KATHMANDU

DON BOSCO COLLEGE (10+2)

1st Term Examination -2057

Stream	**: Science**	**Time**	**: 3 hrs.**
Class	**: XI**	**F.M.**	**: 100**
Subject	**: Mathematics**	**P.M.**	**: 40**

Attempt All Questions

Group "A" ["Short Answer Questions" 18´2=36]

1. If a = 13, b= 14, c=15, find the area of the triangle ABC.
2. Prove the projection law: c = a cosB + b cosA
3. Write any two formula to find the area of the triangle ABC.
4. If the cosines of the two of the angles of a triangle are proportional to the opposite sides, prove that the triangle is isosceles.
5. What do you mean by indeterminate forms? Mention its different forms. 1+1
6. If $\lim_{x \to a} \frac{x^3 - a^3}{x - a}$ = 27, find the values of a.
7. Evaluate $\lim_{x \to 0} \frac{1 - Cos6x}{x^2}$
8. Define limit of a function f in the neighbourhood of x = a. State the necessary and sufficient condition for the existence of the limit of f at x = a. 1+1
9. What do you mean by a matrix? Write down a scalar matrix of order 3.
10. Define minor and co-factor of an element. Find the minor and cofactor of k from the matrix $\begin{pmatrix} 0 & 1 & 2 \\ 4 & k & 2 \\ 5 & 2 & 1 \end{pmatrix}$ 1+1
11. Define singular and non singular matrix. Does the inverse of the matrix A = $\begin{pmatrix} 1 & 2 \\ 1 & 2 \end{pmatrix}$ exists? 1+1
12. Without expanding the determinant (by using the properties) prove that: $\begin{vmatrix} 6 & 1 & 9 \\ 2 & 4 & 7 \\ 18 & 3 & 27 \end{vmatrix} = 0$
13. Reduce the equation of a straight line 4x+3y+7 = 0 to the normal form.
14. The straight line given by the equation 3x-4y+7+k(5x−2y−7) = 0 passes through a fixed point for all values of k. What is that fixed point?
15. Determine whether the points (1,−2) and (2,−1) lie on the same or opposite sides of a straight line 2x+3y+1=0.
16. For what value of k, the perpendicular distance between two parallel lines x+2y−7=0 and x+2y+k=0 is $\sqrt{5}$.
17. Find a single equation representing the line pair x=y−2 and 2x=y
18. Find the partial fraction of $\frac{1}{(x-a)(x+a)}$

Group "B" [Long Answer Questions: 16´4=64]

19. State Sine law in any triangle. Use this law to prove the following; "If the angles of a triangle are in the ratio 1:2:3, prove that the corresponding sides are in the ratio 1:$\sqrt{3}$:2" 1+3
20. State and prove tangent law in any triangle ABC.

21. Write the cosine law for any triangle ABC and hence prove that – "If $a^4+b^4+c^4=2c^2(a^2+b^2)$. then C = 45^0 or 135^0." 1+3

22. Evaluate: $\lim_{x \to y} \frac{\cos x - \cos y}{x - y}$

23. Evaluate: $\lim_{x \to \infty} \sqrt{x}(\sqrt{x} - \sqrt{x-a})$

24. Define continuity of a function at a point. Let a function f(x) is defined as follows:

f(x) = $2-x^2$ for x < 2
= 3 for x = 2
= x-4 for x >2

Is the function f(x) continuous at x = 2? If not, state how can you make f(x) continuous at x = 2?

25. What are the criteria for the product of two matrices? Is the product of two matrices always commutative? Give your answer by an example.

26. What do you mean by symmetric and skew-symmetric matrix? Give one example of each. Prove that the diagonal elements of skew symmetric matrix are zero. (2+2)

27. State any two properties of determinant. Without expanding the determinant, prove that:

$$\begin{vmatrix} a-b-c & 2a & 2a \\ 2b & b-c-a & 2b \\ 2c & 2c & c-a-b \end{vmatrix} = (a+b+c)^3$$ (2+2)

28. Define inverse of a matrix. What are the criteria for the existance of the inverse of a matrix. Prove that two matrices A= $\begin{pmatrix} 1 & 2 \\ 2 & 5 \end{pmatrix}$ & B = $\begin{pmatrix} 5 & -2 \\ -2 & 1 \end{pmatrix}$ erse of each other. (1+1+2)

29. Find the adjoint of the matrix

$$A = \begin{pmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{pmatrix}$$

30. What do you mean by proper fraction? Resolve into partial fractions: $\frac{5x+7}{(x+1)(x+2)}$

31. Find the equation of lines through the point (1,–4) and making an angle of 45^0 with the line 2x+3y+7=0

32. Find the length of perpendicular drawn from (x_1, y_1) upon the straight line $x\cos\alpha+y\sin\alpha=p$.

33. If p and p' be the length of perpendiculars from origin upon the straight lines $x\sec\theta + y\,\text{cosec}\theta = a$ and $x\cos\theta - y\sin\theta = a\cos2\theta$ respectively then prove that $4p^2+p'^2 = a^2$.

34. Find the incentre of the triangle whose sides are 4x–3y+2 = 0, 3x – 4y + 12 = 0, 3x + 4y – 12 = 0.

KATHMANDU

DON BOSCO COLLEGE (10+2)

1st Term Examination -2057

Stream	**: Science**	**Time**	**: 3 hrs.**
Class	**: XI**	**F.M.**	**: 100**
Subject	**: Physics**	**P.M.**	**: 40**

Group "A"

1. Answer in brief any two: ***2´3=6***

a) Can dimensional analysis tell us that a physical equation in completely right?

b) Can the direction of velocity of a body change when its acceleration in constant. Explain with an example.

c) Can you have examples of motion in which acceleration is non zero but velocity is zero. Explain.

2. What do you mean by projectile. Describe the relation for the horizontal range of the projectile and show that for maximum range, projectile should be fired at angle 45^0 with horizontal.

3. a) State and prove the principle of conservation of linear momentum.

Or

Show that motion of a simple pendulum is simple harmonic, hence derive its time period.

b) Rain is falling vertically with speed of $30ms^{-1}$. A man is running at a speed of $10ms^{-1}$ due east. In what direction should be hold his umbrella in order to protect himself from rain.

Group "B"

4. Answer in brief any two: ***2´3=6***

a) Why does temperature remain constant till whole of the solid has melted?

b) Boiling point of water increase with the increase of height from sea level. Explain.

c) Two metal spheres of equal volume made from same material, one is solid and other is hollow are heated by same amount of heat. What about the rise in temperature? Explain.

5. a) Define coefficient of linear expansion and explain how can you determine coefficient of linear. expansion by pullinger apparatus.

b) A ball of copper of mass 0.4kg and at a temperature of 575^0c is plunged into 1kg of water at 30^0c . This increases the temp. of water to 50^0c. If specific heat capacity of water in $4200j/Kg^0c$. find the specific heat capacity of copper.

Group "C"

6. Answer in brief any two: ***2´3 = 6***

a) Can a convex mirror form a real image? Explain

b) Which mirror is used an shaving mirror and why?

c) Why a piece of paper does not form a real image?

7. Derive the relation $\frac{1}{f}=\frac{1}{u}+\frac{1}{v}$ for a concave mirror. Where the symbols have their usual meanings. Explain the sign convention used.

8. a) What do you mean by total internal reflection. Derive the relation $SinC = \frac{i}{n}$. Give the conditions for total internal reflection.

b) What is the critical angle for light passing from glass to water?
$^{a}n_{g} = 1.59$ and $^{a}n_{w} = 1.33$

Group "D"

9. Answer in brief any two: ***2´3=6***

a) Why sharp edges or points are strictly avoided in an electrical machine?
b) A comb run through dry hair attracts small bits of paper. Why?
c) Vehicle carrying in flamable material and running on they rubber tyres ground.

10. What is potential difference between two points in an electrostatic fields. Obtain expression of potential deference in the field between any two point. 8

11. a) What is electrostatic induction? what are the important results of Faraday's Ice Pail experiment. Explain. 5

b) Three charges 4×10^{-9}c and 2×10^{-9}c are placed at the corners A, B, C of an equilateral triangle ABC of sides 5cm. Find the resultant force experienced by charge 2×10^{-9} c at C.

OR

Calculate the electric pot. at the centre of a square of side $\sqrt{2}$ meters. The charges of four cormers of square are $q_1 = 1\mu$ C, $q_2 = -2\mu$C, $q_3 = 3\mu$C, $q_4 = 4\mu$C.

"Best of Luck"

KATHMANDU

DON BOSCO COLLEGE (10+2)

1st Term Examination -2057

Stream	**: Science**	**Time**	**: 3 hrs.**
Class	**: XI**	**F.M.**	**: 100**
Subject	**: English**	**P.M.**	**: 40**

1. Answer any three of the following questions in about 70 words. ***6X3=18***

a) Do you think Janet is a good friend of Kim? Explain.
b) Evangelina is a rebirth of Carmen. Discuss.
c) Describe Dr Braun.
d) Summarize the main idea of the poem *My Heart Leaps up When I Behold.*

2. Answer any two the following questions in about 160 words. ***11X2=22***

a) Do you believe in dreams? Discuss with sufficient example.
b) What is your opinion about ghost? Discuss.
c) Is it good to have many children? Explain.

3. Fill in the gaps with appropriate prepositions. ***1X10=10***

a) He took two books – the shelf. He put one of them – the table, and the other – his briefcase.
b) She ran – the corridor, and – the stairs into the basement.
c) The prisoner jumped – the window, ran – the street, and jumped – a car that was waiting for him on the other side.
d) They couldn't get – the high wall, so they dug a tunnel – it.

4. Rewrite the following sentences using compound noun phrases. ***1X5=5***

Example: He teaches English
He is an English teacher

a) She sells books.
b) He mends shoes.
c) Chris plays classical music on the guitar.
d) Mandy takes photographs.
e) Angela reads news on television.

5. Talk about their intentions using going to/intending to/planning to/ thinking of …–ing ***1X5=5***

a) Roger has decided he doesn't earn enough money.
b) Wendy has decided her life isn't exciting enough.
c) My grandfather has decided that it's not safe to keep his money under the mattress.
d) The Robinsons are worried because their house is full of valuable antiques.
e) Jane has bought 100 kilos of cheese.

6. Ask questions to get the following answers: ***1X5=5***

Example: You want to know what time your uncle gets up.
What time do you get up?

a) You want to know what kind of car his wife drives.
b) You want to know how often he washes his hair.
c) You want to know what school his children go to.
d) You want to know if his wife goes with him on tour.
e) You want to know what does he have for breakfast.

7. Imagine you are a pop star. Answer the questions using the words given in brackets. ***1X5=5***

Example: Do people ever criticise you in the newspapers? (occasionally)
Oh yes. I occasionally get criticised in the newspapers.

a) Does someone drive you to the studio. (always)
b) Do people ever invite you to all-night parties? (occasionally)
c) Do your fans ever attack you after your concerts. (from time to time)
d) And do they ever tear your clothes? (sometimes)
e) Do the police ever arrest your fans? (now and again)

8. Fill the gaps with in/on/at. ***1X5=5***

I started a new job – last Monday, -- 9 o'clock. Monday was fine, but when I went in – Tuesday morning I was the only one there. I waited for a bit, but no one came, so – 10.30 I went home. – the afternoon I phoned up my boss.

9. Look at the people's remark below, and say what happens to them, using **get**.

Example: Doctor: People often telephone me in the middle of the night.

I often get telephoned in the middle of the night.

a) Policeman: They sometimes send me to football matches.
b) Policeman: People occasionally threaten me.
c) Actor: From time to time people ask me for my autograph.
d) Waiter: They always blame me if the food's no good.
e) Beggar: The police often move me on.

10. Choose the correct word. ***1´5=5***

a) Mary was greatly **affected/effected** by her father's death.
b) Don't get off the bus until it is **stationery/ stationary**.
c) The college **principal/principle** was a popular person.
d) He expected to **loose/lose** the election.
e) I would strongly **advise/advice** you to use the dictionary.

11. Write a letter to a friend describing your daily routine. 5

12. Many people visit museums when they travel to new places. Why do you think people visit museums? Use specific reasons and examples to support your answer. 10

OR,

Some people choose friends who are different from themselves. Others choose friends who are similar to themselves. Compare the advantages of having friends who are different from you with the advantages of having friends similar to you. Which kind of friend do you prefer for yourself? Why. 10

"The end"

KATHMANDU

DON BOSCO COLLEGE (10+2)

1st Term Examination -2057

Stream	**: Science**	**Time**	**: 3 hrs.**
Class	**: XI**	**F.M.**	**: 100**
Subject	**: Chemistry**	**P.M.**	**: 40**

Group "A"

Attempt any twelve questions: ***12 ´ 3=36***

1. Write the formula of the following compounds.
   a) Sodium Thiosulphate b) Calcium Phosphate
   c) Sodium Aluminate
2. Define Acid and Basic radical with two examples.
3. Distinguish between atomicity and gm atom.
4. What do you mean by equivalent weight of sodium is 23?
5. Calculate the no. of molecules in 4.4 gm of CO_2 [At. Wt. of C = 12, O = 16]
6. Write the electronic configuration of Cr (at no. = 24) and K^+ (at no. of K = 19)
7. Designate the orbitals with the following quantum number
   a) n = 1 l = 0
   b) n = 3 l = 2
8. Explain why atomic weight are not always in whole no?
9. State Graham's laws of diffusion.
10. What do you mean by standard temperature and pressure (STP)?
11. What will be the density of CO_2 at 100^0c and 800 mm Hg pressure in gm/litre?
12. What are alkali metals?
13. Classify the following oxides I) ZnO II) MgO III) SO_2. Give reason.
14. What is ionization potential? How does it vary along period and in group?
15. What is Ozone layer? Give its significance.

Group "B"

Attempt any five questions: ***5 ´ 7=35***

16. State and explain laws of multiple proportion or law of Reciprocal proportion.
17. Express 1 mole of N_2 as many ways as you can.
18. In 93gm of phosphrous calculate:
    i) No. of gm atom
    ii) No. of gm molecules
    iii) No. of atoms
    iv) No. of molecules (At. Wt. of Phosphrous = 31]
19. What is Hund's rule of maximum multiplicity? Illustrate by taking an example of Nitrogen.
20. Differentiate between orbit and orbital and draw the shapes of s and p orbital.
21. Justify the position of hydrogen in Periodic table.
22. Name the units in which gas constant R can be expressed, if Pv = MRT is to be used with P in atmosphere, V in litres, T in degree kelvin and m in mole what will be the unit of R?

Group "C"

Attempt any two questions: ***14.5 ´ 2=29***

23. Describe the various types of chemical reactions with suitable examples.
24. Discuss the essential postulates of Bohr's model of an atom? What are its limitations?
25. Define Mendeleef's Periodic law. Discuss the Chief anomalies of Mendeleev's Periodic table.

"Best of Luck"

KATHMANDU

DON BOSCO COLLEGE (10+2)

1st Term Examination -2057

Stream	**: Science**	**Time**	**: 3 hrs.**
Class	**: XI**	**F.M.**	**: 100**
Subject	**: Biology**	**P.M.**	**: 40**

Botany

1. Answer the following questions: ***2´ 8=16***

a) What is Trophic level?
b) What do you mean by the term "hierarchies"?
c) What is binomial Nomenclature?
d) Write the types of conjugation in Spirogyra.
e) Define Totipotency.
f) What do you mean by Autotrophs?
g) Why Spirogyra is slimy to touch?
h) Why is mitochondria called "Power house of the cell"?

2. Answer the following questions: ***3´ 5=15***

a) Draw a neat and well labelled diagram of Chloroplast.
b) Differentiate between Monera and Protista.
c) What are the main characters of red algae and brown algae?
d) Give the various functions of Nucleus.
e) What are Ecological Pyramids?

3. Describe the structure of bacteria with a well labelled diagram. 9.5

OR

Give the diagnostic characters of family cruciferae in semitechnical terms with floral formula and diagram. Write any four economically important plants of the family.

4. What is Ecosystem? Describe the Pond Ecosystem with well labelled diagram. 9.5

Zoology

1. Answer the following questions: ***2´ 8=16***

a) Why Female Anopheles Mosquito is called primary host?
b) What do you mean by schizogony?
c) What is polyphyodont teeth?
d) Why is liver not the digestive gland?
e) What do you mean by cyclosis?
f) What is cosmozoic theory?
g) Give the meaning of inorganic evolution.
h) What is the role of nuclei in Paramecium?

2. Answer the following questions: ***3´ 5=15***

a) Why paramecium never gets old?
b) Write in brief about amoeboid stage of plasmodium.
c) Why do the frogs have stream-lined body & webbed feet?
d) Write briefly about habit of frog.
e) Explain in short about special creation.

3. Describe briefly the asexual reproduction of Plasmodium. 9.5

OR

Give the diagrammatic presentation of conjugation in Paramecium.

4. Describe the physiology of digestion in Frog. 9.5

" Best of Luck"