot be extracted by carbon reduction process? What happens when sodium reacts with ammonia?

[2+1+1+1+1]

19. For a given reaction; $\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$.

If 10 gram of pure CaCO_3 are added in solution containing 7.665 gram of HCl

- Find the limiting reactant.
- Calculate the no. of moles of excess reactant left over unreacted.
- Calculate the volume of CO_2 gas produced at NTP.
- Calculate the no. of grams of NaOH required to absorb the whole of the CO_2 produced in the reaction.

[1+1+1+2]

Group C**Long Question Answer****[3×8=24]**

20. Michael Faraday (1791-1867) investigated quantitative aspect of electrolysis by measuring amount of chemical change brought by known quantity of electricity.
- State Faraday's laws of electrolysis.
 - Define the term electrochemical equivalent and Faraday's constant.
 - How would you calculate valency of ionic species by using Faraday's laws of electrolysis?
 - Mention the factors which may affect product of electrolysis.
 - Write one industrial application of electrolysis. [3+2+1+1+1]

Chemistry (3011) Set 'B'

21. Bohr's atomic model was able to answer some limitations of nuclear model of an atom but it still suffers from some limitations.

- What are the basic postulates of Bohr's atomic model?
- How did this model overcome the limitations of Rutherford's atomic model?
- How did Bohr's atomic model explain origin of H-spectra? Sketch and name various series observed in atomic spectrum of hydrogen.
- Mention any three limitation of Bohr's atomic model. [3+1+3+1]

22. Berzelius coined the term isomerism for the phenomena of existence of more than one compounds having same molecular formula but different properties.

- Define the term 'isomer'.
- Write the name of type of structural isomerism.
- Write the functional isomers of $\text{C}_2\text{H}_4\text{O}_2$ and write their IUPAC name.
- Define metamerism with suitable example.
- Show the ring chain isomers of C_3H_6 .
- Show your familiarity with tautomerism. Give one example.

[1+2+2+1+1+1]

OR

Organic compound has generally two parts; alkyl part is non-reactive and functional group is a reactive centre.

- What is meant by alkyl group? Is it radical or compound?
- Write the formula of any two alkyl groups.
- Mention the definition of functional group.
- Write the functional group for:
 - Alcohol
 - Ester
 - Aldehyde
 - Ketone
 - Ether

[1+1+1+5]

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Computer Science (4271) Set 'A'

Nightingale International Boarding Secondary School
Kopundol, Lalitpur

Second Term Exam – Grade XI (Science)

Time: 2:00 hrs.

2082 (2026)

F. M.: 50

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

Group A

Rewrite the correct options of each questions in our answer sheet. (9×1=9)

- In a computer, 16 bits of the address bus are used to specify address in the RAM, the number of the addresses will be
a) 256 b) 5536 c) 16536 d) 6000
- The computer device primarily used to provide hardcopy is the . . .
a) CRT b) line printer c) computer console d) card reader
- Device driver is a . . .
a) software b) hardware c) both a and b d) none of above
- Operating system functions may include
a) input/output control b) virtual storage
c) multiprogramming d) all of the above
- Hexadecimal values of decimal 255 is
a) FF b) FE c) 100 d) 0
- From which menu you can access picture, chart?
a) File b) Edit c) Insert (d) View
- . . . are typical examples of static images
a) File b) Text c) Messages d) Photographs
- Cyber law is related to
a) cyberspace b) education c) game d) none of above
- Which is not a message security
a) message authorization b) message confidentiality
c) cryptography d) message integrity

Group "B"

Give short answer to the following questions [5×5=25]

10. Define number system. Convert $(123.125)_8$ to hexadecimal equivalent. [1+4]

OR

What is nested if? WAP to find the factorial of n number. [1+4]

Computer Science (4271) Set 'A'

11. What is computer ethics? What are the commandments of computer ethics? [5]

OR

What is an intellectual property right? Explain the types of intellectual property rights. [1+4]

12. What is multimedia? Explain all the components of multimedia. [1+4]
13. Subtract $(1011)_2$ from $(111)_2$ using 1's and 2's complement method of subtraction. [2.5+2.5]

OR

Define logic gate. Describe NAND and X-OR gate with graphical symbol, truth table and Venn diagram. [1+4]

14. Differentiate between primary and secondary memory. [5]

OR

Explain presentation tools with features. [5]

Group "C"

Give long answer to the following questions. [2×8=16]

15. WAP that reads marks of five subject and calculate total mark and percentage. Also awards the division on the basis of following criteria.

Percentage

grade

$p \geq 80$

A

$p \geq 60$ and < 80

B

$p \geq 50$ and < 60

C

$p \geq 40$ and < 50

D

otherwise

failed

16. Discuss the term computer architecture. Draw logical diagram of computer architecture and explain the functional components of a computer system. [2+6]

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Computer Science (4271) Set 'A'

Nightingale International Boarding Secondary School
Kopundol, Lalitpur

Second Term Exam – Grade XI (Science)

Time: 2:00 hrs.

2082 (2026)

F. M.: 50

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a) software b) hardware c) both a and b d) none of above
- Operating system functions may include
a) input/output control b) virtual storage
c) multiprogramming d) all of the above
- Hexadecimal values of decimal 255 is
a) FF b) FE c) 100 d) 0
- From which menu you can access picture, chart?
a) File b) Edit c) Insert (d) View
- . . . are typical examples of static images File
a) File b) Text c) Messages d) Photographs
- Cyber law is related to
a) cyberspace b) education c) game d) none of above
- Which is not a message security
a) message authorization b) message confidentiality
c) cryptography d) message integrity

Group "B"

Give short answer to the following questions [5×5=25]

- Define number system. Convert $(123.125)_8$ to hexadecimal equivalent. [1+4]

OR

What is nested if? WAP to find the factorial of n number. [1+4]

Computer Science (4271) Set 'A'

- What is computer ethics? What are the commandments of computer ethics? [5]

OR

What is an intellectual property right? Explain the types of intellectual property rights. [1+4]

- What is multimedia? Explain all the components of multimedia. [1+4]
- Subtract $(1011)_2$ from $(111)_2$ using 1's and 2's complement method of subtraction. [2.5+2.5]

OR

Define logic gate. Describe NAND and X-OR gate with graphical symbol, truth table and Venn diagram. [1+4]

- Differentiate between primary and secondary memory. [5]

OR

Explain presentation tools with features. [5]

Group "C"

Give long answer to the following questions. [2×8=16]

- WAP that reads marks of five subject and calculate total mark and percentage. Also awards the division on the basis of following criteria.

Percentage

grade

$p \geq 80$

A

$p \geq 60$ and < 80

B

$p \geq 50$ and < 60

C

$p \geq 40$ and < 50

D

otherwise

failed

- Discuss the term computer architecture. Draw logical diagram of computer architecture and explain the functional components of a computer system. [2+6]

Computer Science (4271) Set 'B'

Nightingale International Boarding Secondary School
Kopundol, Lalitpur

Second Term Exam – Grade XI (Science)

Time: 2:00 hrs.

2082 (2026)

F. M.: 50

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

Group A

Rewrite the correct options of each questions in our answer sheet. (9×1 =9)

- Which of the following is used as storage locations both in the ALU and in the control section of a computer?
a) accumulator b) register c) adder d) decoder
- Which memory is non-volatile and may be written only once?
a) RAM b) EE-PROM c) EPROM d) PROM
- Windows 11 is based OS
a) CUI b) GUI c) both a and b d) none of above
- . . . runs on computer hardware and serve as platform for other software to run on
a) Operating system b) Application software
c) System software d) All Correct
- The Boolean expression $A.(A + B)$ simplifies to
a) $A + AB$ b) AB c) A d) $A + B$
- To start or open Microsoft PowerPoint application in your computer
a) Click on Start > Programs > All Programs > Microsoft PowerPoint
b) Hit Ctrl + R then type ppt.exe and Enter
c) Click Start > Run then type powerpnt then press Enter
d) All of above
- The use of . . . in multimedia material makes it easier to search and view related content.
a) Linkage b) Hyperlink c) Link d) Connection
- Cyber law is related to
a) cyberspace b) education c) game d) none of above
- A criminal activity within the information technology infrastructure is
a) cyber crime b) digital crime c) exit scam d) identity theft

Computer Science (4271) Set 'B'

Group "B"

Give short answer to the following questions [5×5=25]

- Why modern computers still use binary number system? Convert $(168.1001)_{10}$ to octal equivalent. [2+3]

OR

What is looping? WAP to find sum of n natural numbers. [1+4]

- What is cybercrime? Write the preventive measures of cybercrime. [5]

OR

What is an intellectual property right? Explain the types of intellectual property rights. [1+4]

- What is multimedia? Explain applications of multimedia. [1+4]
- Subtract $(11101)_2$ from $(1011)_2$ using 1's and 2's complement method of subtraction. [2.5+2.5]
- What is Bus system? Draw well labeled diagram of bus system and explain different types of bus. [5]

OR

What is spreadsheet package? Explain its features. [5]

Group "C"

Give long answer to the following questions. [2×8=16]

- WAP that reads marks of five subject and calculate total mark and percentage. Also awards the division on the basis of following criteria.

<i>Percentage</i>	<i>division</i>
$p \geq 75$	<i>distinction</i>
$p \geq 60$ and < 75	<i>first</i>
$p \geq 45$ and < 60	<i>second</i>
$p \geq 35$ and < 45	<i>third</i>
<i>otherwise</i>	<i>failed</i>

- Discuss the term computer architecture. Draw logical diagram of computer architecture and explain the major components of a computer system. [2+6]

Computer Science (4271) Set 'B'

Nightingale International Boarding Secondary School
Kopundol, Lalitpur

Second Term Exam – Grade XI (Science)

Time: 2:00 hrs.

2082 (2026)

F. M.: 50

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

Group A

Rewrite the correct options of each questions in our answer sheet. (9×1=9)

- Which of the following is used as storage locations both in the ALU and in the control section of a computer?
a) accumulator b) register c) adder d) decoder
- Which memory is non-volatile and may be written only once?
a) RAM b) EE-PROM c) EPROM d) PROM
- Windows 11 is based OS
a) CUI b) GUI c) both a and b d) none of above
- . . . runs on computer hardware and serve as platform for other software to run on
a) Operating system b) Application software
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- The Boolean expression $A.(A + B)$ simplifies to
a) $A + AB$ b) AB c) A d) $A + B$
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- The use of . . . in multimedia material makes it easier to search and view related content.
a) Linkage b) Hyperlink c) Link d) Connection
- Cyber law is related to
a) cyberspace b) education c) game d) none of above
- A criminal activity within the information technology infrastructure is
a) cyber crime b) digital crime c) exit scam d) identity theft

Computer Science (4271) Set 'B'

Group "B"

Give short answer to the following questions [5×5=25]

- Why modern computers still use binary number system? Convert $(168.1001)_{10}$ to octal equivalent. [2+3]

OR

What is looping? WAP to find sum of n natural numbers. [1+4]

- What is cybercrime? Write the preventive measures of cybercrime. [5]

OR

What is an intellectual property right? Explain the types of intellectual property rights. [1+4]

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- Subtract $(11101)_2$ from $(1011)_2$ using 1's and 2's complement method of subtraction. [2.5+2.5]
- What is Bus system? Draw well labeled diagram of bus system and explain different types of bus. [5]

OR

What is spreadsheet package? Explain its features. [5]

Group "C"

Give long answer to the following questions. [2×8=16]

- WAP that reads marks of five subject and calculate total mark and percentage. Also awards the division on the basis of following criteria.

<i>Percentage</i>	<i>division</i>
$p \geq 75$	<i>distinction</i>
$p \geq 60$ and < 75	<i>first</i>
$p \geq 45$ and < 60	<i>second</i>
$p \geq 35$ and < 45	<i>third</i>
<i>otherwise</i>	<i>failed</i>

- Discuss the term computer architecture. Draw logical diagram of computer architecture and explain the major components of a computer system. [2+6]

Com. English (0031) Set 'A'
Nightingale International Boarding Secondary School

Kopundol, Lalitpur

Second Term Exam –Grade XI (Science)

Time: 3 hrs.

2082 (2026)

F. M: 75

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

Attempt all the questions.

1. Read the following text carefully and do the tasks that follow: [15]

Television can be defined as an electronic **device** that is used for receiving sound and images that create television programmes which the people watch. Television is also popularly known as T.V. or Telly. Televisions show pictures with sounds. They get data from cables, discs, or over-the-air signals. They turn this data into sound and images. People watch news and shows on them. On March 25, 1925, the Scottish **inventor** John Logie Baird made the first-ever public display of moving visuals on television. The TV set that Baird made had just one color. It could only show part of the picture. To be precise, it just showed the face of the **person** on the screen. Back then TVs didn't work well, but it was just the beginning. The first TV station was set up in 1928 in New York City. Few families had TVs in their homes. The TV broadcasts were not meant to be watched. They showed a Felix the Cat doll for two hours a day. The doll spun around on a record player. They were experimenting to see how they could make TV work. It took many years to get it right. By the end of the 1930s, TVs were working much better. America got its first look at TVs at the 1939. World's Fair. This was one of the biggest events ever. There were 200 small, black and white TVs set up around the fair. The U.S. President, Franklin D. Roosevelt, gave speeches over the TVs. The TVs were only five inches big, but the people loved them. Now everyone wanted a TV. But World War II was going on during this time. Factories were busy making **guns and bombs**, and did not have time to make TVs for people. When the war was finally over, TVs became popular in the U.S. By 1948 there were four big TV networks in America. They aired their shows from 8 pm to 11 pm each night. Local shows were shown at earlier times. Most of the time, nothing

Com. English (0031) Set 'A'

was shown at all. TV was not "always on" like it today. Then in 1953 color TVs came out. However, they **cost** too much money for most people. Also, **shows** were still being aired in black and white. By 1965, color TVs were much cheaper. Soon, TV stations and networks started airing shows in color. People had to switch to a color TV set if they wanted to see the shows. Now most TVs are high-definition or SMART TVs. This means that they have many lines on them. They have a better picture **quality**, a really clear image, and high-definition or SMART TVs. sound. TVs have come a long way since John Baird's 30 line set. High-definition TVs have 1080 lines. There are also "state of the art" sets, which are called 4K TVs. They have 3,840 lines. These TVs are state of the art because people can watch TV in 3-D. Over the years, the television has really come a long way!

A. Complete the following sentences using the appropriate words / phrases highlighted in the text. [5×1=5]

- a. Scottish..... John Logie Baird made the first-ever public display of moving visuals on television.
- b. Factories were busy manufacturing the and did not have time to make TVs during world war II.
- c. High-definition or SMART TVs have a better picture.....
- d. Color TVs came out in 1953. However, they..... too much money for most people.
- e. Television, an electronic..... that is used for receiving sound and images.

B. Match the words in Group 'A' with their meanings in Group 'B'. [5×1=5]

Group 'A'

- i. Display
- ii. Aired
- iii. Broadcast
- iv. Definition
- v. Quality

'Group 'B'

- a. transmit via social medias
- b. something typically expressed in words
- c. the degree of excellence of something.
- d. make a prominent exhibition
- e. mixture of gases that make up atmosphere
- f. example of something

Com. English (0031) Set 'A'
[5×1=5]

C. Answer these questions in brief.

- a. What are the salient features of smart TV?
- b. Who is the inventor of the TV; and which country does he belong to?
- c. Why were the factories not able to supply TVs as per the demand of the people during WW II?
- d. How long did it take to get the TV right in accordance with the text?
- e. Which one variant of the TVs are common; and why?

2. Write short answer to the following questions. [5×2=10]

- a) How did the giant realise his mistake? (The Selfish Giant)
- b) Describe the portrait that the narrator saw in the room. (The Oval Portrait)
- c) In what sense are we the players in the world stage? (All the World's a Stage)
- d) Is the death really life's great invention? (How to Live Before You Die)
- e) Why did Makar disclose that he had killed the merchant? (God Sees the Truth but Waits)

3. Write long answer to the following questions. [5×2=10]

- a) Write a summary of the poem 'All the World's a Stage'.
- b) Was it a wise idea for Dona Laura and Don Gonzalo to keep their identities secret? (A Sunny Morning)

4. Write a couple of paragraphs about your plan after the final examination of grade 11 during vacation. [7]

5. Write an email to your best friend who is living in the USA mentioning about the recent hiking you have experienced. [8]

6. Globalization refers to the process of increasing interconnectedness and interdependence among countries, people, and businesses worldwide. It involves the exchange of ideas, goods, services, information, and culture across international borders, creating a more integrated global economy and society. Reflect on how 'Globalization has impacted Nepal's economy, culture, and lifestyle', both positively and negatively in about 300 words. [10]

Com. English (0031) Set 'A'
[10×1=10]

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

- a) He couldn't pass the exam although he worked very hard. (Write down the word class of the underlined word.)
- b) Mumps (is/am/are/were) a dangerous disease. (Choose the correct form of the verb)
- c) She walked(towards/up to/through) the park to get home. (Choose the correct preposition to fill in the blanks.)
- d) She (could have/would have/must have) forgotten her keys at home because they are not in his bag. (Choose the correct modal verb to complete the sentence.)
- e) They denied(to break/breaking) the vase. (Choose the correct verb to fill in the blanks.)
- f) While we(watch) a movie, the power went out. (Use the correct verb form)
- g) They practised hard(although/despite/yet) they didn't win the match. (Put the correct connective in the blank to complete the sentence.)
- h) She is the scientist(who/whom/whose) discovery changed the world. (Complete the sentence with a relative pronoun)
- i) "We'll arrive at 6 p.m.", they announced. (Change the direct speech into indirect)
- j) She loathes people disturbing her. (Change into passive voice.)

8. Do as instructed. [5×1=5]

- a) Write any two words using the prefix "de".
- b) Arrange the following words as per the order in a dictionary: important, impression, impossible, improvement, inflatable
- c) I'm 'over the moon' as I have got promotion. The meaning of the given idiom is:
i) disappointed ii) thrilled iii) very happy iv) sad
- d) Can I (borrow/lent) some money from you? (Choose the correct word.)
- e) Wow! That's a wonderful view. (Write down the word class of the underlined word in the sentence.)

Com. English (0031) Set 'B'
Nightingale International Boarding Secondary School

Kopundol, Lalitpur

Second Term Exam –Grade XI (Science)

Time: 3 hrs.

2082 (2026)

F. M: 75

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

Attempt all the questions.

1. Read the following passage carefully and do the tasks that follow. [15]

20 Indonesian trafficking victims freed in Myanmar

Associated Press

Jakarta, May 7

Indonesian officials said today they freed 20 of their nationals who were trafficked to Myanmar as part of a cyber scam, amid an increase in human trafficking cases in Southeast Asia. Indonesia's Foreign Affairs Ministry said in a statement that its embassy in Yangon with help from local networks had managed to release the victims from Myawaddy township and brought them to the Thai border yesterday. The Indonesian Embassy in Bangkok will work closely with Thai authorities to repatriate the victims to Indonesia, the statement said. Myawaddy is in eastern Kayin state along the Thai border and is the site of an armed conflict between Myanmar's military and ethnic Karen rebels. Fake recruiters had offered the Indonesians high-paying jobs in Thailand but instead trafficked them to Myawaddy, about 567 kilometers south of Naypyidaw, the capital, to perform cyber scams for crypto websites or apps, said Judah Nugraha, an official in Indonesia's Foreign Affairs Ministry. The situation drew a national outcry in Indonesia after a video made by one of the victims went viral on social media last month. It showed dozens of grim-faced Indonesian workers in a dormitory room, asking their government to help them out of 'the war zone' where they see violence almost every day. "Please help us back to Indonesia, because our life here is very miserable and threatened," one person said, describing how they had been transferred from one company to the other companies over the past eight months before being stranded in Myawaddy. The victim said

Com. English (0031) Set 'B'

they were tortured when they failed to reach certain work targets, receiving beatings, electrocutions and other physical punishments. Authorities said the victims were likely trafficked to Myanmar by illegal means since no records were found of their arrival in Myanmar's immigration system. The case had prompted Indonesian President Joko Widodo to order the Foreign Affairs Ministry to make an 'all out' effort to help rescue the victims, telling a news conference on Thursday: "They have been deceived and taken to an unwanted place by the traffickers." It was unclear how their release was secured, but National Police spokesperson Sandi Nugroho said negotiations were held with the company that employed them. Indonesia's Foreign Minister Retno Marsudi told a news conference on Friday that the government is also working to help Indonesian victims of online scams in Myanmar, Cambodia, Thailand, Vietnam, Laos and the Philippines. (*Source: The Himalayan Times, May 8, 2023*)

A. Write 'True' for correct, 'False' for incorrect and 'NG' if the information is not given in the text [5×1=5]

- a. Fake recruiters had offered the Indonesians low-paying jobs.
- b. Twenty of the Indonesians were trafficked as part of a cyber scam.
- c. Thailand played the crucial role to release the victims.
- d. According to the last paragraph, Indonesian government is also initiating its role to repatriate the victims.
- e. The stranded Indonesian victims were satisfied even though they were trafficked.

B. Match the following words in Group 'A' with their meanings in Group 'B'. [5×1=5]

Group 'A'

Group 'B'

- | | |
|---------------|--|
| a. Repatriate | i. bedchamber |
| b. Stranded | ii. a fraudulent business |
| c. Dormitory | iii. endangered |
| d. Scam | iv. send somebody back to one's own homeland |
| e. Threatened | v. protected |
| | vi. unaccompanied |

Com. English (0031) Set 'B'

[5×1=5]

C. Answer the following questions.

- i. Why were the Indonesians trafficked to Myanmar?
- ii. What was the cause of a national outcry in Indonesia about the trafficked ones?
- iii. How were the victims tortured in Myawaddy?
- iv. Where were the trafficked victims released from?
- v. When was the news issued?

2. Write short answer to the following questions. [5×2=10]

- a) What did the Snow and Frost do to the garden? (The Selfish Giant)
- b) Who is the speaker in the poem? And what is the message of the poem? (Corona Says)
- c) Why is the last stage called second childhood? (All the World's a Stage)
- d) Why did Dona Laura and Don Gonzalo spin fictitious stories about themselves? (A Sunny Morning)
- e) Describe Aksionov's character. (God Sees the Truth but Waits)

3. Write long answer to the following questions. [5×2=10]

- a) Discuss the story as a frame narrative. (The Oval Portrait)
- b) Write a paragraph describing the birth and childhood of Steve Jobs. (How to Live Before You Die)

4. Write a couple of paragraphs about an interesting dream that you have recently had. [7]

5. Write a letter to the editor of a national newspaper mentioning about the problem of air pollution. [8]

6. Write an essay on "The Impact of Tourism on Local Communities" in about 300 words. [10]

7. Do as indicated in the brackets and rewrite the sentences. [10×1=10]

- a) She wore an elegant dress decorated with delicate lace. (Write down the adjectives used in this sentence.)
- b) Haemorrhoids(has/have/had) been considered as one of the serious diseases by WHO. (Choose the correct form of the verb)
- c) The dog jumped(onto/under/into) the pool to fetch the ball. (Choose the correct preposition to fill in the blanks.)

Com. English (0031) Set 'B'

- d) He(should have/could have/can't have) finished the book already; it's too long.
- e) He decided(to quit/quitting) his job and start a business. (Choose the correct verb to complete the sentence.)
- f) She(finish) her report before she went to bed. (Use the correct verb form)
- g)(In spite of/However/Although) it was raining, we decided to go hiking. (Put the correct connective in the blank to complete the sentence.)
- h) The artist,(who/whom/whose) everyone admired, addressed the audience. (Complete the sentence with a relative pronoun)
- i) He said to the waiter, "What is the special about today?" (Change the direct speech into indirect)
- j) People thought that Sudur Pashchim would win the NPL-2024. (Change into passive voice)

8. Do as instructed. [5×1=5]

- a) Write any two words using the prefix "mis".
- b) Arrange the following words as per the order in a dictionary: battery, ballot, balance, banana, balloon
- c) They decided to 'bite the bullet' as they planned to invest in the new stocks even if it was bear market. The meaning of the given idiom is :
 - i) face difficult situation
 - ii) feel excited
 - iii) feel overwhelmed
 - iv) face easiness
- d) The(principle/principal) of the college is highly respected. (Choose the correct word.)
- e) Which one is the opposite word to 'futile'?
 - i) useful
 - ii) meaningless
 - iii) worthless
 - iv) vain

Mathematics (0071) Set A

Nightingale International Boarding Secondary School

Kopundol, Lalitpur

Second Term Exam – Grade XI (Science)

Time: 3 hrs.

2082 (2026)

F. M.: 75

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

Group A [11×1=11]

- If p is true and q is false statements then the truth value of conditional $p \Rightarrow q$ is
a) T b) F c) either T or F d) neither T nor F
- If M_{ij} and C_{ij} are minors and cofactors of a square matrices respectively then $C_{ij} =$
a) M_{ij} b) $-M_{ij}$ c) $(-1)^{i+j}(M_{ij})$ d) $(-1)^{i-j}(M_{ij})$
- The roots of the equation $x^2 - 4x + 3 = 0$ are
a) rational, equal b) rational, unequal
c) irrational, unequal d) imaginary, unequal
- Conjugate of i is
a) i b) $\frac{1}{i}$ c) $-i$ d) $\frac{1}{-i}$
- If A.M. = 36 and H.M. = 16 then G.M. =
a) -24 b) ± 24 c) 24 d) 10
- The distance between two parallel lines $3x + 5y = 11$ and $3x + 5y = -23$ is
a) ± 34 b) 34 c) $\pm\sqrt{34}$ d) $\sqrt{34}$
- The Slope of a straight line $\frac{x}{a} + \frac{y}{b} = 1$ is
a) $\frac{-b}{a}$ b) $\frac{-a}{b}$ c) $\frac{b}{a}$ d) $\frac{a}{b}$
- $\lim_{x \rightarrow 0} \frac{x^0}{\sin x} =$

Mathematics (0071) Set A

- $\frac{\pi}{180}$
 - $\frac{\pi x}{180}$
 - $\frac{180}{\pi}$
 - 1
- $\lim_{x \rightarrow 0} \frac{|x|}{x}$ is
a) 1 b) 0 c) $\frac{0}{0}$ d) does not exist
 - The derivative of $(a + \sqrt{x}) \cdot (a - \sqrt{x})$ is equal to
a) 1 b) -1 c) $\frac{-1}{4x}$ d) $\frac{-1}{2\sqrt{x}}$
 - The point of discontinuous of the function $f(x) = \frac{x+1}{(x+2)(x-3)}$ is
a) -1 b) 2 and 3 c) -2, 3 d) 2, -3

Group B [5×8=40]

- 'If the battery is low then the mobile doesn't work well' is a statement. Find its converse, inverse and contrapositive. [2]
 - If A and B be any two sets, then prove that $B - A = B \cap \bar{A}$ [1]
 - Rewrite the following inequality using absolute value sign $-4 \leq x \leq 1$. [2]
- Prove that $\log(1+2+3) = \log(1) + \log(2) + \log(3)$. [1]
 - Prove that the two matrices $\begin{pmatrix} -3 & -2 \\ 5 & 3 \end{pmatrix}$ and $\begin{pmatrix} 3 & 2 \\ -5 & -3 \end{pmatrix}$ are inverses of each other. [2]
 - If $(3-4i) \cdot (x+iy) = 3\sqrt{5}$, show that $5x^2 + 5y^2 = 9$. [2]

Mathematics (0071) Set A

14.i) If a, b, c are rational and $a + b + c = 0$, show that the roots of $(b + c - a)x^2 + (c + a - b)x + (a + b - c) = 0$ are rational. [3]

ii) If H be the H.M. between a and b, prove that

$$\frac{1}{H-a} + \frac{1}{H-b} = \frac{1}{a} + \frac{1}{b} \quad [2]$$

15.i) If A, B, C are the Subsets of a universal set U prove that

$$A - (B \cup C) = (A - B) \cap (A - C) \quad [3]$$

ii) If $f: \mathbb{R} \rightarrow \mathbb{R}$ be defined by $f(x) = \frac{x-1}{x+1}$, ($x \neq -1$), show that

$$(f \circ f)(4) = -1/4. \quad [2]$$

16.i) If x be a real number and 'a' be a positive real number then prove that $|x| < a \Leftrightarrow -a < x < a$. [3]

ii) Find the square root of i . [2]

17.i) On what side of the line $5x - 4y + 6 = 0$ do the points (0, 0) and (-1, 3) lie? [1]

ii) If p and p' be the length of the perpendiculars from the origin upon the straight line whose equations are $x \cos \theta + y \operatorname{cosec} \theta = a$ and $x \cos \theta - y \sin \theta = a \cos 2\theta$, prove that $4p^2 + (p')^2 = a^2$. [4]

18.i) Evaluate: $\lim_{x \rightarrow a} \frac{x^2 - a^2}{\sin(x - a)}$ [1]

ii) Calculate the limit $\lim_{x \rightarrow \infty} \sqrt{x} - (\sqrt{x} - \sqrt{x - a})$ [2]

iii) If a function $f(x) = \begin{cases} \frac{2x^2 - 18}{x - 3}, & \text{for } x \neq 3 \\ k, & x = 3 \end{cases}$ is continuous at $x = 3$, Find the value of k. [2]

Mathematics (0071) Set A

19.i) Find the derivative of $\frac{1}{\sqrt[3]{3x^2 - 4x - 1}}$ [2]

ii) A function f(x) is defined by

$$f(x) = \begin{cases} x^2 - 5 & \text{for } x < 4 \\ 3 & \text{for } x = 4 \\ 2x + 3 & \text{for } x > 4 \end{cases}$$

Is the function continuous at $x = 4$? If not, how can you make it continuous at $x = 4$? [3]

Group C [8×3=24]

20.i) Let a function $f: A \rightarrow B$ be defined by $f(x) = \frac{x+1}{2x-1}$ with

$A = \{-1, 0, 1, 2, 3, 4\}$ and $B = \{-1, 0, \frac{4}{5}, \frac{5}{7}, 1, 2, 3\}$. Find the range of f. Is the function f one-one and onto both? If not, how can the function be made one-one and onto both? [4]

ii) Find the domain and range of the function $f: \mathbb{R} \rightarrow \mathbb{R}$ defined by $y = \sqrt{21 - 4x - x^2}$ [4]

21.i) Find, from definition, the derivative of $\frac{ax+b}{\sqrt{x}}$ [5]

ii) Show that $\begin{vmatrix} 1+x & 1 & 1 \\ 1 & 1+y & 1 \\ 1 & 1 & 1+z \end{vmatrix} = xyz(1 + 1/x + 1/y + 1/z)$ [3]

22.i) Prove that geometrically $\lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta} = 1$, where 'θ' is measured in radian. [5]

ii) If the roots of equation $lx^2+nx+n=0$ be in the ratio p:q,

prove that $\sqrt{\frac{p}{q}} + \sqrt{\frac{q}{p}} + \sqrt{\frac{n}{l}} = 0$. [3]

Mathematics (0071) Set B

Nightingale International Boarding Secondary School
Kopundol, Lalitpur

Second Term Exam – Grade XI (Science)

Time: 3 hrs.

2082 (2026)

F. M.: 75

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

Group A [11×1=11]

- Which of the following sentences are not statements
a) Nepal exports oil b) $3+5=7$
c) Buddha was born in Nepal d) Ram is a good boy
- A square matrix exists its inverse if it is a
a) Singular matrix b) Non-singular matrix
c) Square matrix d) Scalar matrix
- If the roots of the equation $5x^2 - px + 45 = 0$ have equal roots then the value of p is
a) 30 b) -30 c) ± 30 d) 90
- $\sqrt{-9} + \sqrt{-25} - \sqrt{-36}$ is equal to
a) -2 b) 2 c) $-2i$ d) $2i$
- If A.M.=8 and G.M.=6 then H.M. =
a) 8 b) 6 c) $\frac{9}{2}$ d) $\frac{2}{9}$
- The length of perpendicular from (0,0) to the line $ax + by + c = 0$ is
a) $\frac{c}{\sqrt{a^2 + b^2}}$ b) $\pm \frac{c}{\sqrt{a^2 + b^2}}$
c) $-\frac{c}{\sqrt{a^2 + b^2}}$ d) none of these
- The line perpendicular to the line $ax + by + c = 0$ is
a) $ax - by + k = 0$ b) $bx - ay + k = 0$
c) $bx + ay + k = 0$ d) none

Mathematics (0071) Set B

- The value of $\lim_{x \rightarrow 0} \sin \frac{1}{x}$ is
a) ∞ b) 1 c) 0 d) doesn't exist
- $\lim_{x \rightarrow \infty} \frac{-3x^2 + 5x - 8}{2x^2 - 6x + 7} =$
a) $-\frac{3}{2}$ b) ∞/∞ c) $-\frac{5}{6}$ d) $-\frac{8}{7}$
- The point of discontinuous of the function $f(x) = \frac{x+3}{x^2 - x - 6}$ is
a) -3 b) 2,3 c) 2,-3 d) -2,3
- The derivative of $\sqrt{a^2 + x^2}$ is
a) $\frac{1}{\sqrt{a^2 + x^2}}$ b) $\frac{x}{\sqrt{a^2 + x^2}}$ c) $\frac{2x}{\sqrt{a^2 + x^2}}$ d) $\frac{1}{2\sqrt{a^2 + x^2}}$

Group B [5×8=40]

- Construct a truth table of following compound statement
 $(\sim p \wedge q) \Rightarrow (p \vee q)$ [2]
ii) If A and B be any two sets, then prove that
 $A - \bar{B} = A \cap B$. [1]
iii) Rewrite following inequalities using absolute value sign
 $-4 \leq x \leq -1$. [2]
- Prove that $\log_a \sqrt{a\sqrt{a\sqrt{a^2}}} = 1$ [1]
ii) If $A = \begin{pmatrix} 0 & 2y - 3 \\ 1 - y & 0 \end{pmatrix}$ and $A = -A^T$, find the value of y. [2]
iii) If $x - iy = \sqrt{\frac{1-i}{1+i}}$, prove that $x^2 + y^2 = 1$ [2]

Mathematics (0071) Set B

14.i) If the roots of the equation $(a^2+b^2)x^2 - 2(ac+bd)x + (c^2+d^2)=0$ are equal, then prove that $\frac{a}{b} = \frac{c}{d}$ [3]

ii) If G be the G.M. between a and b, show that

$$\frac{1}{G^2-a^2} + \frac{1}{G^2-b^2} = \frac{1}{G^2} \quad [2]$$

15.i) If A,B,C be the Subsets of a universal set U, prove that $A-(B \cup C) = (A-B) \cup (A-C)$ [3]

ii) If $f:R \rightarrow R$ defined by $f(x) = \frac{1}{1-x}$, ($x \neq 1$) show that

$$(f \circ f)\left(\frac{1}{2}\right) = -1. \quad [2]$$

16.i) Find the square root of $8+6i$. [2]

ii) If y be a real number and 'b' be a positive number then prove that: $|y| < b \Leftrightarrow -b < y < b$ [3]

17.i) Are the points (0,0) and (-1,3) on the same side or on opposite side of the line $5x - 4y + 6 = 0$? [1]

ii) Show that the product of the perpendiculars drawn from the two points $(\pm\sqrt{a^2 - b^2}, 0)$ upon the line $\frac{x}{a} \cos\theta + \frac{y}{b} \sin\theta = 1$ is b^2 . [4]

18.i) Evaluate: $\lim_{x \rightarrow \infty} \frac{x^2 - a^2}{\tan(x-a)}$ [1]

ii) Calculate: $\lim_{x \rightarrow \infty} (\sqrt{3x} - \sqrt{x-5})$ [2]

iii) If a function $f(x) = \begin{cases} kx + 3, & \text{for } x \geq 2 \\ 3x - 1, & \text{for } x < 2 \end{cases}$ is continuous at $x=2$. Find the value of k. [2]

19.i) Find the derivative of: $\frac{1}{\sqrt{ax^2+bx+c}}$ [2]

Mathematics (0071) Set B

ii) Show that the function $\phi(x)$ defined by

$$\phi(x) = \begin{cases} 3 + 2x & \text{for } -\frac{3}{2} \leq x < 0 \\ 3 - 2x & \text{for } 0 \leq x < \frac{3}{2} \\ -3 - 2x & \text{for } x \geq \frac{3}{2} \end{cases}$$

is continuous at $x = 0$ but discontinuous at $x = \frac{3}{2}$. [3]

Group C [8×3=24]

20.i) Find the domain and range of the function $f: R \rightarrow R$ defined by $y = \sqrt{6 - x - x^2}$ [4]

ii) Let $f:R-\{2\} \rightarrow R-\{3\}$ be defined by $f(x) = \frac{3x}{x-2}$. Show that f is bijective. Also find f^{-1} . [4]

21.i) Find, from first principle, the derivative of $(1 + x^2)^{1/2}$ [5]

ii) Show that:

$$\begin{vmatrix} a+x & b & c \\ a & b+y & c \\ a & b & c+z \end{vmatrix} = xyz\left(1 + \frac{a}{x} + \frac{b}{y} + \frac{c}{z}\right) \quad [3]$$

22.i) Prove that geometrically $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$, where 'x' is measured in radian. [5]

ii) If α and β are the roots of $px^2+qx+q = 0$, prove that

$$\sqrt{\frac{\alpha}{\beta}} + \sqrt{\frac{\beta}{\alpha}} + \sqrt{\frac{q}{p}} = 0 \quad [3]$$

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g]kfnfO{ ;u/dfyfsf] b]zsf ;fy} gbLgfnfsf] b]z klg elgG5 . g]kfnf 7'nf demf]nf /
;fgf u/L 5 xhf/eGb a9L vf]nfgfnfxç aU_b5g\ .
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kfgLaf6 xfldn] vf; pkof]lutf lng g;s]sfdq xf]Ogf]F clkt' cf^gf] b]zsf] d"nojfg\
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s_ tnsf] cg'R5]baf6 b'O{ b'O{ j6f tb\ej / cfuGt's zAb klxrfg u/L n]Vg'xf];\ .
lxhf] /flt dg'{eGb cufl8 p;sf] xftdf OGh]S;g nufpg] ;'O{ b]v]sf] lyPF . xf],
pm OGh]S;gdf 8«U; nufpFb] lyof] . crDd Ps l5gkl5 pm sfnf] lgnf] eP/ ToxL
/f]8sf] k]6Ldf 8ª\ u|ª\ u 9Nof] .
v_ lbOPsf zAbxçnfO{ ZfAbsf]zLo s|ddf ldnfO{ n]Vg'xf];\ M
cfifdfg, cu'N6f] , c+z , 1fg
% = lbOPsf] cg'R5]baf6 tLgcf]6f kfl/eflifs zAb klxrfg u/L jfSodf k]of]u u/L
n]Vg'xf];\ M -#_
dflg;eGb k]s[lt alnof] x'G5 . o; lijfodf b'O{ dt x'g ;Sb]g . k]s[lt dflg;sf] pGgl
Pjd\ j]1flgs pknAweGb sof]F u'Off a9L zStzfnL 5 . lbg / /ft x'g' Pp6f k]s[tsf]
lgod xf] . dfG5]n] rfx]/ klk k'/] lbgnfO{ /ft / /ftnfO{ lbg agfpg ;Sb]g. df];d, Ct'
kl/jt{g ;a} k]s[tsf lgod x'g\ . of] lj1fg ;a} 7fpFdf nfu' x'G5 .
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lbOPsf] cg'R5]baf6 Pp6f cg's/OffTds zAb , Pp6f pvfg / Pp6f 6'Ssf klxrfg u/L
ltgnfO{ cy{ v''Ng] u/L jfSodf k]of]u u/L n]Vg'xf];\ M
cfn' vfp/ k]8fsf] wfs gnufpg] xf] eg] Tof] dfG5] g] cfn' xf] . b'a} xftdf n8\8'
kfp] ;f]effUo t s;sf] x'G5 eg]/ d';'d'; xF:g] /d]z klk 6'Kn'Ss cfOk'Uof] . /d]zn]

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u/L ltgsf] lgdf{Of k]lj]mof b]vpfg'xf];\ M
;fdflhs ljs[ltn] o'jfxç a9L k]efljt 5g\ . j]l4s ju{af6 hlt o;sf] ;dfwfgsf] ck]lff
/flvPsf] xf] ,kl/efiff eg] Tolt ;Gtf]ifhgs b]lvFb]g . ljb]zLn] g]kfnLxçnfO{ leGg
tl/sfn] x]g{ yfn]sf] cg'ej xfdL;Fu 5 .
v_ lbOPsf] cg'R5]baf6 b'O{cf]6f ;d:t zAb klxrfg u/L lju|x ug'{xf];\ /
b'O{cf]6f lätT zAb klxrfg u/L bf]xf]l/Psf] c+z 5'6\ofpg'xf];\ M
bf]af6f]df a;]/ ukm;km r'6\g] c?sf] s'/f sf6\g] kfgLd?jfnfO{ hLjg / o;sf]
dxTjsf] s'g] af]w 5}g . hh;n] h] h] eg] klk xfdL uf]j/ uOf]z em}F aGg' x'Fb]g .
gLns07 jx'd'vL k]lTef ePsf] JolSt xf] lsgg] p;n] c?nfO{ cf cfm\gf] sfd /
bfloTjsf] hfgfsf/L ufP ufPfd k'u]/ u/fPsf] 5 .
u_ cg'R5]baf6 rf/cf]6f ;lGwo'St zAb klxrfg u/L ;lGw ljR5]b ug'{xf];\ M
Kfl/jf/sf jof]j]4xçnfO{ j]4f>ddd /fVg] s'/f u/]sf] huGgfysf] ljr/df kl/j]tg
cfPsf] 5 . ljBfnodf u'?;Fu ;/;Nnfx u/L cf-cfm\gf] efjgfnfO{ Ps cfk;df cfbfg
k]bfg ug]{ / cfO kg]{ kfl/jfl/s ;d:of ;dfwfg ub}{ hfg] ;'ljrf/ p;df cfPsf] 5 .
hLjg st{Jo / clwsf/sf] ldnglaGb' aGg'k5{ .
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s_ lbOPsf] cg'R5]bnfO{ k'lnª\ u eP :qLlnª\ u / :qLlnª\ u eP k'lnª\udf kl/jt{g
u/L k'gn]{vg ug'{xf];\ M
p;n] Pp6f ;'Gb/ 3/ agfPsf] 5 . p;sL cdfn] To;nfO{ c;fWo} dg k/fO{g\ pm
v';Ln] lgs] /dfof] . p;sL s]6L ;fyLn] Tof] 3/ lgs} /fd|f] dfGof] .
v_ lbOPsf] cg'R5]bnfO{ t{tLo k'?ifdf kl/jt{g u/L k'gn]{vg ug'{xf];\ M
d lgs] df]6f] 5' . d psfnf] r9\g ;lSbg . d cf]/fnf]df lxF8g eg] cln ;xh dx;' ; u5'
 . cfhef]nL d cfm\gf] df]6f]kgf 36fpg] k]of;df nfu]sf] 5' .
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s_ tnsf uBf+zaf6 b'O{cf]6f p2]Zo, b'O{cf]6f ljw]o tyf b'O{cf]6f p2]Zo lj:tf/ /
b'O{cf]6f ljw]o lj:tf/ kb klxrfg u/L n]Vg'xf];\ M
Df]/f] ;fgf] efO 1fgL 5 . p;n] s'g} klk v/fa sfd u/]sf] 5}g . 3/sf kl/jf/ xfdL ;a}
p;sf] ;kmntfd v';L 5f]F . kl9n]vL p;n] eljiodf /fd|} unf{ . g]kfnL pkGof;
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v_ lbOPsf] jfSonfO{ s/Of eP cs/Of / cs/Of eP s/Ofdf kl/jt{g u/L cg'R5]b k'gn]{vg ug'{xf};\ M;fyLx¿n] g]kfnf w]/} /fd|f] sfd u/] . ltdLx¿n] rflxF u/]gf} . efOX¿n] kl g ofF g]kfnf /fd|f] u/]5f] lg . g]tfx¿n] g]kfnf] 9's'6Lsf] w]/} k};f vfp5g\ lg .

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-c_ xfdLn] eGof], æpgLx¿ rrf8] cfpF5g\ .Æ
-cf_ dnfO{ b'O{ lbg a:g /fhgn] cfu|x u%of] .
-O_ ltdLn] dnfO{ eGof], æxfDL kl g hfcf}Fnf .Æ
-O{ _ ToIf] dflg; To; sfdsf nflu of]Uo 5 eGg] ;a]n] atfP .

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s_ lbOPsf] uBf+z k9L ;f]lwPsf k|Zgx¿sf] pQ/ n]Vg'xf];\ M

g]kfn v'nf Pjd\ ahf/f]Gd'v cy{Jo;:yf ePsf] d'n's xf] . xfd|f] b]zn] cf^g] ;|f]t;fwg] kl/rfng u/L cfly{s ljsf; / ul/aL lgjf/Ofsf] jf]lOfHo gLlt cjnDag u/]sf] 5 . cGt/f{li6«o :t/df k|lt:kwf{ ug' / Jofkf/ Joj;fosf] k|jw{g ug' o;sf] d"n p2]Zo xf] . ;fdg lgsf;L, k}7f/LnfO{ ;dofg's"n agfO{ /fh;j ;a\sng ubf{ b]zsf] cy{tGqdf 6]jf k'U5 . cf^gf] b]zdf pTkflbt h8La'6L tyf s[lfihGo j:t'nfO{ Joj:yfkg u/L d'gfkmf cfh{g ug{ ;lsg] 9fFrdf xfd|f] jf]lOfHo gLlt to ePsf] 5 . Jofkf/3f6f sd ug{ / /f]huf/Lsf] ;a\Vofdf j[14 ug{ o; gLltn] ;xof]u k'xofpg] ck]lff lnOPsf] 5 . k|fs[its / h]ljs lj]jwtf] o'St o; b]zdf kz'kG5L / jg:klthGo pTkfbgnfO{ plrt k|ljw / hgZlStsf] ;+of]hgáf/f lgof{t k|jw{g ug{ ;lsg] ;Defjgf 6/]sf] 5]g . n3' pBf]u, 3/]n' pBf]unfO{ k|f]T;fxt ub}{ g]kfnL df6f] ;'xpfBf] cy{tGq lgdf{Ofit/ nfUg] xf] eg] /fHosf] /fh;j ;a\sngdf kl g j[14 x'G5 . b]zleq} /f]huf/ l;h{gf ug{sf nflu pBf]u Joj;fo ;~rfngfy{ /fHon] lghL lf]qnfO{ kl g k|f]T;f]lxt ug{ ;s] xfd|f] cy{Jo;:yf dha't aGg k'U5 . o;/L ;/sf/n];xhstf[sf] e"l dsf lgjf{x u/L pTk|]/s / lgofds lgsfoaf6 cg'udg;d]t ub}{ lghL lf]qsf] kl g ;lj]mo ;xflutdf b]znfO{ cfly{s ;d[14sf] af6fdf lxF8fpg ;S5 .

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-O{ _ ...h]ljs lj]jwtf / ul/aLú lgjf/Of kbfnLsf] cy{n]Vg'xf];\ .

v_ lbOPsf] cg'R5]b k9L ;f]lwPsf k|Zgsf] pQ/ n]Vg'xf];\ M

hLjgsf] ufx|f];f/f] kl g efjgf;Fu g} hf]l8g] s'/f xf] lg . ;fdfGotM dg k/]sf] sddf sdfO yf]/} eP kl g lRq a'‰o5 . km]l/ d]n] h'g k4ltsf] v]tLkftL ul//x]sf] 5' ,

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-s_ hLjgsf] ufx|f];f/f] s] ;Fu hf]l8Psf] x'G5 <
-c_ cfyL[s tTj];Fu -cf_ ;f:s[its tTj];Fu
-O_ efjgf;Fu -O{ _ /fdflhs cj:yf;Fu
-v_ pTkfbgsf] kof{ojfrL zAb s'g xf]Og <
-c_ pAhf -cf_ k}bfj/ -O_ pAhgL -O{ _ pTkfbg
-u_ /f;folgs v]tL ubf{ ls;fgsf] w]/} k};f sxfF hfG5 <
-c_ a]Fsdf -cf_ 3/df -O_ ahf/df -O{ _ s'g} kl g

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!)= tnsf] cg'R5]b k9L To;af6 d'Vo d'Vo rf/ a'Fbf l6kL Ps t[tLof+zdf ;f/f+z n]Vg'xf];\ M -@±@Ö\$ _

xfd|f] b]z ;'Gb/ k[VjLsf] cnf]lss cfgGbdF ckf/ k|s[itsf] 56f;Fu xFfI;x]sf] ljZjsf] ;jf]{Rr lzv/ ;u/dfyfsf] sfvdf d':s'/fpFb] lj/fhdfg 5 . ckf/ hn;|f]tn] ;DkGg /fi6« g]kfnf;Defjgfsf r'nLx¿ lxdfn em]F c6n 5g\, pRr 5g\ . k|s[itsf] sfvdf sf];L, /f];L, b'wsf];L, tdfsf];L, ;gsf];Lsf ;kgfx¿df ljZjnfO{ emndNn kfg{ ;Sg] s~rg hnk|jfx xfd|f] OR5fz]StnfO{ s'/ / al;x]sf] 5 . u08sLsf] uxgtf, sgf{nLsf] sd{of]u, d]rLsf] dxfgtf, sfnLsf] df]gtf, ltlrnf], uf]Sof] / /f/fsf] pRrtf, km]jfsf] km]nfj6, j]ugf;sf] zfnLgtf, tdf]/sf] tdf;f xfd|f] hn;|f]tsf ch;| e08f/ x'g\ . logLx¿sf] ;xL ;b'kof]un] xfd|f] w/tL x/fe/f aG5 . kf]jifOfo'St cGgfd[t k|fKt x'G5 . hn;|f]taf6 lah'nL lgsfn]/ w/tL emndn kfg{, pBf]u snsf/vfgf vf]Ng ;lsG5 . ljB't\ lgof{t u]/ / cfocfh{g ug{ ;lsG5 . g]kfn] e" w/ftndf /x]sf hLjgbflogL gbLx¿af6 pTkflbt hnljB'tLo pmhf[sf] pkef]uaf6 k]6«f]lnod kbfy[sf] vkt Go"gLs/Of u/L b]zsf] Jofkf/3f6f /f]Sg ;lsG5 . cfhsf] l8lh6n k|ljwo'St ljZjdf b]vf k/]sf] pmhf{ ;a\s6 x6fP/, ljZjahf/df gjLs/OfLo hn pmhf{ laj]mL u]/ / k|z:t cfo cfh{g, /f]huf/L tyf ;DkGgtfsf 9f]sfx¿ vf]Ng ;lsG5 .

!!= tnsf s'g} Ps k|Zgsf] pQ/ n]Vg'xf];\ M

-\$ _

s_ tkfO{Fsf] ufpF glhs}sf] h^undf lah'nLsf] 9n]sf] kf]n dd{t ug{sf nflu lbge/ lah'nL cj?c x'g]af/] hfgfsf/L u/fpg g]kfn ljB't k|flws/Ofn] k|sflzt ug}{ ;''rgfsf] gd'gf tof/ kfg{'xf];\ .

clgifo{ g]kfnL -)})!!_ ;]6 ...sÚ

v_ gofF jif{sf cj;/df cfb{z dfWolds ljBnosf tkm{af6 k|sflzt ul/g} z'esfdgf kqsf] gd'gf tof/ kfg{'xf};\ .

!@= **tnsf s'g} Ps k|Zgsf] pQ/ n]Vg'xf];\ .**

-\$_

s_ cfkm" cWoog/t ljBfnosf] cfof]hgfd] ;DkGg lhNnf:t/Lo jSt[tTjsnf k|ltof]lutf sfo{qmdsf ;Dk"Of{ ljj/Of ;d]6]/ !%) zAb;Ddsf] k|ltj]bg tof/ kfg{'xf};\ .

v_ ...k]6<<f]lnod kbfy{sf] d"noj]l2 / o;sf] c;/Ú zLif{sdf !%) zAb;Dd g36fO{ Pp6f l6KkOfL tof/ kfg{'xf};\ .

!#= **nfu' kbfy{sf] b'Jo{;gaf6 o'jfx?nfO{ arfpg s] ug{ ;!sPnf < !@% zAb ;Dddf cfkm\gf] k|ltlqmf n]Vg'xf];\ M**

-\$_

!\$= **tnsf s'g} b'O{ k|Zgsf] pQ/ n]Vg'xf];\ M**

-\$±\$Ö*_

s_ **lbOPsf] sljtf+z k9L ;f]lwPsf k|Zgsf] pQ/ lbg'xf];\ M**

s'g kxf8n] s'g vf]nfn] ltd|f] ult 5]s]Yof] / jL/ k'vf{ Ū s'g cfFwLn] ltd|f] ofqf /f]s]Yof] / u?8sf] em}F j]u ltd|f] s'g cfsfn] afFWg ;Sof] kf]/vn] /Rof] g]kfn Ū kxf8 t/fO{ h'6\g ;Sof] .

k|Zgxč M

-c_ g]kfnLxčsf] s:tf] kf]/vn] g]kfnsf] /rgf ePsf] xf] < -cf_ sljtf+zsf cfwf/df xdf|f jL/ k'vf{sf] uf]/j ufyfsf] jOf{g ug'xf];\ .

v_ **lbOPsf syf+z k9L ;f]lwPsf k|Zgsf] pQ/ n]Vg'xf];\ M**

aNn ;fgLsf cfFvf p3|] . To;nfO{ cf^gf] c^uk|To^u s;f] v'lDrg nfu]sf] 5fnf b]v]/ lat]sf] bL3{ ;dosf] ;Demgf eof] / emg\ k|Tolfd] To;n] b]vL, ofqsf] tLg rf]yfO k"/f ePkI5 To;n] kfO5 - cfzf ;dfIKtsf] ;fy;fy} hLjg ;GWof klg cfOk'u]sf] /x]5 . b'lgofF cs]{ ePsf] /x]5, o; jt{dfg;Fu To; ;fgLdf s'g} k|sf/sf] ;fd~h:o /x]g5 Ū cfzfn] cem;Dd a'l4nfO{ wf]vf g]kfnL, slff !! 89 lbO/x]sf] lyof], ;fgL lzlyn, SnfGt em}F x'g uO{ . pleO/xgdf z/L/ ;fx|} g} un]sf] h:tf] efg x'g nfUof] / To; } âf/df yrSs a;L .

k|Zgxč M

-c_ ;fgLsf] k|tLlff s;/L ;dfKt eof] < -cf_ o; cg'R5]bdf ;fgLsf] s:tf] dgf]lj1fg k|:t't ePsf] 5

u_ **lbOPsf] hLjgLsf] c+z k9L ;f]lwPsf k|Zgsf] pQ/ n]Vg'xf];\ M**

;GGof;L hLjg ;'? u];Fu} of]udfodf ;fdflhs r]tgf ;nanfof] . pgL wflid{s, ;fdflhs, k|zf;igs, cfly{s tyf /fhgLts lf]qdf ljBdfg ;a} vfn] ljs[ltsf af/]df v'n]/ lj/f]w ug{ yflng\ . pgL 5'jf5'tnfO{ dfgj ;Eotfsf] ;a}eGb 7'nf] sn^s 7fIGyg\ . To;n] s'g} klg ;fdflhs sfo{df dflg;nfO{ 5't / c5't tyf dflyNnf] hft / tNnf] hftdf 5'6\ofpg' 3f]/ ck/fw dflGyg\ . ;gftgL k/Dk/fsf] gfddf hftsf cfwf/df km/s km/s sfg'g k|rngdf /x]sf] To; ;dosf] ;dfhdf 5'jf5't / hftkft gdfGg' 3f]/

clgifo{ -)})!!_ ;]6 ...sÚ

cfkIQsf] ljifo x'GYof] . To:tf JolSt ljleGg b08sf efuL x'Gy] . To:tf] s7f]/ /f0ffsfnlG ;dodf klg pgn] 5'jf5't tyf jOff{>dsf] v'n]/ lj/f]w ul/g\ . k"hf, cf/fwgf, ehg, sLtg, k|;fb ljt/Of / u|xOfdf ltgLxčnfO{ ;xefuL u/fP/ pgn] cf^gf] wf/OffnfO{ Jojxf/df klg ptfl/g\ . pgsf y'k|} eStxč slyt blnt klg lyP / pgLxč ;a} hgf ljgfe]befj ;a} ultljwdf ;+nUg x'g ;Sy] . pgsf] cf>ddf k|rlnt o; lsl;dsf] 5'jf5't/lxt jftfj/Of b]v]/ slyt ;gftgLxč of]udfofs] v'a cfnf]rgf uy]{ .

k|Zgxč M

-c_ of]udfofs] wd{;DaGwL dfGotf s:tf] /x]sf] lyof] < -cf_ kf7;d]tsf cfwf/df of]udfofn] u/]sf ;'wf/sf k|of;xčsf] jOf{g ug'xf];\ .

!%= **tnsf s'g} Ps k|Zgsf] ;dLlffTds pQ/ n]Vg'xf];\ .**

-*_

s_ ;Tolgi7f / ;dtdf"ns ;dfhsf] :yfkqdf of]udfofn] lbPsf of]ubfgsf] rrf{ ug'xf];\ .

.

v_ cf^gf] 3/df jf; a:g cfOk'u]sf] ofqLsf nflu ;fgLn] u/]sf] bL3{ k|tLlff tkfO{'nfO{ s:tf] nfUof], syfTds ;Gbe{;d]t Vofn u/L ljZn]ifOf ug'xf];\ .

!^= **s'g} Ps zLif{sdf @%) zAb;Ddsf] Pp6f lgaGw n]Vg'xf];\ M**

-*_

s_ d]/f] b]zsf o'jfk':tfn] rfx]sf] g]kfn Vf_ ;~rf/ dfWodsf] dxTj u_ jftfj/Of k|b'ifOfn] dfgj:jf:Yodf kfg]{ k|efj

-)-

clgjfo{ g]kfnL -)!!_ ;]6 ...vÚ

gfOl6ª\u]n OG6/g]Zgn af]l8{ª\u ;]s]G8/L :s'n
sf]k'08f]n, nlnrk'/

bf];|f] q}dfi;s k/Llff – slff !! -lj1fg ;+sfo_

;do M # 306f @)*@ -@)@^_ k"Off{ª\sM &%

k/LliffyL{xçn} cf^g} z}nLdf df]lnstf cleJoQm x'g] u/L ;[hgfTds pQ/
lbg'kg]{5 . bfofF lsgf/fdf lbOPsf] cª\sn] k"Off{ª\nfO{ hgfpFb5 .

!= tn lbOPsf /]vfª\lst j0f{xçsf] 3f]ifTj / k|f0fTj 5'66\ofpg'xf];\ M

-#_

Æxhf/f}F dfOnsf] ofqf Pp6f ;fgf] kfOnfaf6 ;'? x'G5Æ

@= z'4 u/L n]Vg'xf];\ M

-#_

**sfo{sdsf clGtd aStf ;'Gb/ 5GTofn g} lyP . pgn] yf]/}af]n] t/ ld7f] af]n] .
ædgsf] zfGtL vf]Hg 6f9f hfg'kb}{g, of] tkfO{F leq} 5 of]uaf6 of] k|fKt x'G5 .**

#= /]vfª\lst zAbxçsf] zAbju{ klxrfg u/L n]Vg'xf];\ M

-@_

**Tof] 7fpF ;a}sf nfuL a:g pko'tm 5]g . ToxF cg]s lx+;|s hLjhGt' / cGo
;ª\qmfds hLjx? Af:5g [] Û**

\$= lbOPsf k|Zgsf] pQ/ lbg'xf];\ M

-@±@Ö\$ _

s_ tnsf] cg'R5]baf6 b'O{ b'O{ j6f tT;d / cfuGt's zAb vf]hL n]Vg'xf];\ M

**k|ftM sfnlG e|d0fdf lg:sFbf ljleGg ljBfnosf] 8«; nufPsf ljBfyL{xç xftdf
df]jfOn / Jofu le]/ sn]hlt/ lxFGb} u/]sf] b[io /dfOnf] b]lvG5 .**

v_ lbOPsf zAbxçnfO{ ZfAbsf]zLo s|ddf ldnfO{ n]Vg'xf];\ M

cFh'nL , cFh]nL ,cFu'7L , cFsfO{

**%= lbOPsf] cg'R5]baf6 tLgcf]6f kfl/eflifs zAb klxrfg u/L jfSodf k|of]ju
ug'xf];\ M -#_**

**8fS6/ emf d]/f 8fS6/ dfq} geP/ u'? klg x'g'eof] .Æ pxfFn] eGg'eof] dgsf]
Psfu|tf g} zflGtsf] cfwf/ xf] . ulx/f] zflGt Wofgaf6 k|fKt x'G5 / zf/Ll/s zflGt
of]ufEof;af6 k|fKt x'G5 . To;]n] clxn]sf] j}1flgs o'udf ;'vL / lg/f]uL hLjgsf
nflu of]ufEof; cfjZos 5 .Æ oGqdfgjn] ;a} s'/f Ps} :j/df l;Wofof] .**

cyjf

**lbOPsf] cg'R5]baf6 Pp6f cg's/OffTds zAb , Pp6f pvfg / Pp6f 6'Ssf klxrfg
u/L ltgnfO{ jfSodf k|of]ju ug'xf];\ M**

**P]Fr]k]Fr] / ;;fk6L u]/ eP klg u'hf/ rnfpg]xç k|lt ;befj /fVb} ;dfh;]jfdf
;dlk{t pgsf] ;dfh ;]jf b]v]/ 3'6'Ss y's lgNg] nf]lekfkLxçsf] dgdf hlt kfk nufP
klg pgLxç v'?v'? sfd ul//xG5g\ . sfu s/fpFb} u5{ lkgf ;'Sb} u5{ eg]em}F ççn]**

clgjfo{ -)!!_ ;]6 ...vÚ

cj/f]w u/]klg lg8/ eP/ sfd ug]{ pgnfO{ s;]n] pl5Gg ;Sb}gg\ . nDs]sf]
xfQLnfO{ rDs]sf] 3f]8fn] e]6\g ;Sb}g eg]em}F pgsf] a/fa/L ug{ s;]n] ;Sb}g .

^= tnsf s'g} b'O{ k|Zgsf] pQ/ n]Vg'xf];\ M

-@±@Ö\$ _

**s_ tnsf] cg'R5]baf6 b'O{cf]6f pk;u{ Jo'TkGg zAb / b'O{cf]6f k|Too Jo'TkGg
zAb klxrfg u/L lgdf0f{ k|lqmof b]vfp'g'xf];\ M**

**g]kfn k|fs[its ;'Gb/tfsf b[li6n] ;DkGg d'n's xf] . oxfF hn;|f]tsf ckf/ e08f/ 5
, cgd]n hl8a'6L 5g\ . clg lxdfnL ;'Gb/ft t cTolws dgdf]xs 5 .**

**v_ cg'R5]baf6 b'O{cf]6f ;d:t zAb klxrfg u/L lju|x ug'xf];\ / b'O{cf]6f lâTj
zAb klxrfg u/L bf]xf]l/Psf] c+z 5'6\ofpg'xf];\ M**

**Rf]af6f]df a;]/ ukm;km u/] / lbg s6fpg] / s;]sf] ;/;Nnfx g;'Gg] xfd|f
7"NbfO klg cfhef]ln 3/3/sf b]nf b]nfd f'k'u/ 5/l5d]snfO{ ljgkl/>d b]zljf;
x'g g;Sg] eGb} pgLxçnfO{ s;]sf] s[kkfq gjL sfdsfhdf nfUg k|]/Off lbO
/x]sf 5g\ .**

**u_ lbOPsf] cg'R5]baf6 rf/cf]6f ;lGwo'St zAb klxrfg u/L ;lGw ljR5]b
ug'xf];\ M**

**xfd|f ;~ho bfO ko{6sxçnfO{ :jfut;Tsf/ ug{ / jof]j[4xçsf] ;]jf ;>'iffdf nfUg
cToGt ?lr /fv5g\ . o;af6 k|l/t eP/ sdfO wdfO s]xL gePsf] ;/]Gb|n] klg
/ftsf] rGb|f]bo / ljxfgsf] ;'"of]{bo x"g" cufj} j[4f>d uO{ pgLxçnfO{ ;xof]ju
u/]5g\ .**

&= tn lbOPsf s'g} Ps k|Zgsf] pQ/ n]Vg'xf];\ M

\$ _

s_ tnsf] cg'R5]bnfO{ pRr cfb/df kl/j{tg ug'xf];\ M

**pm ljBfnof6 ;/f;/ 3/ uof] . To; kl5 lStfa af]s]sf] emf]nf vf6df kmfNof] .
xft v'šf s]xL gwf]Osg vfhf vfof] . To;kl5 es'08f] af]s]/ ;fyLxç;Fu v]Ng uof]**

v_ lbOPsf jfSoxçnfO{ 4LlLo k"ifdf kl/jt{g u/L n]Vg'xf];\ M

**xfdL ljBfnodf lzlfnsfO{ e]6\5f]F . d g]kfnL ljifosf] af]/df w]/) s'/f u5' .
xfdLn] cfkm'n] ghfg]sf] k|Zgxç lzlfnsfO{ ;]W5f]F . d]/f] s'/f ;'g]/ lzlf
bª\u kg'x'G5 .**

***= tnsf b'O{ s'g} k|Zgsf] pQ/ n]Vg'xf];\ M**

@±@Ö\$ _

**s_ tnsf uBf+zaf6 b'O{cf]6f p2]Zo, b'O{cf]6f ljw]o tyf b'O{cf]6f p2]Zo lj:tf/
/ b'O{cf]6f ljw]o lj:tf/ kb klxrfg u/L n]Vg'xf];\ M**

clgjo{ g]kfnL -)!!_ ;]6 ...vÚ

Df]/f] efO g]kfnL pkGof; /fd|/L k9\5 . pm pQm pkGof; k9]/ dSv k/]sf] 5 .
ljBfnodf u'?n] g]kfn / g]kfnLnfo{ cfTdfb]lv g] ;Ddfg ug'k5{ eGg'eof] .
d]n] klg b]znfo{ s]xL ug'{k5{ eGg] k|Of u/]sf] 5' .

cyjf

lbOPsf] cg'R5]bsf jfSoxčnfO{ ;a\ult ldnfo{ k'gn}{vg ug'{xf];\ M
O{Zj/ / d Pslbg 3'Dg hfG5 . xfdLn] ToxfFsf] j:t'l:yltsf] c]nf]sg u5{ . d]/f]
sn]hsf] ;fyL lutf klg 3'Dg uP5 . To;]n] xfdL ;a]nfO{ 3'dSs8 elgPsf xf]pg\ .

v_ lbOPsf] jfSonfo{ s/of eP cs/of / cs/of eP s/ofdf kl/jt{g u/L n]Vg'xf];\ M

pgLxč w]/} /fd|f 5g\ . ltdL slxNo} g/fd|f] af]Nb]g} . cfh w]/} hf8f] xf]nf
h:tf] 5 . kfgL k/]g / hf8f] ePg .

cyjf

**lbOPsf jfSoxčnfO{ k|Toif eP ck|Toif / ck|Toif eP k|Toif sygd f kl/jt{g
ug'{xf];\ M**

-c_ b]jsf]6fn] eg] æsyf Pp6f ;fgf] cfFvLem\ofn xf] .Æ
-cf_ pgn] dnfO{ xfdL ;a] ldn sfd u/] b]z ljsfz x'G5 eg] .
-O_ pgxčn] eg] , æxfdLxč rff8} cfpF5f]F .Æ
-O{ _ /fdn] cfkm\gf] ;fyLxčnfO{ slffs]7fdf cg'zf;gdf a:g' k5{ eGof] .

(= tnsf b'a} k|Zgsf] pQ/ n]Vg'xf];\ M -
Š±ŠÖ * _

s_ lbOPsf] cg'R5]b k9\g'xf];\ / ;f]lwPsf k|Zgxčsf] pQ/ n]Vg'xf];\ M

lzlfOf l;sfOsf] cleGg cª\usf čkdf d"Nofª\sgnfO{ lnOG5 . of]hgf lgdf{Of,
kf7\oj]mdsf] lgdf{Of tyf sfof{Gjog / l;sfO ;xhLs/of lj]mofsnfk cflb z}lifs
k|OfnLcGtu{ t ;Fu;Fu} cfPsf x'G5g\ . ;fdfGotof d"Nofª\sgleq ljBfyL{
d"Nofª\sgsf ;fy;fy} sfo{]md d"Nofª\sg, kf7\oj]md d"Nofª\sg, lzlfO
d"Nofª\sg cflb kb{5g\ . o;sf cltl/St sfo{]md pTkfbg, gLlt lgod, sfo{blftf
Joj:yfkg cflb lf]qnfo{ klg d"Nofª\sgleq ;d]6\g ;lsG5 . ;fdfGotof dfkg,
k/LlfOf / d"Nofª\sgnfO{ Pp6} cy{sf čkdf lnOP tfklg logLxčlardf tfl]js
leGgtf 5 . dfkg / k/LlfOfefGbf d"Nofª\sg a9L Jofks 5 . d"Nofª\sgleq dfkg
/ k/LlfOf kb{5g\ . k/LlfOfsf cfwf/df dfkg ul/G5 . dfkgn] ljBfyL{sf] u'Of,
lfdtf jf ljz]iftfsf] ;ª\VofTds jOf{g ub{5 . d"Nofª\sgn] ;ª\VofTds, u'OffTds
JofVofsf ;fy} d"no lgwf{/Of ub{5 . d"Nofª\sgs} cfwf/df s'g} ljBfyL{ jf
sfo{]mdsf] clGtd lgOf{o lbg] sfd ul/G5 . ljz]if u/L ljBfyL{ d"Nofª\sg ubf{
lgdf{OffTds / lgOf{ofTds u/L b'O{ lsl;daf6 ug{ ;lsG5 . ;'wf/fTds d"Nofª\sg
lgdf{OffTds d"Nofª\sg xf] . of] sfo{]md ;~rfng ;Fu;Fu} ul/G5 . lg/Gt/
d"Nofª\sg ub}{ k[i7kf]ifOf lbg ldNg] of] d"Nofª\sg h'g;'s} ;dodf cf]krfl/s /
cgf]krfl/s čkdf ug{ ;lsG5 . lgdf{OffTds d"Nofª\sgsf c+znfo{ klg ;dfj]z ub}{
z}lifs sfo{]mdsf cGTodf ul/g] of] lgOf{ofTds d"Nofª\sgn] k|dfOfkq lbg]

clgjo{ -)!!_ ;]6 ...vÚ

sfd ub{5 . o:tf] d"Nofª\sg lzlfOf l;sfO sfo{]md jf z}lflOfs sfo{]mdsf]
cGTodf ul/G5 .

k|Zgxč M

-c_ d"Nofª\sg eg]sf] s] xf] <
-cf_ lgdf{OffTds / lgOf{ofTds d"Nofª\sglar s] km/s 5 <
-O_ k|dfOfkq lbg] k/Llff lsg cfjZos 5 <
-O{ ...kf7\oj]mdÚ / ...k[i7kf]ifOfÚ sf] cy{ n]Vg'xf];\ .

v_ lbOPsf] cg'R5]b k9\g'xf];\ / ;f]lwPsf k|Zgxčsf] pQ/ n]Vg'xf];\ M

cfh xfdL cfm]F;Fusf] lagf glrg]/ ef]tfl/O/x]sf] s:t'/L em]F ePsf 5f]F .
hn;|f]tdf wgl /fi6« eP klg lbuf] k"jf{wf/ ljsf;sf of]hgfsf cefjn] ubf{ xfdL
;|f]t / ;fwg eP klg cFWof/fdf a:g afWo 5f]F . pj{/fe"ld eP/ klg l;FrfOsf
cfw'lgs k|ljlw ckgfpg g;Sbf hUuf afFem} 5g\, hgdf ef]sef]s} 5g\ . o'jzLst
lab]l;g afWo 5g\ . ljsf; lgdf{Ofn] ljZjnfO{ rlst kfg]{ 15d]sLnfo{ 6'n'6'n'
x]/} uF; , af;s} ;d:ofdf lk/f]lng afWo 5 xfd|f] ;dfh . of] cj:yfnfo{ abn]/
ljZj k|lt:kwf{df xf]ldg ;Sg agfpg] lfdtf hn;|f]tdf dfq 5 . xfdL cd[t ;dfg
lxdfnsf] s~rg kfgL af]tndf a]r]/ ljZjsf dflg;sf] ltvf{ d]6fpg ;S5f]F . sgf{nLdf
hnljxf/, sf];L / tfdfsf];Ldf l;FrfOsf plrt Joj:yfkg u]/ wtL{ pj{/f agfpg ;S5f]F
.

-s_ ...ljgÚ zAbsf] cy{ s'g xf] <
-c_ j]u/ -cf_ dfq -O_ d[ugfle -O{ _ ljgÚ

-v_ ...lgdfOf{Ú / ...cfw'lgsÚ zAb s;/L lgdfOf{ ePsf x'g\ <
-c_ pk;u{ / k|Too nfu]/ -cf_ k|Too / pk;u{ nfu]/
-O_ pk;u{ / ;d:t zAb eP/ -O{ _ k|Too / ;d:t zAb eP/

-u_ xfdL s] eP/ klg cFWof/fdf a:g afWo 5f]F <
-c_ lxdfn / hn;|f]t -cf_ hn;|f]t / ;|f]t ;fwg
-O_ ljsfzsf k"jf{wf/ -O{ _ ljsfzsf of]hgf

-3_ g]kfnfo{ ljZj k|lt:kwf{df xf]ldg ;Sg] agfpg] lfdtf s]df dfq 5 <
-c_ jg;Dkbf -cf_ hn;Dkbf -O_ vlgh;Dkbf -O{ _ dfjg;|f]t

**!)= tnsf] cg'R5]b k9L To;af6 d'Vo d'Vo rf/ a'Fbf l6kL Ps t[tLof+zdf ;f/f+z
n]Vg'xf];\ M -@±@ÖŠ_**

g]kfnfo{ ;u/dfyfsf] b]zsf ;fy} gbLgfnfsf] b]z klg elgG5 . g]kfnf 7'nf demf]nf /
;fgf u/L 5 xhf/eGbf a9L vf]nfgfnfç aUb5g\ . oLdWo] sltko ;|f]txč lxdfnosf
lxdhna6 kfl/kf]lft ePsf 5g\ . g]kfnaf6 aUg] gbLgfnfçaf6 !&) c/a So'las ld6/
kfgL axg] ub{5g\ . of] hnk|jfx uª\uf gbLdf ldnL aª\ufnsf] vf8Ldf k'Ub5 . o;
kfgLaf6 xfdLn] vf; pkof]lutf lng g;s]sf dfq xf]Ogf]F clkt' cf^gf] b]zsf] d"nojfg
df6fnfo{ ;d]t o;n] b]zaflx/ k'ªofPsf] s'/f ;j]l]bt} 5 . o;/L ;DefJo cfly{s d]?b08sf
čkdf /x]sf] hn;Dkbfno{ pkof]udf NofO{ b]zdf ljBdfg vfBfGg, pmhf{ / cGo
;d:ofxčsf] lg/fs/Of ug'{ cfhsf] r'gf}tL /x]sf] 5 . b]zsf] cfly{s ljsf;sf nflu ljB't\ zLst

clgjfo{ g]kfnL -)!!_ ;]6 ...vÚ

dxìjk"Of{ / ;jf[|kl/ b]g x'g ;S5 . g]kfnL pknAw hn;Dkbfaf6 k|r'/ dfqdf hnljB't\ zLstsf] ljsf; ug[} u'Ghfo; ePsf] / sf]Onf, UofF;, vlgh, t]n cflb cGo zLstsf] ;|f]t klg kQf nflu;s]sf] x'Fbf oL ;a} pmhf{ zLstsf] ljsf; ug[}tkm{ hf]8 lbP/ cl3 a9\g' cfhsf] ;dosf] dfu xf] .

!!= tnsf s'g} Ps k|Zgsf] pQ/ n]Vg'xf];\ M

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s_ cfkm\gf] 3/df vfg]kfgLsf] gofF nfOg h8fg u/Llbg cg'/f]w ub} :yflgo vfg]kfgL sfo{nonfO{ ;Daf]wg u/L Pp6f lgj]bg n]Vg'xf];\ .

v_ ;fdflhs lf]qdq of]ubfg k'¥ofpg] s'g} Ps JolStTjsf] of]ubfgsf] sb/ ub}{ k|bfg ul/g] ;Ddfg kqsf] gd'gf tof/ kfg'{xf];\ M

!@= tnsf s'g} Ps k|Zgsf] pQ/ n]Vg'xf];\ .

-\$_

s_ tkfO{Fn} ug'{ePsf] s'g} e|dOfsf ;Dk"Of{ ljj/Of ;d]6]/ !%) zAb;Ddsf] k|ltj]bg tof/ kfg'{xf];\ .

v_ ...g]kfnfsf] cy{tGq j[4df ko{6g pBf]usf] e"ldsfÚ zLif{sdf !%) zAb;Ddsf] l6KkOfL n]Vg'xf];\ .

!#= jftfj/Of ;+/lfOf ug{ s:tf] pkfo cjnDjg ug{ ;lsPnf < !@% zAb;Dddf cfkm\gf] k|ltlqomof n]Vg'xf];\ .

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!\$= tnsf s'g} b'O{ k|Zgsf] pQ/ lbg'xf];\ M

-\$±\$Ö*_

s_ lbOPsf] sljtf+z k9L ;f]lwPsf k|Zgsf] pQ/ n]Vg'xf];\ M

gfsf y'gL g]kfnLnfo{ s;n] 5]Sg ;s]Yof] / lxdfnsf] lxdgbL s;n] /f]Sg ;s]Yof] / jL/ k'vf{ Ū ltd|} /ut g]kfnLsf g;fel/ pxL uLt pxL uf]/j rGb|;"o{ Wjhfel/ .

k|Zgxč M

-c_ g]kfnLxčsf] jL/tf s;/L u'lGhPsf] 5 < -cf_ rGb|;"o{ Wjhfdf s:tf] uf]/j cª\lst 5 <

v_ lbOPsf] lgaGwf+z k9L ;f]lwPsf k|Zgxčsf] pQ/ n]Vg'xf];\ M

dnfO{ nfUof] k|Zg ug'{cfnf]rgfTds x'g' xf] / k|Zgn] dflg;nfO{ ljj]sL agfpF5 / a'l4 lbG5 . k|Zg gu/]sf] eP Uoflnlnof] Uoflnlnof] x'g] lyPgg\ . ufuL{ / d]q]oL ufuL{, d]q]oL x'g] lyPgg\ . clnslt ljb|f]x t rfxG5 g} ;dtfd"ns ;dfh agfpg . d]n] dª\unfb]jL l;+x, ;fxgf k|wfg ;Dem]F, d]n] /fh/fh]Zj/L, of]udf of / ljb|f]xL w]/} dlxfxč ;Dem]F . of] ;dfgtfsf ofqdf d]n] w]/} k'ifxčnfO{ ;Dem]F, hf] dlxf;Fu} ldn]/ Gofok"Of{ ;femf ;+s[Its]f] lgdf{Of ug{ rfxGy} . o; dxfg\ :jtGqtsf] ofqfnfo{ k"Of{tf lbg rfxGy} . d]n] o; ofqdf ;fd]n eP/ cfjfh lbPF . b]zdf nf]stGq cfof], b]zdf uOfTgq cfof] . ;+ljwfgn] ;f+:s[Its klxrfg ;yflkt u¥of] . ;dfgtfsf ljifo Nofof] t]klg xfdLn] Gofv]Hg' 5, ;+ljwfgsf]

clgjfo{ -)!!_ ;]6 ...vÚ

sfof{Gjog vf]Hg' 5 / ;'Gb/ ;+s[Its]f] lgdf{Of ug'{ 5 . xfdLn] k|fkt ug]{ Gofv] klg oxL xf] . gofF g]kfnfsf] ;f+:s[Its lbzf / ult klg t oxL xf] .

k|Zgxč M

-c_ hLjgdf cfnf]rgfTds x'g s] ug'{k5 < -cf_ lgaGwf+zdf s:tf] ;+s[Its]f] kl/sNkgf ul/Psf] 5 <

u_ lbOPsf syf+z k9L ;f]lwPsf k|Zgsf] pQ/ n]Vg'xf];\ M

Tof] t[i0ff, Tof] cgGtsfnLg k|tLlff, Tof] lbgx'Fsf] cEo:t lg/fzfsf] wSsf To;sf] ;f;df ldl;O;s]sf] lyof] . ToxL To;sf] hLjg lyof], ToxL To;sf] hLjg]md . To;]nfO{ ;dft]/ Tof] c'gf] hLjg u[x:yLsf] u[lxOfL lyO{, cf'gL ;f;"sL a'xf/L / kf]OsL hf]O{ . sbflrt\ s'g} x7ft\ clezfk] ToxLF l5GgleGg ul/lbPsf] cj:yfdf klg Tof] ;fgL rfxg] u[lxOfL, a'xf/L / nf]Ug]sL :jf:gL eO/xg ;SnL < s'g x[boaf6 o:tf] cfzf ug]{ <

k|Zgxč M

-c_ ;fgLsf] k|tLlffn] p;sf] s:tf] dgl:ylnfo{ b]vfPsf] 5 < -cf_ ;fgLsf] hLjgdf s:tf ptf/r9fj b]lvG5g <

!%= tnsf s'g} Ps k|Zgsf] ;dLlffTds pQ/ n]Vg'xf];\ .

-*_

s_ jt{dfg ;Gbe{df of]udfofs] wd{ /fHosf] cjwf/Off slQsf] ;fGble{s 5, ;dLlff ug'{xf];\ .

v_ ...Tof] km]l/ kms{nf <Ú syfdf ;fdflhs, cfly{s / k|fs[Its kl/]zsf] lrqOf s;/L ul/Psf] 5 < ljj]rgf ug'{xf];\ .

!^= s'g} Ps zLif{sdf @%) zAb;Ddsf] Pp6f lgaGw n]Vg'xf];\ M

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s_ ;""o{ pmhf{sf] cgGt e08f/ v_ h]GhL k':tfn] vf]h]sf] gofF g]kfn

u_ k|fs[Its k|sf]ksf

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

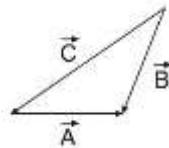
Attempt all questions.

Group 'A'

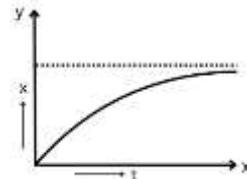
Multiple choice questions.

(11×1=11)

- Which of the following is dimensional formula for specific heat?
 - $M^0L^2T^{-2}K^{-1}$
 - $M^0L^2T^{-3}K^{-1}$
 - $M^0LT^{-2}K^{-1}$
 - $ML^2T^{-2}K^{-1}$
- For the given figure the correct one is
 - $\vec{A} + \vec{B} = \vec{C}$
 - $\vec{B} + \vec{C} = \vec{A}$
 - $\vec{C} + \vec{A} = \vec{B}$
 - $\vec{A} + \vec{B} + \vec{C} = 0$



- Which of the following is the correct statement from the given displacement time graph?
 - It represents retarded motion
 - It represents accelerated motion
 - It represents motion with constant velocity
 - It represents particle at rest



- A block of mass $M=2\text{kg}$ is placed on earth. The coefficient of static friction is 0.4. A force $F=2.5\text{N}$ is applied on block as shown in figure. The frictional force between block and earth is
 - 7.84 N
 - 2.5 N
 - 19.6 N
 - Zero



- An object is moved from infinity to focus of concave mirror, the size of image goes on
 - increasing
 - decreasing
 - both increasing and decreasing
 - attaining same size
- The refractive index of glass is 1.5 and water is 1.33. then what is the critical angle for glass water interface?
 - 54.6°
 - 48°
 - 62.7°
 - 56°
- An object is placed at the focus of concave mirror of focal length 20 cm. The distance of the image is
 - 40 cm
 - 10 cm
 - 20 cm
 - infinity

- Which of the following is a derived quantity?
 - Mass
 - Length
 - Time
 - Density
- A charge of 5C is given a displacement of 0.5m. The work done in the process is 10J. The potential difference between the two point will be
 - 2V
 - 0.5V
 - 1V
 - 25V
- Optical fibre is based on phenomenon
 - total internal reflection
 - interference
 - diffraction
 - polarisation
- Density of nucleus
 - is same for all nuclei
 - increases with increase in atomic number
 - decreases with increase in atomic number
 - increases with increase in radius

Group 'B'

Give short answer to the following questions. (8×5=40)

- A ball is thrown from ground at an angle of θ with horizontal.
 - Show that its trajectory is parabola. [2]
 - Derive the expression for time of flight. [1]
 - A ball is thrown forward from the top of a cliff with a velocity of 10m/s. The height of a cliff above the ground is 45m. Calculate (i) the time to reach the ground. (ii) the direction of the ball to the horizontal just before it hits the ground, take $g=10\text{m/s}^2$. [1+1]
- Show that $\beta=2\alpha$, where the symbols have their usual meanings. [2]
 - A brass pendulum clock keeps correct time at 15°C . How many seconds per day will it lose or gain at 0°C ? Linear expansivity of brass is $2 \times 10^{-5}\text{K}^{-1}$. [3]
- State Newton's law of cooling. Show that the rate of temperature fall is inversely proportional to the linear dimension of the object. [2]
 - A substance takes 3 minutes in cooling from 50°C to 45°C and takes 5 minutes in cooling 45°C to 40°C . What is the temperature of surroundings? [3]

Physics (1011) Set 'A'

15. a. Define specific heat capacity. Derive $H = ms$, where symbol carries their usual meanings. [1+1=2]
 b. Why are telephones wires taut in winter and slackened in summer? [1]
 c. A steel wire 8meter long and 4mm in diameter is fixed to two rigid supports. Calculate the increase in tension when the temperature falls to 10°C. (Linear expansivity of steel= $12 \times 10^{-6} \text{K}^{-1}$, Young's modulus for steel= $2 \times 10^{11} \text{Nm}^{-2}$) [2]
16. a. Sketch the graph of angle of deviation versus angle of incidence in prism ? [1]
 b. show that the deviation produced in small angle prism for small angle of incidence is independent to the angle of incidence. [2]
 c. A narrow beam of light is incident normally on one face of an equilateral prism (refractive index 1.5), the prism being surrounded by liquid (refractive index 1.25), at what angle the ray of light emerges out? [2]
17. a. Write two basic property of electric charge [1]
 b. What is action of points? Why pointed ends are avoided in electrostatic machines? [2]
 c. Define relative permittivity. The relative permittivity of water is 80. What does it mean? [1+1]
18. a. State Gauss law. Use it to find electric field intensity due to charged hollow sphere at a point
 (i) inside the sphere
 (ii) Outside the sphere [1+1+1=3]
 b. A mass of 10^{-15}kg has a charge $2 \mu\text{C}$. What electric field is required to keep it levitating. ($g=10 \text{m/s}^2$) [2]
19. a. What is equipotential surface. Why two equipotential surfaces never intersect? [1+1=2]
 b. A charge 10nC is at center. Another charge -2nC moves from point (0.2, 0) to a point (0.15, 0.15). Find the work done. [3]

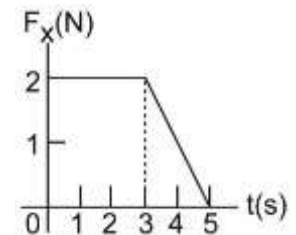
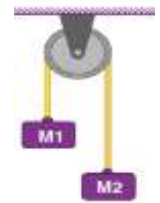
Physics (1011) Set 'A'

Group 'C'

Long answer questions.

(3 × 8 = 24)

20. a. In the given figure, two blocks are connected by a cord passing over a small frictionless pulley at rest where $M_1 = 5 \text{kg}$ and $M_2 = 12 \text{kg}$.
 i. What is the acceleration of the system? [1]
 ii. What is the tension in the cord? [1]
 b. State and explain the principle of conservation of linear momentum. [3]
 c. The force shown in the force versus time diagram in Figure acts on a 1.5Kg object. Find
 (i) the impulse of the force [2]
 (ii) the final velocity of the object if it is initially at rest. [1]



21. a. What is the percentage error in density of a cube when its mass is uncertain by $\pm 2\%$ and length of its edge is uncertain by $\pm 1\%$? [2]
 b. Differentiate between dot product and cross product of two vectors. [1]
 c. State the parallelogram law of vector and use it to find the magnitude and direction of resultant vector. [3]
 d. A small smooth object slides from rest down a smooth inclined plane inclined at 60° to the horizontal. What is (i) the acceleration down the plane, (ii) the time to reach the bottom if the plane is 10m long. [1+1=2]
22. a. What is mass defect? [1]
 b. Draw and write any one significance of BE curve. [2]
 c. Differentiate between creation and annihilation. [2]
 d. Calculate the energy released in the reaction.
 ${}^3\text{Li}^6 + {}^0\text{n}^1 \longrightarrow {}^1\text{H}^3 + {}^2\text{He}^4$
 [Mass of $\text{Li}^6 = 6.015126 \text{ amu}$, mass of ${}^1\text{H}^3 = 3.016049 \text{ amu}$, mass of ${}^0\text{n}^1 = 1.008665 \text{ amu}$, mass of $\text{He}^4 = 4.00264 \text{ amu}$, and $1 \text{ amu} = 931 \text{ MeV}$] [3]

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

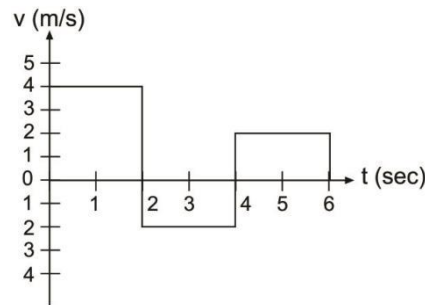
Attempt all questions.

Group 'A'

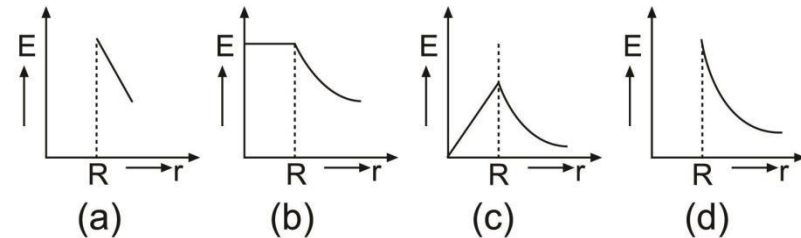
Multiple choice questions.

(11×1=11)

- The number of significant figures in 7316000 are
a. 7 b. 6
c. 5 d. 4
- The percentage error in the measurement of mass and velocity are 4% and 2% respectively. The error in the measurement of momentum will be
a. 5% b. 6% c. 8% d. 11%
- The velocity time graph of a body moving in a straight line is as shown in Fig. The displacement and distance travelled by the body in 6 seconds are
a. 8m,8m b. 8m,16m
c. 16m,8m d. 16m,16m
- The normal reaction is doubled then the coefficient of friction (is)
a. doubled b. halved
c. remains same d. becomes four times
- An object is placed at the focus of concave mirror of focal length 20cm. The distance of the image is
a. 40cm b. 10cm c. 20cm d. infinity
- The rear view mirror in car is
a. plane mirror b. concave mirror
c. convex mirror d. plano convex mirror
- When white light passes through the glass slab,
a. Wavelength decreases b. Wavelength increases
c. velocity increases d. frequency decreases



- A ball weighing 0.5kg moving with a speed of 2m/s hits a wall perpendicularly. It bounces back with the same speed. What is the average force exerted by wall on the ball if the two were in contact for 10^{-3} S?
a. 10^3 N b. 2×10^3 N
c. 3×10^3 N d. 4×10^3 N
- Which of the following graphs represents the variation of electric field strength E with distance r from the center of a charged conducting sphere? Where R is radius of sphere



- The number of neutron in an atom X of atomic number Z and mass number A is
a. zero b. Z c. (A-Z) d. A
- The absolute refractive index of glass slab and water medium are 1.5 and 1.33 respectively. The relative refractive index of glass with respect to water medium is
a. 1.5 b. 1.12 c. 1.88 d. 1.99

Group 'B'

Give short answer to the following questions.

(8×5=40)

- Define projectile with an example. [1]
 - When a body is projected horizontally, show that its path is parabolic. [2]
 - A projectile is fired with a velocity of 320m/s at an angle of 30° to the horizontal. Find (i) time of flight. (ii) Magnitude of its velocity after 2 seconds. [1+1]
- Show that $\gamma = 3\alpha$, where the symbols have their usual meanings. [2]
 - The pendulum of a clock is made of brass whose linear expansivity is $1.9 \times 10^{-5} \text{K}^{-1}$. If the clock keeps correct time at 15°C , how many seconds per day will it lost at 20°C ? [3]

Physics (1011) Set 'B'

14. a. A copper pot with 0.5 kg contains 0.170 kg of water at a temperature of 20°C. A 0.250 kg block of iron at 85°C is dropped into the pot. Find the final equilibrium temperature of mixture. ($S_c=390 \text{ Jkg}^{-1}\text{C}^{-1}$, $S_w=4190 \text{ Jkg}^{-1}\text{C}^{-1}$) [2]
- b. Explain the process of mixture to measure specific heat capacity of solid using Regnault's apparatus. [3]
15. a. Liquid has only cubical expansion, why? [2]
- b. Define the terms coefficients of real and apparent expansion of liquid and prove that $\gamma_r = \gamma_a + \gamma_g$ [3]
16. a. Write the conditions for minimum deviation in prism. [1]
- b. Derive the relation $\mu = \frac{\sin\left(\frac{A+\delta}{2}\right)}{\sin\frac{A}{2}}$, where δ is the angle of minimum deviation. [2]
- c. A narrow beam of light is incident normally on one face of an equilateral prism (refractive index 1.45), the prism being surrounded by water (refractive index 1.33). At what angle the ray of light emerges out? [2]
17. a. Define one coulomb of charge. [1]
- b. State Coulomb's law and derive the relation of force between two charges. [2]
- c. Two charges 2nC and 6nC are separated by 1m . At what point between them and if another charge of 5nC is kept so that it experiences no net force. [2]
18. a. Define electric potential at a point. [1]
- b. Prove that electric field intensity is negative gradient of electric potential. [2]
- c. A 2nC charge is at a distance 20cm from a fixed $-10\mu\text{C}$. What amount of energy is required to make it move at 25cm ? [2]
19. a. Define electric field lines. Write any two properties of electric lines of force. [2]
- b. Use Gauss law to find the expression of the electric field intensity due to a linear charged conductor. [3]

Physics (1011) Set 'B'

Group 'C'

Long answer questions.

(3×8=24)

20. a. Define linear momentum. Write its dimension. [1]
- b. Show that when a body just begins to slide down an inclined plane, the coefficient of friction between the two surfaces is equal to tangent of angle of repose. [3]
- c. A force is applied to a stationary trolley to push it across a horizontal floor. Fig. Shows the force applied to the trolley against time.
- i) Calculate the magnitude of the impulse that acts on the trolley. [1]
- ii) The trolley reaches a velocity of 2.2m/s after the force is applied. Assuming the friction is negligible, calculate the mass of the trolley. [1]
- d. A ball A of mass 0.1kg moving with a velocity of 6m/s collides directly with a ball B of mass 0.2kg at rest. Calculate their common velocity if both balls move off together. [2]
21. a. A student writes an expression of the force causing a body of mass (m) to move in a circular motion with a velocity (v) as $F=mv^2$. Use the dimensional method to check its correctness. [2]
- b. If $\vec{A}=3\vec{i}+2\vec{j}+\vec{k}$ and $\vec{B}=5\vec{i}-2\vec{j}-3\vec{k}$ find $\vec{A} \cdot \vec{B}$ and $\vec{A} \times \vec{B}$ [2]
- c. State triangle law of vector addition. [2]
- d. A small smooth object slides from rest down a smooth inclined plane inclined at 30° to the horizontal. What is (i) the acceleration down the plane, (ii) the time to reach the bottom if the plane is 5m long. [1+1]
22. a. Why is the mass of a nucleus slightly less than the mass of constituent nucleons? [1]
- b. Show that nuclear density is same for all the nuclei. [2]
- c. Differentiate between nuclear fission and fusion reaction. [2]
- d. Calculate the binding energy per nucleon for a Helium nucleus. Given that mass of helium nucleus = 4.001509 amu , mass of proton = 1.007277 amu and mass of neutron = 1.008666 amu . [3]

