



ASSIGNMENT

Class: XII
 Subject: Basic Mathematics

F.M-100
 P.M.-40

Attempt all the questions.

Group 'A'

- 1) a) A person has got 12 acquaintances of which 9 are relatives. In how many ways can he invite 8 guests so that 6 of them may be relatives? 2
 b) How many different number of 5 digits can be formed with the digits 0, 1, 2, 3, 4? 2
 c) Using L Hospital's rule, evaluate $\lim_{x \rightarrow 0} \frac{x - \sin x \cdot \cos x}{x^3}$ 2
- 2) a) Evaluate : $\int \frac{dx}{x + \sqrt{x^2 - 1}}$ 2
 b) Solve $(x + y)dy + (y - x)dx = 0$ 2
 c) Solve $\frac{dx}{1 + x^2} + \frac{dy}{1 + y^2} = 0$ 2
- 3) a) Evaluate : $\int \frac{dx}{\sqrt{x^2 - a^2}}$ 2
 b) In a certain problem the probability that A can solve is $\frac{2}{3}$, B can solve is $\frac{3}{4}$. If it is given to both of them, find the probability that the problem will be solved. 2
 c) If $\vec{a} = (3, -1, -4)$, $\vec{b} = (-2, 4, -3)$ & $\vec{c} = (-5, 7, -1)$, find the unit vector along $\vec{a} - 2\vec{b} + \vec{c}$. 2
- 4) a) Using L-Hospital's rule, evaluate : $\lim_{x \rightarrow 0} \frac{e^x - x - 1}{x^2}$ 2
 b) In a certain distribution, the following results are obtained mean = 45, median = 48, co-efficient of skewness = -0.5, find SD. 2
 c) Two dice are thrown. Find the probability of getting neither a double nor a sum of 8. 2
- 5) a) In how many different ways can the letter of the word SUNDAY be arranged? How many of these arrangements do not begin with S? How many of these begin with S and do not end with Y? 4

b) Evaluate : $\int \frac{dx}{a + b \cos x}, a > b$ 4

6) a) Solve : $x \frac{dy}{dx} + 2y = x^2 \log x$. 4

b) There are 10 electric bulbs in the stock of a shop out of which 4 are defectives. In how many ways can a selection of 6 bulbs be made so that 4 of them may be good? 4

7) a) Evaluate : $\int \frac{dx}{4 + 3 \cos x}$. 4

b) Solve : $xdy - ydx = \sqrt{x^2 + y^2} dx$. 4

8) a) State & prove addition theorem or probability.
 OR

A sample of 100 fuses is known to have a average of 15 defective fuses. There fuses for the sample are tested. What is the probability that

- i) none of them is defective
- ii) exactly one of them is defective
- iii) at least one of them is defective.

b) Find Karl-pearson's correlation co-efficient. 4

X	12	9	8	10	11
Y	12	8	6	8	10

9) Define cross product of two vectors. Give its geometrical meaning. Using vector method, prove that $\sin(A + B) = \sin A \cos B + \cos A \sin B$. 6

10) In any ΔABC , prove vectorially $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$. 6

11) Find from first principle, the derivative of $\log(\cos^{-1} x)$. 6

Group 'C'

16) a) Prove that the vector product $\vec{a} \times \vec{b}$ is perpendicular to both \vec{a} and \vec{b} . 2

b) By using Gauss elimination, solve $3x - 2y = 1$
 $x + 2y = 3$ 2

c) Solve by Guess Jordan method for $6x - 5y - 1 = 0$ and $9x + 10y - 5 = 0$. 2

17) a) Apply the Guess Seidel method to solve the following system of equations :
 $5x + 2y + z = 12$, $x + 2y + 5z = 20$, $x + 4y + 2z = 15$. 4

b) Evaluate : $\int_0^{\frac{\pi}{2}} \sqrt{\sin x} dx$ taking $x = 6$ correct to four significant figure by using Simpson's $\frac{1}{3}$ rule. 4

18) Define trapezoidal rule. Evaluate using trapezoidal rule. 6

$$\int_0^1 \frac{dx}{1+x} \text{ for } n=4 + \textit{rapezoidal} .$$

6

19) Using Simpson's rule, evaluate

6

$$\int_0^2 \frac{dx}{1+x^4} \text{ for } n=4$$

"Best of Luck"



ASSIGNMENT

Class: XII
 Subject: Basic Mathematics

F.M-100
 P.M.-40

Attempt all the questions.

Group 'A'

19x2=38

- 1) a) In how many ways can four boys and three girls be seated in a row containing 7 seats if they may sit anywhere? 2
- b) Which term is free from x in two expansion of $\left(x^2 - \frac{1}{x}\right)^{15}$? 2
- c) Expand $\left(2x + \frac{1}{2x}\right)^5$
- 2) a) It is required to seat 5 boys and 4 girls in a row so that the girls occupy the even places. How many such arrangement is possible? 2
- b) Find the middle term in the expansion of $\left(2x + \frac{1}{3x^2}\right)^9$. 2
- c) Prove that $C_0 + C_1 + C_2 + C_3 + \dots + C_n = 2^n$
- 3) a) Find the cosines of the angle between the vectors.
 $\vec{a} = (1, -2, -2)$ and $\vec{b} = (2, 1, -2)$
- b) Find the area of a parallelogram whose adjacent sides are represent by the vectors $3\vec{i} + \vec{j} - 2\vec{k}$ and $\vec{i} - 3\vec{j} + 4\vec{k}$.
- c) Using L' Hospital's rule evaluate $\lim_{x \rightarrow 0} \frac{e^x + e^{-x} - 2\cos x}{\sin^2 x}$.
- 4) a) Integrate $\int \frac{dx}{\sqrt{2ax - x^2}}$
- b) Evaluate $\int \frac{dx}{x + \sqrt{x^2 - 1}}$.
- c) Solve $x dy + (x + y) dx = 0$.
- d) Using L' Hospital rule, evaluate $\lim_{x \rightarrow 0} \frac{\sqrt{1+3x} - \sqrt{1-3x}}{x}$

- 5) a) Evaluate $\int \frac{e^x dx}{\sqrt{e^{2x} + 1}}$
- b) Solve $\sqrt{1-x^2} dy + \sqrt{1-y^2} dx = 0$
- c) Find the skewness and CV if mean, median and SD are respectively 56, 59 and 12.
- 6) a) What is the probability that January will have 5 Saturday?
- b) A bag contains 25 tickets numbered from 1 to 25. A ticket is drawn and then another ticket is drawn without replacement. Find the probability that both tickets will shown even numbers.
- c) Two golfers A and B statics are given below. Find which golfer is more consistent.

Golfer	\bar{x}	σ
A	76	6.56
B	85	2.58

Group 'B'

8x4=32

- 7) a) In how many ways can a committee of 5 members be formed from 8 officials and 4 non officials, so that each committee may consist of at least on officials.
- b) If the three consecutive co-efficient in the expansion of $(1+x)^n$ be 165, 330 and 462. Find n.
- 8) a) In how many ways can the letters of the word 'COMPUTER' be arranged so that
 - i) all the vowels are always together?
 - ii) the vowels may occupy only odd positions?
- b) $1 + \frac{1+2}{2!} + \frac{1+2+3}{3!} + \frac{1+2+3+4}{4!} + \dots \infty = \frac{3e}{2}$
- 9) a) Prove that the three vectors $\vec{a} - 2\vec{b} + 3\vec{c}, -2\vec{a} + 3\vec{b} - 4\vec{c}$ and $-\vec{b} + 2\vec{c}$ are coplanar.
- b) State and prove the 'Total theorem of probality'.
 OR
 A dice is thrown 3 times getting a '5' or '6' is numbered a success. Find the probability of getting i) 3 success ii) no success.
- 10) a) Evaluate $\int \frac{dx}{a + b \cos x}, a > b$.
- b) Solve $\sin x \cdot \frac{dy}{dx} + \cos x \cdot y = x \sin x$
 OR
 $xy \frac{dy}{dx} = x^2 + y^2$
- Group 'C'** **6x5=30**
- 11) State scalar product of two vectors. Prove vectorically that
 $\cos(A-B) = \cos A \cos B + \sin A \sin B$

- 12) State mean value theorem Interpret it geometrically. Verify mean value theorem for the functions $f(x) = x^3 + x^2 - 6x$ in $[-1, 4]$.

OR

Find the derivative of $\log \cos^{-1} x$ by using first principle.

13) Prove that $\sum_{n=1}^{\infty} \frac{n^2}{(n+1)!} = e - 1$

- 14) From the following data between the ages of husbands and wives calculate the two regression equations and find the husband's age when wife's age is 20 and wife's age when the husband's age is 30.

Wife's Age (x)	18	20	22	23	27	28
Husband's Age (y)	23	25	27	30	32	31

- 15) Let $G = \mathbb{Q} - \{1\}$, where \mathbb{Q} is the set of rational numbers. Let \star is an operation define on G given by $a \star b = a + b + ab$. Show that (G, \star) forms a group.

"Best of Luck"

ASSIGNMENT

Class: XII
 Subject: Basic Mathematics

F.M-100
 P.M.-40

Attempt all the questions.

Group 'A'

1. a) From 10 persons, in how many ways can a selection of 4 be made when two perpendicular persons are always included? 2
- b) Find the middle term of $\left(x + \frac{1}{x}\right)^{18}$. 2
- c) How many different number of 5 digits can be formed with the digits 0, 1, 2, 3, 4? 2
- 2) a) Evaluate : $\int \frac{dx}{x + \sqrt{x^2 - 1}}$ 2
- b) Solve $(x + y)dy + (y - x)dx = 0$ 2
- c) Solve $\frac{dx}{1 + x^2} + \frac{dy}{1 + y^2} = 0$ 2
3. a) Using L Hospitals rule, evaluate $\lim_{x \rightarrow 0} \frac{e^x + e^{-x} - 2 \cos x}{\sin^2 x}$. 2
- b) Integrate $\int \frac{dx}{\sqrt{(x-2)(x-3)}}$ 2
- c) Solve : $\frac{dy}{dx} = \frac{e^x + x + 1}{e^y + y + 1}$ 2
4. a) If $|\vec{x} + \vec{y}| = |\vec{x} - \vec{y}|$, prove that \vec{x} is perpendicular to \vec{y} . 2
- b) In a certain distribution, the following results are obtained mean = 45, median = 48, co-efficient of skewness = -0.5, find SD. 2
- c) The probability of solving the problem by students A is $\frac{3}{8}$ and that of B is $\frac{1}{4}$, find the probability of solving the problem if both of them try. 2
5. a) In how many ways can the letters of the word, "CALCULUS" be arranged so that the two L's do not come together. 4
- b) If three consecutive co-efficient-s in the expansion of $(1 + x)^n$ are 165, 330 & 462. Find n. 4

6. a) Prove that $\frac{\frac{1}{2!} + \frac{1}{4!} + \frac{1}{6!} + \dots}{\frac{1}{1!} + \frac{1}{3!} + \frac{1}{5!} + \dots} = \frac{e-1}{e+1}$ 4
- b) A bag contains 25 tickets numbered from 1 to 25. A ticket is drawn and then another ticket is drawn without replacement. Find the probability that both tickets will shown even numbers. 4
7. a) Evaluate : $\int \frac{dx}{a + b \cos x}, a < b$. 4
- b) Solve : $\frac{dy}{dx} + \frac{2y}{x} = x^3$ 4
- 8) a) In how many ways can the letters of the word 'COMPUTER' be arranged so that
 - i) all the vowels are always together? 4
 - ii) the vowels may occupy only odd positions? 4
- b) Evaluate: $\int \frac{dx}{1 + \sin x + \cos x}$ 4
9. Define vector product of two vectors prove vectorically.
 $\cos(A - B) = \cos A \cos B + \sin A \sin B$ 6
10. By using first principle find the derivative of $\log(\cos^{-1} x)$. 6
11. From the following data between the ages of husbands and wives calculate the two regression equations and find the husband's age when wife's age is 20 and wife's age when the husband's age is 30. 6

Wife's Age (x)	18	20	22	23	27	28
Husband's Age (y)	23	25	27	30	32	31
12. a) Convert 1011.1111_2 into decimal numbers. 2
- b) Convert the binary number : $(101110101)_2$ into hexadecimal. 2
- c) Express $EA5_{16}$ into binary number. 2
13. a) Solve using Gauss elimination method, the following equations. 4

$$3x_1 + 5x_2 + 6x_3 = 7$$

$$2x_1 + 4x_2 + 3x_3 = 5$$

$$x_1 + 3x_2 - 2x_3 = 5$$

Or
 Solve the following equations using Gauss siedel method.
 $3x + y = 5$ & $x + 2y = 5$
- b) Using bisection method find the value of $\sqrt{3}$ within an error of 10^{-3} . 4
14. Find the root of the equation $x^3 - 2x - 5 = 0$ lying between 2 & 3 correct to three places of decimals by successive bisection method. 6

Or

Solve $2x^2 - 3x - 1 = 0$ using Newton Raphson method taking $x_0 = 1$ with error less than 10^{-4} .

15. By using Simpson's $\frac{1}{3}$ rule, evaluate $\int_0^1 \sqrt{1+2x^2} dx, x = 4$.

"Best of Luck"

ASSIGNMENT

Class: XII
 Subject: Basic Mathematics

F.M-100
 P.M.-40

Attempt all the questions.

Group 'A'

- 1) a) A person has got 12 acquaintances of which 9 are relatives. In how many ways can he invite 8 guests so that 6 of them may be relatives? 2
- b) How many different number of 5 digits can be formed with the digits 0, 1, 2, 3, 4? 2
- c) Using L Hospital's rule, evaluate 2

$$\lim_{x \rightarrow 0} \frac{x - \sin x \cos x}{x^3}$$

- 2) a) Evaluate : $\int \frac{dx}{x + \sqrt{x^2 - 1}}$ 2

b) Solve $(x + y)dy + (y - x)dx = 0$ 2

c) Solve $\frac{dx}{1 + x^2} + \frac{dy}{1 + y^2} = 0$ 2

- 3) a) Evaluate : $\int \operatorname{Cosec} x \, dx$ 2

b) In a certain problem the probability that A can solve is $\frac{2}{3}$, B can solve is $\frac{3}{4}$. If it is given to both of them, find the probability that the problem will be solved. 2

c) If $\vec{a} = (3, -1, -4)$, $\vec{b} = (-2, 4, -3)$ & $\vec{c} = (-5, 7, -1)$, find the unit vector along $\vec{a} - 2\vec{b} + \vec{c}$. 2

- 4) a) Using L-Hospital's rule, evaluate : $\lim_{x \rightarrow 0} \frac{e^x - x - 1}{x^2}$. 2

b) In a certain distribution, the following results are obtained mean = 45, median = 48, co-efficient of skewness = -0.5, find SD. 2

c) Two dice are thrown. Find the probability of getting neither a double nor a sum of 8. 2

- 5) a) In how many different ways can the letter of the word MONDAY be arranged? How many of these arrangements do not begin with M? How many of these begin with M and do not end with Y? 4

b) Evaluate : $\int \frac{dx}{a + b \cos x}$, $a < b$ 4

- 6) a) Solve : $x \frac{dy}{dx} + 2y = x^2 \log x$. 4

- b) There are 10 electric bulbs in the stock of a shop out of which 4 are defectives. In how many ways can a selection of 6 bulbs be made so that 4 of them may be good? 4

- 7) a) Evaluate : $\int \frac{dx}{4 + 3 \cos x}$. 4

b) Solve : $xdy - ydx = \sqrt{x^2 + y^2} dx$. 4

- 8) a) State & prove addition theorem or probability.
 OR

A sample of 100 fuses is known to have a average of 15 defective fuses. There fuses for the sample are tested. What is the probability that

- i) none of them is defective
- ii) exactly one of them is defective
- iii) at least one of them is defective. 4

- b) Find Karl-pearson's correlation co-efficient. 4

X	12	9	8	10	11
Y	12	8	6	8	10

- 9) Define cross product of two vectors. Give its geometrical meaning. Using vector method, prove that $\sin(A + B) = \sin A \cos B + \cos A \sin B$. 6

10) In any $\triangle ABC$, prove vectorially $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$. 6

- 11) Find from first principle, the derivative of $\log(\cos^{-1} x)$. 6

Group 'C'

- 16) a) Prove that the vector product $\vec{a} \times \vec{b}$ is perpendicular to \vec{a} . 2

b) By using Gauss elimination, solve $3x - 2y = 1$
 $x + 2y = 3$ 2

c) Solve by Gauss Jordan method for $6x - 5y - 1 = 0$ and $9x + 10y - 5 = 0$. 2

- 17) a) Apply the Gauss Seidel method to solve the following system of equations :
 $5x + 2y + z = 12$, $x + 2y + 5z = 20$, $x + 4y + 2z = 15$. 4

b) Using Gauss elimination method solve:
 $x + y + z = 0$, $x - 2y + z = -3$, $x + 2y - z = 5$ 4

- 18) Solve using matrix inverse method

$3x + y + z = 15$, $x + y + z = 3$, $y - z = -1$

- 19) Prove that the three vectors $\vec{a} + 2\vec{b} + 3\vec{c}$, $-2\vec{a} + 3\vec{b} - 3\vec{c}$ and $-\vec{b} + 2\vec{c}$ are coplanar.

"Best of Luck"

[REF]
Whitefield International College
 Town Planning, Nayabazar, Kathmandu

ASSIGNMENT

Class: XII
 Subject: Basic Mathematics

F.M-100
 P.M.-40

Attempt all the questions.

Group 'A'

- 1) a) A person has got 12 acquaintances of which 9 are relatives. In how many ways can he invite 8 guests so that 6 of them may be relatives? 2
- b) How many different number of 5 digits can be formed with the digits 0, 1, 2, 3, 4? 2
- c) Using L Hospital's rule, evaluate 2

$$\lim_{x \rightarrow 0} \frac{x - \sin x \cos x}{x^3}$$

- 2) a) Evaluate : $\int \frac{dx}{x + \sqrt{x^2 - 1}}$ 2

b) Solve $(x + y)dy + (y - x)dx = 0$ 2

c) Solve $\frac{dx}{1 + x^2} + \frac{dy}{1 + y^2} = 0$ 2

- 3) a) Evaluate : $\int \frac{dx}{\sqrt{x^2 - a^2}}$ 2

b) In a certain problem the probability that A can solve is $\frac{2}{3}$, B can solve is $\frac{3}{4}$. If it is given to both of them, find the probability that the problem will be solved. 2

c) If $\vec{a} = (3, -1, -4)$, $\vec{b} = (-2, 4, -3)$ & $\vec{c} = (-5, 7, -1)$, find the unit vector along $\vec{a} - 2\vec{b} + \vec{c}$. 2

- 4) a) Using L-Hospital's rule, evaluate : $\lim_{x \rightarrow 0} \frac{e^x - x - 1}{x^2}$. 2

b) In a certain distribution, the following results are obtained mean = 45, median = 48, co-efficient of skewness = -0.5, find SD. 2

c) Two dice are thrown. Find the probability of getting neither a double nor a sum of 8. 2

- 5) a) In how many different ways can the letter of the word SUNDAY be arranged? How many of these arrangements do not begin with S? How many of these begin with S and do not end with Y? 4

b) Solve $\sqrt{1 - x^2} dy + \sqrt{1 - y^2} dx = 0$

c) Find the skewness and CV if mean, median and SD are respectively 56, 59 and 12.

- 6) a) What is the probability that January will have 5 Saturday?
- b) A bag contains 25 tickets numbered from 1 to 25. A ticket is drawn and then another ticket is drawn without replacement. Find the probability that both tickets will shown even numbers.
- c) Two golfers A and B statics are given below. Find which golfer is more consistent.

Golfer	\bar{x}	σ
A	76	6.56
B	85	2.58

Group 'B'

8x4=32

- 7) a) In how many ways can a committee of 5 members be formed from 8 officials and 4 non officials, so that each committee may consist of at least on officials.
- b) Solve by using Gauss Seidel $3x - 2y = 1$ and $x + 2y = 3$
- 8) a) In how many ways can the letters of the word 'COMPUTER' be arranged so that
 - i) all the vowels are always together?
 - ii) the vowels may occupy only odd positions?

b) Evaluate: $\int \frac{dx}{1 + \sin x + \cos x}$

- 9) a) Prove that the three vectors $\vec{a} - 2\vec{b} + 3\vec{c}$, $-2\vec{a} + 3\vec{b} - 4\vec{c}$ and $-\vec{b} + 2\vec{c}$ are coplanar.

b) State and prove the 'Total theorem of probability'.

OR

A dice is thrown 3 times getting a '5' or '6' is numbered a success. Find the probability of getting i) 3 success ii) no success.

10) a) Evaluate $\int \frac{dx}{a + b \cos x}$, $a > b$.

b) Solve $\sin x \cdot \frac{dy}{dx} + \cos x \cdot y = x \sin x$

OR

$xy \frac{dy}{dx} = x^2 + y^2$

Group 'C'

6x5=30

- 11) State scalar product of two vectors. Prove vectorially that

$\cos(A - B) = \cos A \cos B + \sin A \sin B$

- 12) State mean value theorem Interpret it geometrically. Verify mean value theorem for the functions $f(x) = x^3 + x^2 - 6x$ in $[-1, 4]$.

OR

Find the derivative of $\log \cos^{-1} x$ by using first principle.

13) In any ΔABC , prove vectorially $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

- 14) From the following data between the ages of husbands and wives calculate the two regression equations and find the husband's age when wife's age is 20 and wife's age when the husband's age is 30.

Wife's Age (x)	18	20	22	23	27	28
Husband's Age (y)	23	25	27	30	32	31

- 15) Solve by using Gauss Elimination

$$5x + 2y + z = 12$$

$$x + 2y + 5z = 20$$

$$x + 4y + 2z = 15$$

"Best of Luck"