Stream : Science
Class : XII
Subject : Physics

Time : 3 hrs.
F.M. : 75
P.M. : 30

Group "A"

1. Attempt all the questions in brief: 8´2=16

a) Why does a small quantity of liquid assume spherical form?

b) How can the intensity and penetrating power of X-rays be controlled?

c) Why is spring made of steel and not of copper?

d) What are the conditions for sustained interference?

e) Why is light produced by electric discharge in gases at low pressure?

f) What is the difference between fission and fusion?

g) What is induction brake?

h) Unlike solid and liquid, why does a gas have two specific heat capacities?

2. Attempt any four in brief: 4´2=8

a) A flask containing glycerin and other containing water are stirred vigorously and placed on the table in which flask will the liquid come to rest earlier and why?

b) Why do the oil films on the surface of water appear to be coloured?

c) What is photoelectric effect? Why can't it be explained on the basis of wave nature of light?

d) C_p is greater than C_v. Why?

e) What is plane polarized light?

f) How did Millikan's oil drop experiment lead to the quantum nature of charge?

g) What is back e.m.f.?

h) State Fleming's left hand rule.

3. Attempt all questions:

a) Explain Stoke's Law. Describe in brief how it can be used to measure the coefficient of viscosity of glycerin. 5

OR

Define stress, strain & the Young Modulus. Derive an expression for the potential energy stored in a stretched wire.

b) A clean glass capillary tube of internal diameter 0.04cm, is held vertically with its lower end below the surface of clean water in a beaker and with 10cm of the tube is above the surface. To what height will the water rise in the tube? [Surface tension of water is $7.2 \times 10^{-2} Nm^{-1}$] 4

4. Derive the adiabatic equation for one mole of gas in terms of pressure, volume and temperature. 4

5. a) Explain Huygen's wave theory of light and explain laws of refraction on the wave theory of light.

OR

Derive an expression for fringe width in a Young's double slit experiment.

b) In Fraunhofer diffraction due to a narrow slit a screen in placed 2m away from the lens to obtain the pattern. If the slit width is 0.2mm and the first minima lies 5mm on either side of the first central max. Find the wavelength of the light used. 4

6. a) State Bohr's Postulates, using these postulates derive an expression for the total energy of an electron in the nth orbit of hydrogen atom. 5

OR

Discuss the construction and working of modern Coolidge tube.

b) An electron is shot down on X-ray tube across a potential difference of 30kV. If it collides with a heavy massive atom of the target and loses all of its energy, what is the wavelength of the x-rays produced? 4

7. What is radiocarbon dating? Derive the relation $N = N_o e^{-\lambda t}$ in a radioactive decay. 5

8. a) State and explain Faraday's laws of electromagnetic induction. Explain in brief how Lenz law is in accordance with the law of conservation of energy. 5

OR

What do you mean by Eddy current? Describe the construction and working of a transformer.

b) A circular metal disc of area $3\times10^{-3} m^2$ is rotated at 50 rev/s about an axle through its centre perpendicular to its place. The disc is in a uniform magnetic field of flux density $5\times10^{-3}T$ in the direction of the axle. Between which points on the disc is the maximum emf enduced? What is the value of this emf? How does the emf vary with time? 5

9. Define progressive wave and derive the progressive wave equation in terms of period of wave (T). 5

"The End"

KATHMANDU
DON BOSCO COLLEGE (10+2)
Second Terminal Examination -2057

Stream : Science   Time : 3 hrs.
Class : XII   F.M. : 75
Subject : Biology   P.M. : 30

ZOOLOGY

1.Attempt any seven questions: *1´7=7*
     a) What is the role of insulin in human body?
     b) Name the enzyme which calatyse the respiratory reaction.
     c) What is the difference between blood group A and blood group B?
     d) Why is blood group 'O' said to be universal donor?
     e) What is erythroblastosis foetalis?
     f) What is prostrate gland?
     g) What are Nissl's bodies?
     h) What is bone?

2. Attempt all questions: *3´5=5*
     a) What is the role of hemoglobin in respiration?
     b) Discuss briefly about thyroid gland.
     c) Describe the internal structure of kidney.
     d) Discuss the causes of high blood pressure [Hypertension].
     e) What is the differences between Graafian follicles and corpus luteum?

3.   Describe the CO_2 transport in Man.   8
               OR
   Describe the structure of Male reproductive organ of human?

4.   Describe the Rh factor as blood group.   7
               OR
   Describe the structure of nephron with diagram.

BOTANY

1. Attempt all questions: *1´7=7*
     a) Define the term "Biotechnology".
     b) What do you mean by polygenic inheritance?
     c) Define "gene".
     d) Name different types of plant tissue culture.
     e) What do you mean by dihybrid cross?
     f) Define plant hormone.
     g) What is Respiration?

2. Attempt all questions: *3´5=15*
     a) Explain that ABO blood group is an example of co-dominance.
     b) Discuss the application of bio-technology.
     c) Describe the structure of t-RNA.
     d) Write in short any two physiological effects of auxin.
     e) Give the role of light in photosynthesis.

3.   Describe the structure and function of DNA. Write how it differs from RNA.   8
               Or
   Explain DNA is hereditary material.

4.   What is plant breeding? What are the main objectives and techniques of plant breeding?   7
               Or
   Explain briefly about Kreb's cycle.

KATHMANDU

DON BOSCO COLLEGE (10+2)

Second Terminal Examination -2057

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

Group "A"

Attempt all the questions: 6´3´2=36

1. a) Sum to infinity the series $16 - 8 + 4 - 2 + \ldots\ldots\ldots\ldots\ldots$
   b) How many odd numbers of two different digits can be formed from the integers 1,2,3,4 ?
   c) Find the seventh term of $(2x+y)^{12}$.

2. a) Determine the equation of the circle if the ends of the diameter be at $(3,0)$ and $(7,-1)$.
   b) Discuss the continuity & discontinuity of $f(x) = \dfrac{e^{1/x} - 1}{e^{1/x} + 1}$ at $x = 0$
   c) Find the equation of the parabola whose focus is $(-3,4)$ and the directrix $6x - 7y + 5 = 0$

3. a) Integrate $\int \dfrac{dx}{a^2 + x^2}$
   b) If the position vectors of M and N are $\overrightarrow{3i + j - 3k}$ and $\overrightarrow{4i + 2j + k}$ respectively, find $\overrightarrow{MN}$
   c) Find the median from the following set of observations: 5, 3, 2, 4, 10, 7, 12

4. a) Find the sum of the first n even natural numbers.
   b) Draw a histogram and frequency polygon for the following data.

Marks:	$0 - 4$	$4 - 8$	$8 - 12$	$12 - 16$	$16 - 20$
No. of Adds:	4	6	10	8	4

   c) Find $\overrightarrow{a}$ when $\overrightarrow{2a} - \overrightarrow{b} = (4, 7)$ and $\overrightarrow{b} = (2, 1)$

5. a) What is the resultant of two collinear forces P and Q acting on a particle
      i) in the same direction,
      ii) in the opposite direction.
   b) Find the equation of tangent to the curve $y = x^3 - 2x^2 + 4$ at the point $(2, 4)$
   c) Find the area enclosed by $y = 3x$, the x – axis and the ordinates at $x = 0$ and $x = 4$

6. a) Explain, what do you mean by a differential equation.
   b) Solve: $x\, dy + y\, dx = 0$
   c) Solve: $\dfrac{dy}{dx} = \dfrac{y + x}{x}$

Group "B"

Attempt all questions: 8´2´4=64

7. a) Find the general term and then the sum of the first n terms of the series
      $1.n + 2.(n-1) + 3.(n - 2) + \ldots\ldots\ldots\ldots$
   b) How many numbers between 4000 and 5000 can be formed with the digits 2,3,4,5,6,7 ?

8. a) Find the sum of the cubes of the first n natural numbers.

b) If in the expansion of $(1+x)^{2n+1}$, the coefficient of x^r and x^{r+1} are equal. Find r.

9. a) Prove that the two circles $x^2 + y^2 + 2ax + c^2 = 0$ and $x^2 + y^2 + 2by + c^2 = 0$ touch if $\dfrac{1}{a^2} + \dfrac{1}{b^2} = \dfrac{1}{c^2}$

   b) Find the equation of tangent to the general circle $x^2 + y^2 + 2gx + 2fy + c = 0$ at a given point (x_1, y_1) on it.

10. a) Find the condition of tangent of a straight line to a parabola.
   b) Prove that the tangent at the ends of the latus rectum of a parabola are perpendicular to each other.

11. a) Find from first principles of the derivative of $\sin^{-1}x$ w. r. to x.

                           OR

   A 15 ft. ladder leans against a vertical wall. If the top slides downwards at the rate of 2ft per sec. Find the speed of the lower end when it is 12 ft. from the wall.

   b) Integrate $\displaystyle\int \dfrac{dx}{(2x+1)\sqrt{4x+3}}$

12. a) Integrate $\displaystyle\int \sqrt{9x^2 + 24x + 25}\,dx$

   b) Find the area bounded by the axes of co-ordinates, the curve $x^2 = 4a\,(y-2a)$ and the ordinate at the point (h, k)

                         OR

   Solve $\dfrac{dy}{dx} - 2xy = x$

13. a) State and prove the Parallelogram Law of forces.
   b) Define scalar product of two vectors. Find the cosine of the angle between the two vectors $\vec{2i} + \vec{j} + \vec{k}$ and $\vec{4i} + \vec{3j} - \vec{5k}$

14. a) Define mean deviation. Prove that the standard deviation is the least possible root mean square deviation.
   b) Calculate the coefficient correlation from the following data of price & demand.

Price (Rs.)	14	16	19	22	24	30
Demand (kg)	24	22	20	24	23	26

"The End"

Group "A"

Attempt all the questions: $5 \times 3 \times 3 = 45$

1. a) What do you mean by a sequence?
   b) How many types of sequences you know?
   c) Write down the nth term of a G.S. whose first term is x & common ratio r.

2. a) Find the sum of first n odd natural numbers.
   b) Sum to infinity the series $16 + 8 + 4 + 2 + \ldots\ldots\ldots$
   c) Find the nth term of the series $1 + 3 + 6 + 10 + \ldots\ldots\ldots\ldots$.

3. a) How many numbers of two different digits can be formed from the integers 2, 3, 4 and 5?
   b) There are six doors in a hostel. In how many ways can a student enter the hostel and leave by a different door?
   c) How many odd numbers of two different digits can be fored from the integers 2, 3, 4, & 5?

4. a) Find the limit of $f(x) = \dfrac{1}{1 + e^{1/x}}$ at x = 0, if it exits.
   b) What do you mean by Primary data?
   c) What do you mean by an Ogive?

5. a) Find the equation of the circle if the ends of the diameter be at (3,0) & (7, −1)
   b) What is the condition that the radius of the general circle is real?
   c) If the position rectors of M and N are $\overrightarrow{3i} + \overrightarrow{j} - \overrightarrow{3k}$ and $\overrightarrow{4i} + \overrightarrow{2j} + \overrightarrow{k}$ respectively by find $\overrightarrow{MN}$.

Group "B"

Attempt all questions: $11 \times 5 = 55$

6. a) Find the general term and then the sum of the first n terms of the series
   $1.n + 2. (n–1) + 3. (n–2) + \ldots\ldots$

7. Sum to infinity $1+3x+5x^2+7x^3 + \ldots\ldots\ldots$, $(/x/<1)$

8. How many numbers between 4000 and 5000 can be formed with the integers 1,2,3,4,5,6, and 7?

9. Find the sum of the squares of the first n natural numbers.

10. How many permutations are there of the letters of the word "Mathematics"?

11. If a^2, b^2, c^2 are in A.P., then prove that b+c, c+a, a+b are in H.P.

12. For any two unequal positive numbers, prove the following relations.
    a) $(GM)^2 = (AM) \times (HM)$
    b) $AM > GM > HM$

13. Find from first principle the derivative of $\sin^{-1}x$. w.r. to x.

14. A 15 ft. ladder leans against a vertical wall. If the top slides downwards at the rate of 2ft persec, find the speed of the lower end when it is 12 ft. from the wall.

15. Integrate $\displaystyle\int \frac{dx}{(2x+1)(\sqrt{4x+3})}$

16. Define mean deviation. Prove that the standard deviation is the least possible root mean square deviation
    OR
    Calculate the coefficient of correlation from the following data of price & demands.

Price (Rs.)	14	16	19	22	24	30
Demand (kg)	24	22	20	24	23	26

"Good Luck"

KATHMANDU
DON BOSCO COLLEGE (10+2)
Second Terminal Examination -2057

Stream : Science   Time   : 3 hrs.
Class   : XII   F.M.   : 75
Subject : Chemistry   P.M.   : 27

Group "A"

A. Attempt any fifteen questions: *15´2=30*

   1) Define a) Molarity   b) Molality
   2) What do you mean by electrode potential?
   3) What is pH and pOH?
   4) What is decinormal solution? How can you prepare a decinormal solution of oxalic acid.
   5) Define primary standard and secondary standard solution.
   6) Why an aqueous solution of $FeCl_3$ is acidic in nature?
   7) Give the structural formula of picric acid and salicylic acid.
   8) Both phenol and ethanol have functional group – OH, ethanol is completely miscible while phenol is slightly soluble in water why?
   9) What products are obtained when Ozonolysis is carried out on 1 butene?
   10) Give a suitable chemical test to identify acetophenone and benzaldehyde.
   11) Why does nitrobenzene give m-dinitrobeenzene instead of ortho or para product on nitration?
   12) What is Tollen's reagent? What happens when acetaldehyde is heated with Tollen's reagent?
   13) Amino group of aniline is protected before nitration why?
   14) Why phenol is more acidic than ethyl alcohol?
   15) What is Schiff's base and how does it form?
   16) How are Cast iron, wrought iron and steel different from each other?
   17) What happens when mercury is heated with conc sulphuric acid?
   18) What is alloy steel? Give the composition of stainless steel.

Group "B"

*B. Attempt any five questions:*   *5´5=25*

   19) State and explain Faraday's law of electrolysis.
   20) Define solubility product principle. Give one application of it is qualitative analysis.
   21) Define end point and indicator. 20ml of N/10 solution of NaOH neutralises 25 ml of the solution of a dibasic acid containing 6gm of acid per litre. Find the molecular weight of the acid.
   22) Show your acquaintance with the following reactions
       a) Benzoin Condensation   b) Kolbe's reaction
   23) Discuss the Hoffmann's method for the separation 1^0, 2^0 and 3^0 amines from their mixture.
   24) Compare the basic character of the followings with reasons.
       NH_3, CH_3NH_2 and $C_6H_5NH_2$
   25) Discuss the reaction involved in manufacture of Cast iron from blast furnace with a neat and labelled diagram.
   26) Give two methods of prepartion of corrossive sublimate. And also give its action upon excess of KI and NH_3

C. Attempt any two questions: *2´10=20*

27)a) Construct a galvanie cell by using given redox reaction

$$Cu + AgNO_3 \rightarrow Cu(NO_3)_2 + Ag \downarrow$$
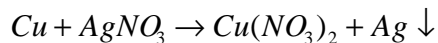
b) Find the weight of copper deposited from $CuSO_4$ solution by a current of 0.25 ampere flowing for an hour [At. wt. of Cu = 63.5]

28) How would you prepare of nitrobenzene in laboratory? What happens when nitrobenzne is reduced in acidic, alkaline and neutral mediums?

29) An organic compound A on reduction yield parent hydrocarbon B which on nitration give C. C on reduction in acidic solution gives D. on Coupling with diazonium salt D gives p-amino azo benzene. Give names for A, B, C, and D and also write chemical reaction involved.

30) Discuss the manufacture of steel by open hearth's process. What is tempering of steel?

31) Write short notes on (any two)
   a) Fermentation
   b) Hoffmann – bromamide reaction
   c) Common ion effect
   d) Purification of mercury

"Best of Luck"

KATHMANDU
DON BOSCO COLLEGE (10+2)
Second Terminal Examination -2057

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

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1. Read the following application and answer the questions given below: *15*

We are of the opinion that each and every citizen is entitled to his basic rights: basic civil rights, right to expression, right to choice and right to equality. The discrimination made on the basis of language, culture, color, race is unjust and inhuman. And, we have seen that the people of Bhutan have raised their voices against such discrimination meted out by the Bhutanese government, especially the king of Bhutan and his regime against the people. That's why Nepal and all political parties of Nepal support the struggle of the people of Bhutan. We believe that the struggle of Bhutanese people is an internal and domestic problem or issue. Because the demand and struggle was raised by the Bhutanese people and it was against the rulers of the country. And it would have been solved by these two parties, specially the government or the king of Bhutan would have solved the questions by having dialogue with the people. Unfortunately, the government of Bhutan, the king of Bhutan did not share the problem raised by the people and the government began to suppress the movement. And the suppression was very much inhuman and cruel too. In course of suppression, people were forced to be expelled from the country. And until now not less than one hundred and twenty thousand people are outside Bhutan as refugees in Nepal and India. After the suppression the issue has turned from domestic issue to wide, broad issue which has gone outside border. People of South Asia and people of international arena have been concerned over the Bhutanese problem.

Questions:
a) What do we, Nepalese people, believe?
b) Why has Nepal supported the struggle of the people of Bhutan?
c) What kind of problem is the struggle? Who can solve it?
d) Why were Bhutanese people expelled from the country?
e) How has the domestic issue gone outside the borders of Bhutan?

2. Answer any three questions in short: *5´3=15*

a) What is the theme of the poem "The Grandmother?" Discuss.

(The Grandmother)

b) What is Chekov's opinion about marriage and love?

(About Love)

c) Write a short account of the life of the people of Karnali.   (A Hurried Trip…..)

d) What tension does the poet show in the poem "Travelling Through The Dark?"

3. Answer any one of the following: *10*

a) How does the writer show the growth of an ordinary boy to an assertive young man in the story "The Last Voyage of the Ghost Ship"?
b) What are the main points that the King raises in his speech in "I have a Dream"?

4. Complete the following with a conflicting report: *5*

a) Oh look. It's raining.
b) The rent's $25 a week.
c) Can I have one of your cigarettes?
d) I am afraid I can't affort to come to the concert.
e) My two daughters are coming to stay with me.

5. Explain the following deductions using an 'if' sentence.   *5*
     a) He can't be a saldier – he's not wearing a uniform.
     b) They must be having an argument – they've shut the door.
     c) She can't have been enjoying herself - she left early.
     d) He must have been here recently -the kettle's warm.
     e) He can't be working at the library – I haven't seen him there.

6. Imagine you are in the situations below.
     I) Write a wish for each of the following: *3*
     a) You are sick and lying in bed.
     b) You need a job.
     c) It's raining.
     II) Express regrets for the following: *2*
     a) You are expelled from a job.
     b) Someone has just refused to marry you.

7. Change the following sentences, using 'when' or 'after' instead of 'and' and 'but'   *5*
     a) She peeled banana and gave it to be baby.
     b) He kicked the dog and it barked.
     c) He drank the coffee and asked for another cup.
     d) I read his biography and discovered what a strange person he had been.
     e) I paid my bill and left he restaurant.

8. Report the following remarks using a suitable verb from the box: *5*

agreed,   refused, threatened, advised, tried to persuade.

     a) 'If you don't pay up, I will take legal action.'
     b) 'Very well, then we'll give him his deposit back.'
     c) "No, I have no intention of sending you the money."
     d) 'Please, you must help me! I don't know what to do.'
     e) ' I think you ought to get in touch with safeguard.'

9. Change the suggestion below, using <u>ought to</u>, <u>ought not to</u>, <u>might as well</u> or <u>there's no point in</u>:   *5*
     a) Why don't we give it away – its not worth anything anyway.
     b) Don't ask him – he doesn't speak English.
     c) Let's not talk about it now – the children are listening.
     d) Why don't you take a pullover – it might turn cold.
     e) Why not to buy in the supermarket – it's not more expensive than corner shops.

10. Change the following questions below into information questions as in the example: *5*
     e.g. Are we having tomato / chicken / mushroom soup today?
     Ans: What soup are we having today?
     a) Was it raining / foggy / cold when you were in London?
     b) Are you planning to use your father's car / Tony's car / my car?
     c) Is it 500 miles / 1000 miles / a long way to London from here?
     d) Are you Margaret's cousin / brother / nephew?
     e) Have you given away/ sold / burnt my old football boots?

11. Choosing appropriate verbs from the list report the reports the remarks below: *5*

promise, recommend, insist, threaten, beg
a) You've got to lend me the money! Oh, please, please
b) Why don't you paint the ceiling yellow?
c) I'll buy you an ice-cream if you're good.
d) No, I've already told you – I'm going to pay.
e) I'll report you to the police if you don't do what I say.

12. Write a newspaper report on so-called Hritik Scandal. 10

13. *Read the following passage and answer the questions given below:* 2×5=10

MONDAY 4 MAY, It's 10:35 am. And there are 389 media people in Belfast, most, it would seem, in the Europa Hotel, and all are looking for a war.

For the first time in 12 years of covering the world's conflicts and especially the troubles in Northern Ireland, I have been forced to question seriously the objectivity of some of my colleagues.

There have been reports of photographers paying youths to throw rocks and bottles as passing army vehicles. One US TV crew is said to have such an incident filmed.

In the Lower Falls a TV crew was seen by police inciting rioters to do damage on a building site, and in another incident a TV crew was seen directing rioters to create action which was then filmed.
The very presence of photographs and TV crews on street corners in Belfast seems to induce youths to throw things at passing security vehicles.

Last weekend I was approached by youths in the Falls Road asking what I wanted them to do. When I said I didn't want them to do anything, I was informed that some foreign journalists always paid them.

Questions:
a) In what ways, according to the writer, are photographers and TV crews adding to the violence in Northern Ireland?
b) What evidence does he have of this?
c) Why do you think some foreign journalists behaved in this way?
d) Why has the writer been forced to question seriously the objectivity of some of his colleagues?
e) This is an example of "Chequebook Journalism." Now define "Chequebook Journalism."

"The End"

KATHMANDU
DON BOSCO COLLEGE (10+2)
Second Terminal Chance Examination -2057

Stream : Science
Class   : XII
Subject : Biology

Time   : 1.3 hrs.
F.M.   : 50
P.M.   : 20

ZOOLOGY

1.Attempt all questions: *1´7=7*

    a) Write the role of insulin in human body.

    b) Name the respiratory enzyme which accelerate respiratory reaction.

    c) What is bone?

    d) Why is Blood group AB said to be universal recepent.

    e) What are Nissl's bodies?

    f) What is the difference between blood group 'A' & blood group 'B'?

    g) How does plasma transport O_2?

    h) Name endocrine glands found in human body.

2.   a) What is the role of haemoglobin in respiration?

    b) Describe the internal structure of kidney.

    c) What is the difference between Graafian follicles & corpus luteum?

3.   Describe CO_2 transport in Man.

        OR

    Describe the structure of Male reproductive organ of human?

        OR

    Describe the structure of nephron with diagram.

BOTANY

1. Attempt all questions: *1´8=8*

    a) What is incomplete dominance?

    b) What is monohybrid cross?

    c) What are the main differences between RNA and DNA?

    d) Define the term bio-technology?

    e) Define the term emasculation?

    f) Define the term hybrid?

    g) Define photosynthesis?

    h) What do you mean by aerobic respiration?

2. Attempt all questions: *3´3=9*

    a) Write the characters of DNA?

    b) Write in brief about photolysis of water?

    c) Discuss in brief the method of plant tissue culture?

3. Attempt any one questions: Long Questions: *8*

    a) Explain the Mendel's dihybrid cross with an example?

        OR

    b) Describe various techniques of plant breeding?

        OR

    c) Explain the calvin cycle.

"Best of Luck"

KATHMANDU
DON BOSCO COLLEGE (10+2)
Second Terminal Chance Examination -2057

Stream : Science   Time   : 1.3 hrs.
Class   : XII   F.M.   : 50
Subject : Chemistry   P.M.   : 20

Group 'A'

A. Attempt any five questions: *5´2=10*

   1) Define: I) Normal Solution   II. Mole fraction

   2) What is pH and pOH?

   3) What is Haloform reaction?

   4) Why phenol is more acidic than ethyl alcohol?

   5) What is the action of ammonia on mercurous chloride?

   6) Give a suitable chemical test to identify acetophenone and benzaldehyde.

Group 'B'

B. Attempt any four questions: *4´5=20*

   7) Define solubility product principle. Give one application of it in qualitative analysis.

   8) Show your acquantance with the following reaction   a) Kolbe's reaction   b) Aldol Condensation

   9) Complete the following reaction

   a) $C_6H_5CHO + (CH_3COO)_2O \xrightarrow{CH_3COONA} ?$

   b) $CH3COCH3 + HCN \rightarrow A \xrightarrow{Hydrolysis} ?$

   10) Discuss the manufacture of steel by Bessemer's process.

   11) Write a short note on rusting of Iron.

Group C

C. Attempt any two: *2´10=20*

   12) Describe the lab method for preparation of aniline with neat & labelled diagram. What happens when aniline is sulphonated?

   13) Write the structure of organic compounds A,B,C & D in the following sequence of reaction.

$$\xrightarrow[H_2SO_4]{HNO_3} A \xrightarrow[heat]{Sn/HCL} B \xrightarrow[heat]{CHCl_3/KOH} C \xrightarrow{H_2/Pd} D$$

   14) Discuss the manufacture of Cast Iron from blast furnace with a neat and labelled diagram.

"Best of Luck"

KATHMANDU
DON BOSCO COLLEGE (10+2)
Second Terminal Chance Examination -2057

Stream : Science   Time   : 1.3 hrs.
Class   : XII   F.M.   : 50
Subject : Mathematics   P.M.   : 20

Group 'A'

A. Attempt all questions: $9 \times 2 = 18$

1) How many numbers between 4000 and 5000 can be formed with the digits 2,3,4,5,6?
2) Find the seventh term of $(2x+y)^{12}$.
3) Obtain the equation of the circle if the ends of the diameter be at $(3,0)$ and $(7,-1)$.
4) Discuss the continuity and discontinuity of $f(x) = \dfrac{e^{1/x} - 1}{e^{1/x} + 1}$ at $x = 0$
5) Find $\vec{a}$ when $2\vec{a} - \vec{b} = (4, 7)$ and $\vec{b} = (2, 1)$.
6) Find the equation to the tangent to the curve $y = x^3 - 2x^2 + 4$ at the point $(2, 4)$
7) Define median, find the median height of 10 students with the following heights.
   Heights in inches: 51, 53, 58, 54, 50, 52, 56, 55, 57, 59.
8) Compute the standard deviation for the following frequency distribution:

Class interval:	0–4	4–8	8–12	12–16
Frequency:	4	8	2	1

9) What do you mean by an Ogive?

Group "B"

B. Attempt all questions: $8 \times 4 = 32$

10) Find the sum of the cubes of the first n natural numbers.

11. For any unequal positive numbers a & b, prove that
    i) $AM \times HM = GM^2$
    ii) AM>GM>HM

12. Solve for n the equation $C(n+2,4) = 6C(n, 2)$

13. A six feet man walks away from a 10ft. lamp post at the rate of 5 miles per hour. How fast does the end of his shadow move?

14. If in the expansion of $(1+x)^{2n+1}$, the coefficient of x^r and x^{r+1} are equal, find r.

15. Find from first principles the derivative of $\sin^{-1}x$ w.r. to x.

16. Integrate $\int \sqrt{9x^2 + 24x + 25}\ dx$

17. Define scalar product of two vectors. Find the cosine of the angle between the two vectors

$\vec{2i} + \vec{j} + \vec{k}$ and $\vec{4i} + \vec{3j} - \vec{5k}.$

"Good Luck"

Stream : Science   Time : 1.3 hrs.
Class : XII   F.M. : 50
Subject : Physics   P.M. : 20

1. Attempt any four questions in brief: *4´2=8*
     a) Define laminar and turbulent flow.
     a) Why does a small quantity of liquid assume spherical form?
     b) How can the intensity and penetrating power of X-rays be controlled?
     d) When we stir a liquid vigorously, it becomes warm. Is it a reversible process?
     d) What are the conditions for sustained interference?
     h) Unlike solid and liquid, why does a gas have two specific heat capacities?

2. Attempt any two in brief: *4´2=8*
     a) C_p is greater than C_v. Why?
     b) Define half life time.
     c) State Lenz's law.
     d) Give differences between Compound Microscope & Astronomical Telescope.

3. Attempt all questions:

     a) What is capillary? Derive the relation $T = \dfrac{rhpg}{2Cosq}$. Where symbols have usual meaning.

     b) A clean glass capillary tube of internal diameter 0.04cm, is held vertically with its lower end below the surface of clean water in a beaker. To what height will the water rise in the tube? [Surface tension of water is $7.2\times10^{-2}Nm^{-1}$, Angle of contact $\theta=0^0$, let $r_{water} = 1gm/cm^3$.]   5

4.   Derive the adiabatic equation for one mole of gas as PV^r = constant.   4

5.   a) Explain Huygen's wave theory of light and explain laws of refraction on the wave theory of light.   5
OR
     What is decay law? Derive the relation $N = N_0e^{-\lambda t}$

     b) Critical angle for a certain wavelength of light in glass is 40^0. Calculate the polarizing angle and the angle of refraction in glass corresponding to this.   5

6.   a) State Bohr's Postulates, using these postulates derive an expression for the total energy of an electron in the nth orbit of hydrogen atom.   5
OR
     Explain how are x-rays produces with tube – diagram.

     b) An electron is shot down on X-ray tube across a potential difference of 30kV. If it collides with a heavy massive atom of the target and loses all of its energy, what is the wavelength of the x-rays produced?   5

8.   a) State and explain Faraday's laws of electromagnetic induction.   5

"The End"