

ANNUAL/SEMESTER EXAMINATION NOV/DEC. - 2017 (Regulation - 2014)

Subject : 1.2 APPLIED MATHEMATICS

Time : 3 Hours

Max. Marks : 80

PART - A

Answer the following questions

2x10=20

- 1) Evaluate the determinant $\begin{vmatrix} \cos \theta & \sin \theta \\ \sin \theta & \cos \theta \end{vmatrix}$
- 2) Find x and y, if $\begin{bmatrix} x+3 \\ 2-y \end{bmatrix} = \begin{bmatrix} 1 \\ -3 \end{bmatrix}$
- 3) Find the value $\cos 30^\circ \cos 45^\circ - \sin 30^\circ \sin 45^\circ$
- 4) If $\sin A = \frac{5}{13}$, compute $\cos A$ and $\tan A$
- 5) Find $\frac{dy}{dx}$, if $y = 3x^3 - x^2 + 6$
- 6) Find $\frac{dy}{dx}$, if $y = \frac{2x+1}{x^2+1}$
- 7) Evaluate $\int (x^6 + x^2 + x + 5) dx$
- 8) Integrate $\int \cos(2 - 7x) dx$
- 9) If A(3, 4) and B(-2, 1) find the distance between two points
- 10) Find the median of the observation
4, 7, 3, 2, 5, 6, 8

PART - B

- 11) a) Find the value $= \begin{vmatrix} 16 & 19 & 13 \\ 15 & 18 & 12 \\ 14 & 17 & 11 \end{vmatrix}$ 4
- b) Solve by using Cramer's rule
 $4x + y - 3z = 3, 2x + 3y - 2z = 6, x + y + z = 4$ 8
- OR
- c) If $A = \begin{bmatrix} 0 & 2 & 3 \\ 2 & 1 & 4 \end{bmatrix}$ & $B = \begin{bmatrix} 7 & 6 & 3 \\ 1 & 4 & 5 \end{bmatrix}$ then find $2A - 3B$ 4
- d) Find the inverse of matrix $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 1 & 1 \\ 1 & 1 & 2 \end{bmatrix}$ 8

P.T.O.

12) a) Prove that, $\cot A - \tan A = 2 \cot 2A$ 4

b) Prove that, $\frac{\sin \theta}{1 + \cos \theta} + \frac{1 + \cos \theta}{\sin \theta} = 2 \operatorname{cosec} \theta$ 8

OR

c) Prove that, $\cot A - \operatorname{cosec} 2A = \cot 2A$ 4

d) If $A + B + C = 90^\circ$ then prove that $\cot A + \cot B + \cot C = \cot A \cdot \cot B \cdot \cot C$ 8

13) a) Differentiate, $y = ax^2 + b \tan x + 5x$ with respect to x . 4

b) Find $\frac{dy}{dx}$, when $y = \ln \tan \left(\frac{\pi}{4} + \frac{x}{2} \right)$ with respect to x 8

OR

c) Differentiate, $y = \sqrt{\sec(2x + 1)}$ with respect to x 4

d) Find $\frac{dy}{dx}$, when $y = \frac{e^{3x^2}}{\ln \sin x}$ with respect to x 8

14) a) Evaluate: $\int (5x^3 + 7x^2 + 10) dx$ 4

b) Integrate: $\int x^2 e^{ax} dx$ 8

OR

c) Evaluate: $\int (5 \tan^2 x) dx$ 4

d) Evaluate: $\int_{-1}^2 (2x + 1)(x - 2) dx$ 8

15) a) Solve the following simultaneous linear equations 4

$$5x + 2y + 2 = 0$$

$$3x + 4y - 10 = 0$$

b) Show that the points $(0, -1)$, $(-2, 3)$, $(6, 7)$ and $(8, 3)$ are vertices of a rectangle. 8

OR

c) Show that the points $A(-1, 4)$, $B(0, 2)$ and $C(2, -2)$ are collinear. 4

d) Find the mean of the following distribution 8

C.I	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70
Frequency	1	7	24	36	25	6	1

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INDIAN INSTITUTE OF HANDLOOM TECHNOLOGY
BARGARH/GUWAHATI/FULIA/JODHPUR/SALEM/VARANASI/CHAMPA/KANNUR/KHITI GADAG/SPKM VENKATAGIRI
DIPLOMA IN HANDLOOM AND TEXTILE TECHNOLOGY
SEMESTER EXAMINATION - NOV/DEC-2017
(2011 REGULATION)

SEMESTER : I SEMESTER

Hours : 3 Hours

Max.marks:80

Subject Code & Name: 1.2 APPLIED MATHEMATICS

PART - A

Answer the following questions.

2x10=20

- 1) Evaluate the determinant $\begin{vmatrix} 2 & 4 \\ 3 & -2 \end{vmatrix}$
- 2) If $A = \begin{bmatrix} 3 & 2 \\ 1 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 2 \\ 1 & 3 \end{bmatrix}$, then find $A+B$
- 3) If $\sin A = \frac{4}{5}$, compute $\cos A$ and $\tan A$.
- 4) Find the value of $\sin 75^\circ$.
- 5) Find $\frac{dy}{dx}$, if $y = x^3 - 5x$.
- 6) Find $\frac{dy}{dx}$, if $y = \sqrt{2x+1}$
- 7) Evaluate : $\int 3x^2 dx$
- 8) Integrate : $\int \sin 3x dx$
- 9) If $P(3, -1)$ and $Q(-1, 1)$ find the distance between two points.
- 10) Find the mode of the data
5, 3, 4, 8, 4, 3, 4, 8, 2, 6

PART - B

- 11) a) Solve $\begin{vmatrix} 4 & x+1 \\ 3 & x \end{vmatrix} = 5$ 4
- b) Solve by using Cramer's rule. 8
 $2x + y + 2z = 2, 3x + 2y + z = 2, -x + y + 3z = 6$

OR

- c) If $A = \begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$ & $B = \begin{bmatrix} 4 & 2 \\ -1 & -2 \end{bmatrix}$ then find AB 4
- d) Find the adjoint of matrix $\begin{bmatrix} 2 & 1 & 2 \\ 2 & 2 & 1 \\ 1 & 2 & 2 \end{bmatrix}$ 8

P.T.O.

- 12) a) Prove that, $\frac{\cos \theta}{1 - \sin \theta} = \frac{1 + \sin \theta}{\cos \theta}$ 4
b) Prove that, $\sqrt{\frac{1 - \cos \theta}{1 + \cos \theta}} = \operatorname{cosec} \theta - \cot \theta$ 8

OR

- c) Prove that, $\frac{\sin A + \sin 2A}{1 + \cos A + \cos 2A} = \tan A$ 4
d) Prove that, $(\sec \theta - \tan \theta)^2 = \frac{1 - \sin \theta}{1 + \sin \theta}$ 8

- 13) a) Find the derivative of $x^2 + 2x - \sin x + 5$ w.r.t. x 4
b) Find $\frac{dy}{dx}$, where $y = x \sin x - \frac{e^x}{1+x^2}$ 8

OR

- c) Find the derivative of $(x^2 + 2x - 1)^5$ w.r.t. x 4
d) Find $\frac{dy}{dx}$, where $y = \sqrt{\sin \sqrt{x}}$ 8

- 14) a) Evaluate: $\int x(x - 1)^2 dx$ 4
b) Integrate: $\int x^2 e^x dx$ 8

OR

- c) Evaluate: $\int (3x^3 - x^2 + 5x + 2)^2 dx$ 4
d) Evaluate: $\int \frac{x^2 + 1}{(x^3 + 3x + 7)^3} dx$ 8

- 15) a) Solve the following simultaneous linear equations 4
 $2x + 3y - 8 = 0$
 $3x + y - 5 = 0$
b) Show that the triangle with vertices A(-3, 1), B(5, 4) and C(0, -7) is isosceles. 8

OR

- c) Show that the points A(-1, 4), B(0, 2) and C(2, -2) are collinear. 4
d) Find the mean of the following grouped frequency distribution. 8

Marks	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100
Number of Students	7	11	10	9	13

DIPLOMA IN HANDLOOM & TEXTILE TECHNOLOGY
I SEMESTER (BACK PAPER) EXAMINATION – NOV/DEC-2015

1.2 APPLIED MATHEMATICS

Time : 3 Hours

Max. Marks:80

PART A



Answer the following questions

(2x10=20)

1. Find the value of the determinant $\begin{vmatrix} 8 & -3 \\ 2 & 4 \end{vmatrix} = 0$
2. If $A = \begin{bmatrix} 1 & -1 \\ 2 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 3 \\ -4 & 5 \end{bmatrix}$ then Find AB
3. Find the value of $2\sin 15 \cos 15$
4. If $A+B+C = 180$, find the value of $\tan(A+B)$
5. If $y = \frac{1}{\sqrt{x}}$ find $\frac{dy}{dx}$
6. Differentiate $\log(x^3 + 1)$ with respect to x
7. Evaluate : $\int (x + 1)^3 dx$
8. Evaluate : $\int \sec 2x \tan 2x dx$
9. Find the distance between the points P(3,2) and Q (-2,-3)
10. If the arithmetic mean of data 7, 8, x, 11, 14 is x then find the value of x

PART -B

Answer the following questions

1.(a) Show that

$$\begin{vmatrix} x+a & a & a \\ b & x+b & b \\ c & c & x+c \end{vmatrix} = x^2(x+a+b+c) \quad (4)$$

1.(b) Solve the following simultaneous equations using Cramer's rule.

$$\begin{aligned} x+2y+5z &= 4 \\ 3x+y+4z &= 6 \\ -x+y+z &= 3 \end{aligned} \quad (8)$$

OR

1.(c) If $A = \begin{bmatrix} -1 & 2 & 3 \\ 3 & 4 & -1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & -2 & 0 \\ 2 & 1 & -1 \\ 1 & -1 & 1 \end{bmatrix}$ then verify that $(AB)^T = B^T A^T$ (4)

1.(d) If $A = \begin{bmatrix} 1 & 0 \\ 4 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 3 \\ 5 & 7 \end{bmatrix}$ then show that $(AB)^{-1} = B^{-1}A^{-1}$ (8)

2.(a) Prove that $(\sin 45 + A) \sin (45 - A) = \frac{\cos 2A}{2}$ (4)

2.(b) Show that $\frac{\cos A - \cos 3A}{\sin 3A - \sin A} = \tan 2A$ (8)

OR

2.(c) If $\frac{\cos(A-B)}{\cos(A+B)} = 3$ then show that $\cot A \cot B = 2$ (4)

2.(d) If $A+B+C=180$, prove that $\cot A \cot B + \cot B \cot C + \cot C \cot A = 1$ (8)

3.(a) Differentiate $y = x^2 \sin x$ with respect to x (4)

3.(b) If $y = \frac{1}{1+x^2-2x}$ then find $\frac{dy}{dx}$ (8)

OR

3.(c) If $y = e^{5\sqrt{x}} + \tan x$, find $\frac{dy}{dx}$ (4)

3.(d) Find the differential co-efficient of $\sqrt{\frac{1+x}{1-x}}$ (8)



4.(a) Evaluate : $\int \frac{\sin(\log x)}{x} dx$

(4)

4.(b) Evaluate : $\int \frac{x dx}{(x^2+7)^4}$

(8)



OR

4.(c) Evaluate : $\int (3x + 2)^2 dx$

(4)

4.(d) Evaluate : $\int \frac{1}{1+\cos x} dx$

(8)

5.(a) Solve the following simultaneous linear equations:

$$8x + 5y = 9$$

$$3x + 2y = 4$$

(4)

5.(b) Prove that the points (1,0) , (-1,0) and (0, $\sqrt{3}$) form an equilateral triangle.

(8)

OR

5.(c) Show that the points A(3,0) , B(4,5) , C (-1,4) and D(-2,-1) form a Rhombus.

(4)

5.(d) Find the Mean of the following frequency distribution :

Classes	0-20	20-40	40-60	60-80	80-100
Frequency	7	11	10	9	13

(8)

DIPLOMA IN HANDLOOM & TEXTILE TECHNOLOGY
1 YEAR (BACK PAPER) EXAMINATION - NOV/DEC-2015

1.2 APPLIED MATHEMATICS

Time : 3 Hours

Max. Marks:80

PART-A



(2x10=20)

I. Answer all questions

1. Find x if $\begin{vmatrix} x & 25 \\ 3 & 5 \end{vmatrix} = 0$

2. If $A = \begin{bmatrix} 2 & 3 & 1 \\ 0 & -1 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 & -1 \\ 0 & 1 & 3 \end{bmatrix}$ Find $A-2B$

3. Find the value of $\frac{\tan 4A - \tan 3A}{1 + \tan 4A \tan 3A}$

4. If $\sin A = \frac{3}{5}$ and $\cos B = \frac{12}{13}$ find the value of $\sin (A+B)$

5. If $y = x^5 + 3$, find $\frac{dy}{dx}$

6. Differentiate $\sin(ax + b)$ with respect to x

7. Evaluate : $\int \sec^2 x dx$

8. Evaluate : $\int \sqrt{x} dx$

9. Find the distance between the points P(a,0) and Q (0,b)

10. If the Arithmetic Mean is 24 and Mode is 12, Find the Median.

PART - B

Answer the following questions

1.(a) Show that

$$\begin{vmatrix} 1 & 1 & 1 \\ x & y & z \\ y+z & z+x & x+y \end{vmatrix} = 0 \quad (4)$$

1.(b) Solve the following simultaneous equations using Cramer's rule.

$$\begin{aligned} x + 2y - z &= -3 \\ 3x + y + z &= 4 \\ x - y + 2z &= 6 \end{aligned} \quad (8)$$

OR

1.(c) If $A = \begin{bmatrix} 2 & 1 & 3 \\ 4 & -1 & 2 \end{bmatrix}$, $B = \begin{bmatrix} -3 & 1 \\ 2 & 3 \\ 0 & 2 \end{bmatrix}$ and $C = \begin{bmatrix} -1 & 2 & 3 \\ 0 & -1 & 2 \end{bmatrix}$ then verify that $(AB)C = A(BC)$ (4)

1.(d) If $A = \begin{bmatrix} 9 & 4 \\ 6 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 5 & -3 \\ -4 & 3 \end{bmatrix}$ Show that $(AB)^{-1} = B^{-1}A^{-1}$ (8)

2.(a) If $A+B = 45$ Prove that $(1+\tan A)(1+\tan B) = 2$ (4)

2.(b) Show that $\frac{\cos 3A}{\cos A} = 2 \cos 2A - 1$ (8)

OR

2.(c) Prove that $\cos 20 \cos 40 \cos 80 = \frac{1}{8}$ (4)

(d) Show that $\frac{\sin 3A + \sin A}{\cos A + \cos 3A} = \tan 2A$ (8)

3.(a) Differentiate $y = (x^2 + 1) \cos x$ with respect to x (4)

3.(b) If $y = \frac{8x+5}{7x-2}$ then find $\frac{dy}{dx}$ (8)

OR

3.(c) Find the differential co-efficient of $\log(x^2 + 2x)$ (4)

3.(d) If $y = \frac{\sqrt{x} + \log x}{1+x^3}$, find $\frac{dy}{dx}$ (8)



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3(a) Evaluate : $\int (x - 1)(x + 3)(x - 3)dx$ (4)

4.(b) Evaluate : $\int x e^{x^2} dx$ (8)

OR



4.(c) Evaluate : $\int (\sin x + \cos x)^2 dx$ (4)

4.(d) Evaluate : $\int \frac{x dx}{a^2 + x^2}$ (8)

5.(a) Solve the following simultaneous linear equations:

$3x + 2y = 11$ (4)

$2x + 3y = 4$

5.(b) Prove that the points (2,-2), (-3,8) and (-1,4) are collinear. (8)

OR

5.(c) Show that the points A(1,7), B(4,2), C (-1,-1) and D(-4,4) are the vertices of a Square. (4)

5.(d) Find the Mean of the following frequency distribution :

Classes	0-8	8-16	16-24	24-32	32-40
Frequency	5	9	10	8	8

(8)

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 RARGARH/FULLIA/GUWAHATI/JODHPUR/SALEM/VARANASI/CHAMPA/KANNUR/KHTI,GADAG/SPKMIHT VENKATAGIRI
 DIPLOMA IN HANDLOOM & TEXTILE TECHNOLOGY
 FIRST YEAR (REGULAR & BACK PAPER) – APRIL/MAY-2016

1.2 – Applied Mathematics

Time: 3 Hrs

Max Marks: 80

PART A

I. Answer the following questions:

(2 x 10 = 20)

(a) Find the value of determinant $\begin{vmatrix} \cos\theta & \sin\theta \\ \sin\theta & \cos\theta \end{vmatrix}$

(b) If $\begin{bmatrix} 2x & y \\ 1 & 3 \end{bmatrix} - \begin{bmatrix} 4 & 2 \\ 0 & -1 \end{bmatrix} = \begin{bmatrix} 8 & 3 \\ 1 & 2 \end{bmatrix}$ find x and y.

(c) Find the value of $\frac{\cos 30^\circ + \sin 60^\circ}{1 + \cos 60^\circ + \sin 30^\circ}$

(d) Find the value of θ , $2 \sin 2\theta = \sqrt{3}$

(e) If $y = (x^2+5)^8$ find $\frac{dy}{dx}$.

(f) Differentiate: $\sqrt{\log x}$ with respect to x.

(g) Integrate: $\int e^{3x} dx$.

(h) Evaluate: $\int (x^2 + \sqrt{x})^2 dx$.

(i) Find the solution of equation $x + y = 3$ and $2x - y = 0$

(j) Find the median of the data 1, 5, 3, 2, 6, 7.

PART B

II. Answer the following questions.

a) If $A = \begin{bmatrix} 1 & 0 & -2 \\ 2 & 3 & -1 \end{bmatrix}$, $B = \begin{bmatrix} 4 & -1 & 3 \\ 0 & 2 & 1 \end{bmatrix}$ and $C = \begin{bmatrix} 2 & -3 & 0 \\ 1 & 4 & 5 \end{bmatrix}$ (4)

Then find $A - 3B + 2C$

b) Solve the following using Cramer's rule (8)

$$2x + y + 2z = 2$$

$$3x + 2y + z = 2$$

$$-x + y + 3z = 6$$

OR

c) Find AB and BA, where $A = \begin{bmatrix} 1 & 2 \\ 2 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 5 & -2 \\ -2 & 1 \end{bmatrix}$ (4)

d) Find the inverse of matrix, $\begin{bmatrix} 3 & -2 & 3 \\ 2 & 1 & -1 \\ 4 & -3 & 2 \end{bmatrix}$ (8)

III. a) If $16 \cot A = 12$, then find the value of $\frac{\sin A + \cos A}{\sin A - \cos A}$ (4)

b) Prove that, $\frac{\cos A - \sin A}{\cos A + \sin A} = \sec 2A - \tan 2A$ (8)

OR

c) If $(A+B) = 45^\circ$, Prove that $(1 + \tan A)(1 + \tan B) = 45^\circ$ (4)

d) Prove that, $\cot A - \operatorname{cosec} 2A = \cot 2A$ (8)

IV. a) If $y = \sqrt{x}(\sqrt{x} + 1)$ then find $\frac{dy}{dx}$ (4)

b) Differentiate, $\tan\left(\frac{\pi}{4} + \frac{x}{2}\right)$ with respect to x . (8)

OR

c) If $y = \sqrt{\sin \sqrt{x}}$ then find $\frac{dy}{dx}$. (4)

d) Differentiate, $\frac{e^x + \cos x}{1 - \sin x}$ with respect to x . (8)

V. a) Evaluate: $\int 5 \tan^2 x dx$ (4)

b) Evaluate: $\int_{-1}^2 (2x + 1)(x - 2) dx$ (8)

OR

c) Evaluate: $\int \frac{\cos x}{\sin^5 x} dx$ (4)

d) Evaluate: $\int x^2 \sin ax dx$ (8)

VI. a) Solve the following simultaneous linear equations. (4)

$$3x + 2y = 10$$

$$4x - 3y = 2$$

b) Show that the points $(3, 2)$, $(0, 5)$, $(-3, 2)$ and $(0, -1)$ are vertices of a square. (8)

OR

c) Prove that the points $(7, 2)$, $(1, -2)$ and $(-2, 4)$ are collinear. (4)

Handwritten calculation: $20 \left(\frac{20 - 14}{14} \right) \times 10$

d) Find the median of the following grouped frequency distribution. (8)

Marks	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
No. of students	6	8	14	16	4	2

Handwritten notes and calculations:

- *****
- $d + \left(\frac{h - CF}{CF} \right) \times h$
- $d + \left(\frac{\frac{h}{2} \times EF}{EF} \right) \times h$
- 2/13
- 13.45
- 50

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DIPLOMA IN HANDLOOM & TEXTILE TECHNOLOGY

FIRST SEMESTER (OLD SYLLABUS BACK PAPER) EXAMINATION – APRIL/MAY-2016

1.2 APPLIED MATHEMATICS

Time: 3 Hours

Max. Marks: 80

PART-A

2x10=20

Answer the following questions.

1. a) Find the value of determinant $\begin{vmatrix} 2 & -3 \\ 1 & -4 \end{vmatrix}$
- b) If $A = \begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 2 \\ -1 & -2 \end{bmatrix}$ then find AB
- c) Find the value of $\sin 60^\circ \cdot \cos 30^\circ + \cos 60^\circ \cdot \sin 30^\circ$
- d) Evaluate: $\frac{\cos 37^\circ}{\sin 53^\circ}$
- e) If $y = x^3 - 5x$ find $\frac{dy}{dx}$.
- f) Differentiate $(x-5)^7$ with respect to x .
- g) Integrate: $\int (x^6 + x^2 + 5x) dx$
- h) Evaluate: $\int \frac{1}{x\sqrt{x}} dx$.
- i) Let A (3,-2) and B (6,2) then find |AB|.
- j) Find the mode of the data
4, 5, 6, 7, 6, 7, 6, 5.

PART B

2. Answer the following equations:

a) Evaluate: $\begin{vmatrix} \sin^2 \theta & \cos^2 \theta & 1 \\ \cos^2 \theta & \sin^2 \theta & 1 \\ -10 & 12 & 2 \end{vmatrix}$

b) Solve the following equations using cramer's rule.

$$\begin{aligned} x + 2y + 3z &= 6 \\ 2x + 4y + z &= 7 \\ 3x + 2y + 9z &= 14 \end{aligned}$$

OR

c) If $A = \begin{bmatrix} 1 & 2 & 3 \\ 6 & 7 & 8 \\ 6 & -3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 & 3 \\ 3 & 4 & 2 \\ 5 & 6 & 1 \end{bmatrix}$ then verify that $[AB]^T = B^T A^T$

d) Find the inverse of matrix $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 1 & 1 \\ 1 & 1 & 2 \end{bmatrix}$

3. a) Prove that $\frac{\sin \theta}{1 - \cos \theta} = \operatorname{cosec} \theta + \cot \theta$

b) Prove that $\sqrt{\frac{1 - \sin \theta}{1 + \sin \theta}} = \sec \theta - \tan \theta$

OR

c) Show that $\frac{\cot A - \tan A}{\cot A + \tan A} = \cos 2A$

d) If $A + B + C = 180^\circ$ prove that
 $\cot A \cdot \cot B + \cot B \cdot \cot C + \cot C \cdot \cot A = 1$

4
8
4
8
4

(8)

900
53
27

4. a) If $y = \sqrt{\sec(2x+1)}$ then find $\frac{dy}{dx}$. 4

b) Differentiate $\frac{e^x + e^{-x}}{x^2 + 1}$ with respect to x . 8

OR (D)

c) If $y = \ln(e^{nx} + e^{-nx})$ find $\frac{dy}{dx}$ 4

d) Differentiate $\frac{e^{3x^2}}{\ln \sin x}$ with respect to x . 8

OR

5. a) Evaluate $\int 6x^3(x+5^2) dx$ 4

b) Evaluate $\int^2 (4x^3 - 5x^2 + 6x) dx$ 8

OR (D)

c) Evaluate $\int \sec^2 4x dx$ 4

d) Evaluate $\int x^2 e^{ax} dx$ 8

6. a) Solve the following simultaneous linear equations. 4

$$3x - 7y = -10$$

$$-2x + y = 3$$

b) Show that the points $(0, -1)$, $(-2, 3)$, $(6, 7)$ and $(8, 3)$ are vertices of a rectangle. 8

OR

c) If the distance between the points $(3, a)$ and $(6, 1)$ is 5, find the value of a . 4

d) Find the mean of the following grouped frequency distribution. 8

Marks	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50
No. of Students	6	12	18	9	5

 8

$$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$\sqrt{(6 - 3)^2 + (1 - a)^2}$$

$$3^2 + 1^2 - 2ab + a^2$$

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DIPLOMA IN HANDLOOM & TEXTILE TECHNOLOGY
FIRST YEAR (2014 REGULATION) EXAMINATION - NOV/DEC -2016

1.2 APPLIED MATHEMATICS

Time : 3 Hours

Max. Marks : 80

PART - A

Q.1. Answer the following questions

02x10=20

- a. If $\begin{vmatrix} x & 2 \\ 18 & x \end{vmatrix} = \begin{vmatrix} 6 & 2 \\ 18 & 6 \end{vmatrix}$, then find x.
- b. Find the value of x, y and z from the following equations.
 $\begin{bmatrix} x+y & 2 \\ 5+z & xy \end{bmatrix} = \begin{bmatrix} 6 & 2 \\ 5 & 8 \end{bmatrix}$
- c. Find the value of $\frac{\tan 25^\circ + \tan 20^\circ}{1 - \tan 25^\circ \cdot \tan 20^\circ}$
- d. Express in the form of a product : $\sin 4\theta + \sin 2\theta$
- e. Find $\frac{dy}{dx}$, if $y = (9\sqrt{x} + x^2)$
- f. Differentiate : $\frac{e^x}{\sin x}$ with respect to x.
- g. Integrate : $\int (\sin x + \cos x) dx$
- h. Evaluate: $\int_0^{\pi/4} \sec^2 x dx$
- i. Find the solution of the equation : $x + 2y = 4$ and $x - 2y = 0$
- j. Find the mean of the first six prime numbers

PART - B

Q.2. Answer following questions.

- a. If $A = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 0 & 2 \\ 1 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} 0 & 0 \\ -1 & 2 \end{bmatrix}$ 04
Verify that $A + (B+C) = (A+B) + C$
 - b. Solve the following equations by using CRAMER'S Rule 08
 $7x + 3y - 4z = 6$
 $2x - 5y + 6z = 3$
 $x + y + 2z = 4$
- OR
- c. Find AB and BA, Where 04
 $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ 3 & 4 \\ -1 & 1 \end{bmatrix}$
 - d. Solve the following equations by using matrix inversion method 08
 $2x - 5y + 3z = -19$
 $7x + 2y + 6z = 1$
 $4x + 5y + 4z = 11$

Q.3.

a. Prove that

$$\frac{\sin(A-B)}{\cos A \cos B} + \frac{\sin(B-C)}{\cos B \cos C} + \frac{\sin(C-A)}{\cos C \cos A} = 0$$

b. Prove that

$$\cos 20^\circ \cos 40^\circ \cos 60^\circ \cos 80^\circ = \frac{1}{16}$$

OR

c. Prove that

$$\frac{\sin \theta + \sin 2\theta + \sin 3\theta}{\cos \theta + \cos 2\theta + \cos 3\theta} = \tan 2\theta$$

d. If $A + B + C = 180^\circ$, then prove that

$$\sin A + \sin B - \sin C = 4 \sin \frac{A}{2} \sin \frac{B}{2} \cos \frac{C}{2}$$

Q.4.

a. By using product rule, find $\frac{dy}{dx}$,

$$\text{if } y = (1 + \sqrt{x} + x)(2 - x^2 + 7x)$$

b. By using quotient rule, find $\frac{dy}{dx}$,

$$\text{if } y = \frac{\sqrt{x} + \log x}{1+x^3}$$

OR

c. Differentiate : $xe^x \cos x$ with respect to x

d. By using quotient rule, find $\frac{dy}{dx}$,

$$\text{if } y = \frac{x \cos x}{(2x+1) \sin x}$$

Q.5.

a. Evaluate :

$$\int (x + \frac{1}{\sqrt{x}}) (\sqrt{x} - \frac{1}{\sqrt{x}}) dx$$

b. Evaluate :

$$\int \frac{2x+3}{x^2+x+1} dx$$

OR

c. Evaluate :

$$\int \sin 9x \cdot \sin 11x dx$$

d. Evaluate :

$$\int \frac{dx}{3x^2-4x-5}$$

Q.6.

a. Solve the following simultaneous linear equations

$$5x - 3y = -30$$

$$2x + 4y = 70$$

b. Prove that the points A (3, 4), B (9, 8), C (5, 2) and D (-1, -2) are vertices of a Rhombus.

OR

c. Prove that the points A (1, 1), B (-2, 7) and C (3, -3) are collinear.

d. Find the missing frequency in the following distribution if N is 100 and median is 32.

C.I	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	Total
f	10	f_1	25	30	f_2	10	100

1.2 APPLIED MATHEMATICS

Time: 3 Hours

Max. Marks: 80

PART - A

Q.1. Answer the following questions

02x10=20

a. In the determinant $\begin{vmatrix} 4 & 7 & 6 \\ -2 & 0 & -1 \\ 1 & 4 & 2 \end{vmatrix}$, what is the cofactor of 0?

b. Find the value of x, y, z and t from the following equations.

$$\begin{bmatrix} x & 3x - y \\ 2x - z & 3y - t \end{bmatrix} = \begin{bmatrix} 3 & 2 \\ 5 & 7 \end{bmatrix}$$

c. Find the value of : $\frac{1 - \tan^2 15^\circ}{1 + \tan^2 15^\circ}$

d. Express the sum (or) difference of the given expressions : $\cos 7x \cos 5x$

e. Find $\frac{dy}{dx}$, if $y = \frac{1}{x^3} - \frac{1}{x}$

f. Find $\frac{dy}{dx}$, if $y = e^x \sin x$

g. Integrate : $\int (\sec 2x \tan 2x) dx$

h. Evaluate: $\int_1^2 (4x^3 - 5x^2) dx$

i. Find the solution of the equations : $2x + y = 4$ and $3x - y = 0$

j. Find the median of the data : 4, 5, 6, 7, 6, 2, 3, 8

PART - B

Q.2. Answer following questions.

a. For what value of 'p' is the matrix $\begin{bmatrix} 4 & -3 & -1 \\ 2 & 4 & 6 \\ 3 & p & -4 \end{bmatrix}$ singular. 04

b. Prove that

$$\begin{vmatrix} a^2 + 1 & ab & ac \\ ba & b^2 + 1 & bc \\ ca & cb & c^2 + 1 \end{vmatrix} = 1 + a^2 + b^2 + c^2 \quad 08$$

OR

c. Find the value of $\begin{bmatrix} x & y & z \end{bmatrix} \begin{bmatrix} a & h & g \\ h & b & f \\ g & f & c \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix}$ 04

d. Solve the following equations by using CRAMER'S Rule 08

$$\begin{aligned} x + 2y + 3z &= 6 \\ 2x + 4y + z &= 7 \\ 3x + 2y + 9z &= 14 \end{aligned}$$

- Q.3. a. If $A + B = 45^\circ$, then prove that $(\cot A - 1)(\cot B - 1) = 2$ 04
 b. Prove that $\sin 20^\circ \sin 40^\circ \sin 60^\circ \sin 80^\circ = \frac{3}{16}$ 08

OR

- c. Prove that $\frac{1 - \cos 3\theta}{1 - \cos \theta} = (1 + 2 \cos \theta)^2$ 04
 d. If $A + B + C = 180^\circ$, then prove that $\cos^2 A + \cos^2 B + \cos^2 C = 1 - 2 \sin A \sin B \sin C$ 08

- Q.4. a. By using product rule, find $\frac{dy}{dx}$, if $y = (2x^2 - 5)(\sqrt{x} + 1) \log x$ 04
 b. By using quotient rule, find $\frac{dy}{dx}$, if $y = \frac{x \cos x}{(2x+1) \sin x}$ 08

OR

- c. Find $\frac{dy}{dx}$, if $y = e^{3x} \log x \sin 3x$ 04
 d. Differentiate $\frac{e^{x^2} \log(\sec x)}{\tan x}$ w.r. to 'x'. 08

- Q.5. a. Evaluate:
 $\int \frac{\sin x}{1 - \sin x} dx$ 04

- b. Evaluate:
 $\int \frac{dx}{x^2 - 3x - 4}$ 08

OR

- c. Evaluate:
 $\int e^{2x} \sin x dx$ 04

- d. Evaluate:
 $\int \frac{4x-3}{x^2+3x+8} dx$ 08

- Q.6. a. Solve the following simultaneous linear equations 04
 $5x + 7y = 30$
 $-3x + 10y = -18$

- b. Prove that the points A (1, 2), B (5, 4), C (3, 8) and D (-1, 6) are the vertices of a square 08

OR

- c. Prove that the points A (2, 0), B (11, 6) and C (-4, -4) are collinear. 04

- d. The frequency distribution given below shows the heights of 60 students of a class.
 If mean of the data is 157, Find the missing frequencies x and y 08

Height(in cm)	144-148	148-152	152-156	156-160	160-164	164-168	Total
Number of students	x	8	15	y	16	6	60

INDIAN INSTITUTE OF HANDLOOM TECHNOLOGY

BARGARI/GUWAHATI/FULIA/JODHPUR/SALEM/VARANASI/CHAMPA/KANNUR/KHTI GADAG/SPKM

VENKATAGIRI

DIPLOMA IN HANDLOOM & TEXTILE TECHNOLOGY

ANNUAL EXAMINATION APRIL/MAY-2017 (2014-REGULATION)

Time : 3 Hours
FIRST YEAR

1.2 APPLIED MATHEMATICS

Max. Marks : 80

Part - A

10 x 2=20 Marks

- 1 Solve $\begin{vmatrix} 4 & 5 \\ 3 & x \end{vmatrix} = 1$
- 2 If $A = \begin{bmatrix} 2 & 3 & 1 \\ 0 & -1 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 & -1 \\ 0 & 1 & 3 \end{bmatrix}$ Find $A - 2B$
- 3 Find the value of $\frac{\cos 30^\circ + \sin 60^\circ}{1 + \cos 60^\circ + \sin 30^\circ}$
- 4 Find the value of $\frac{\tan 4A - \tan 3A}{1 + \tan 4A \tan 3A}$
- 5 If $y = 5 \sin x - e^x + \log x$, find $\frac{dy}{dx}$
- 6 Differentiate $\log(x^3 + 1)$ with respect to x
- 7 Evaluate : $\int \sec 2x \tan 2x dx$
- 8 Integrate : $\int (x^6 + x^2 + 2) dx$
- 9 Find the Median of the observation 4, 7, 3, 6, 8, 5, 9
- 10 Let $A(3, -2)$ and $B(6, 2)$ then find $|AB|$

PART-B

12 x 5= 60 Marks

- 11 A) Show that $\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^3 & b^3 & c^3 \end{vmatrix} = (a-b)(b-c)(a-b)(a+b+c)$ (4)
- B) Solve the following using Cramer's rule : $x + y + z = 3$, $2x - y + z = 2$, $3x + 2y - 2z = 3$ (8)

(Or)

- C) If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, Prove that $A^2 - 4A - 5I = 0$ (4)
 - D) Find the inverse of matrix $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 1 & 4 \\ 1 & 0 & 2 \end{bmatrix}$ (8)
- 12 A) Prove that $\sin(45 + A) \sin(45 - A) = \frac{\cos 2A}{2}$ (4)

- B) If $A + B + C = 180^\circ$ Prove that $\cot A \cdot \cot B + \cot B \cdot \cot C + \cot C \cdot \cot A = 1$ (8)

(Or)

- C) If $(A + B) = 45^\circ$, Prove that $(1 + \tan A)(1 + \tan B) = 45^\circ$ (4)

- D) Prove that $\sin 20 \sin 40 \sin 60 \sin 80 = \frac{3}{16}$ (8)

- 13 A) Differentiate $y = e^x \log x$ with respect to x (4)

- B) Find $\frac{dy}{dx}$, when $y = \frac{\sqrt{x}-1}{\sqrt{x}+1}$ with respect to x (8)

(Or)

- C) If $y = \frac{1}{1+x^2-2x}$ then find $\frac{dy}{dx}$ (4)

- D) Differentiate $\frac{e^x + \cos x}{1 - \sin x}$ with respect to x (8)

- 14 A) Evaluate $\int (4x^3 - 5x^2 + 6x) dx$ (4)

- B) Evaluate $\int \frac{\cos x}{3+5 \sin x} dx$ (8)

(Or)

- C) Evaluate : $\int \frac{1}{4x^2-9} dx$ (4)

- D) Evaluate : $\int \frac{x+2}{x^2+4x-3} dx$ (8)

- 15 A) Solve the following simultaneous linear equations (4)

$$8x + 5y = 9, 3x + 2y = 4$$

- B) Show that the points (2, 2), (8, 4), (5, 7) and (-1, 1) are the vertices of a rectangle. (8)

(Or)

- C) Find the value of 'a' So that the points (1, 4), (2, 7), (3, a) are collinear (4)

- D) Find the mean of the following grouped frequency distribution : (8)

Marks	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100
Number of Students	7	11	10	9	13

INDIAN INSTITUTE OF HANDLOOM TECHNOLOGY

BARGARH/GUWAHATI/FULIA/JODHPUR/SALEM/VARANASI/CHAMPA/KANNUR/KHTI-GADG/SPKM-IIHT-VENKATAGIRI

DIPLOMA IN HANDLOOM AND TEXTILE TECHNOLOGY

ANNUAL EXAMINATION - April / May - 2018

(Regulation 2014)

Year / Semester: 1st Year

Time: 3 Hours

Subject Code & Name: 1.2 & Applied Mathematics

Max. Marks: 80

PART - A

(2 X 10 = 20)

Answer the following questions:

1. Find the value of $x \begin{vmatrix} 2 & 4 \\ -1 & x \end{vmatrix} = 0$
2. If $A = \begin{bmatrix} 1 & -1 \\ 2 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 3 \\ -4 & 5 \end{bmatrix}$ then find AB
3. Find the value of $\frac{\tan 4A - \tan 3A}{1 + \tan 4A \tan 3A}$
4. Find the value of $3 \sin 10^\circ - 4 \sin 10^\circ$
5. If $y = x^4 + 1$ find $\frac{dy}{dx}$
6. Differentiate: if $y = \sqrt{\log x}$ with respect to x
7. Evaluate: $\int \cos 2x \, dx$
8. Evaluate: $\int \frac{1}{x^3} \, dx$
9. If the arithmetic mean of data 7, 8, x , 11, 14 is 9 then find the value of x
10. Find the median of data 4, 8, 1, 5, 6, 3, 7, 2, 10

PART - B

5 X (4 + 8) = 60

Answer the following questions:

11. (a) Show that $\begin{vmatrix} 1 & a+b & a^2+b^2 \\ 1 & b+c & b^2+c^2 \\ 1 & c+a & c^2+a^2 \end{vmatrix} = (a-b)(b-c)(c-a).$ (4)

(b) Find the inverse of the matrix: $\begin{bmatrix} 1 & 1 & -1 \\ 2 & 1 & 0 \\ -1 & 2 & 3 \end{bmatrix}$ (8)

(OR)

(c) If $A = \begin{bmatrix} 3 & -2 \\ 2 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $C = \begin{bmatrix} 2 & 3 \\ 4 & -1 \end{bmatrix}$ then Show that $A(BC) = (AB)C.$ (4)

(d) Solve the equations by using Cramer's Rule: (8)

$$4x + y - 3z = 3, 2x + 3y - 2z = 6, x + y + z = 4$$

12. (a) Prove that : $\frac{\cos(A+B)}{\cos A \cos B} = 1 - \tan A \tan B$ (4)

(b) If $A + B = 45^\circ$, Prove that $(1 + \tan A)(1 + \tan B) = 2$,

Hence find the value of $\tan(22\frac{1}{2}^\circ)$. (8)

(OR)

(c) Find the value of $\sin 40^\circ \cos 10^\circ - \cos 40^\circ \sin 10^\circ$ (4)

(d) If $A + B + C = 180^\circ$ Prove that $\cot A \cot B + \cot B \cot C + \cot C \cot A = 1$ (8)

13. (a) If $y = 7 \cos x + 9 \log x - 3x^2 + \frac{1}{x^2} + 1$ then find $\frac{dy}{dx}$ (4)

(b) Find $\frac{dy}{dx}$ if $y = (x^2 - 4)(2x^2 - 7)$ (8)

(OR)

(c) Differentiate $y = 8x^3 - 5x^2 + 6x - 7$ with respect to x . (4)

(d) Find the differentiation of the function $\sqrt{\frac{1+x}{1-x}}$ with respect to x . (8)

14. (a) Evaluate : $\int \frac{5}{x^4} dx$ (4)

(b) Evaluate : $\int \frac{1}{1+\sin x} dx$ (8)

(OR)

(c) Evaluate : $\int x(x-1)^2 dx$ (4)

(d) Evaluate : $\int \frac{\tan^{-1} x}{\cos^2 x} dx$ (8)

15. (a) Solve the following simultaneous equations : $8x + 5y = 9$, $3x + 2y = 4$ (4)

(b) Verify that the points $(3,0)$, $(4,5)$, $(-1, 4)$ and $(-2,-1)$ are the vertices of rhombus (8)

(OR)

(c) Verify that the points $(2,-2)$, $(-3, 8)$ and $(-1, 4)$ are collinear. (4)

(d) Find the mean of the following grouped frequency distributions: (8)

Marks	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100
Number of Students	5	8	6	15	5

GWA - 3

INDIAN INSTITUTE OF HANDLOOM TECHNOLOGY

BARGARH/GUWAHATI/TELETA/JODHPUR/SALEM/VARANASI/CHAMPA/KANSUR/KHITLA/ADLAG/SHYAM-SHRI/AYENKAT/AGRI

DIPLOMA IN HANDLOOM AND TEXTILE TECHNOLOGY

SEMESTER EXAMINATION - April / May - 2018

(Regulation 2011)

Year / Semester: I Semester

Time: 3 Hours

Subject Code & Name: 1.2 & Applied Mathematics

Max. Marks: 80

PART - A

2 X 10 = 20

Answer the following questions:

1. Solve $\begin{vmatrix} 1 & 2 \\ 3 & x \end{vmatrix} = 1$
2. If $A = \begin{bmatrix} 3 & 1 \\ 4 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 2 & -2 \\ 1 & 5 \end{bmatrix}$ Find $A - 2B$
3. Find the value of $1 - 2 \sin^2(22 \frac{1}{2})$
4. Find the value of $\sin 75^\circ$
5. If $y = x^4 - 5x$, find $\frac{dy}{dx}$
6. Find $\frac{dy}{dx}$ if $y = \sqrt{2x + 1}$
7. Evaluate: $\int 5x^4 dx$
8. Integrate: $\int \cos 4x dx$
9. Find the Mode of the observation 5, 3, 4, 8, 4, 3, 4, 8, 2, 6
10. If A (3, -2) and B (6, 2) then find distance between A and B

PART - B

5 X (4 + 8) = 60

Answer the following questions:

11. (a) Show that $\begin{vmatrix} 1 & 1 & 1 \\ x & y & z \\ x^2 & y^2 & z^2 \end{vmatrix} = (x - y)(y - z)(z - x)$ (4)
- (b) Solve the following using Cramer's rule: $x + y + z = 3$, $2x - y + z = 2$, $3x + 2y - 2z = 3$ (8)
- (OR)
- (c) If $A = \begin{bmatrix} 2 & 3 \\ 0 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 3 & 4 \\ 2 & 1 \end{bmatrix}$, Prove that $(A + B)^T = A^T + B^T$ (4)
- (d) Find the inverse of matrix $\begin{bmatrix} 2 & -5 & 3 \\ 7 & 2 & 6 \\ 4 & 5 & 4 \end{bmatrix}$ (8)

12. (a) Find the value of $\cos 75^\circ \cos 15^\circ - \sin 75^\circ \sin 15^\circ$ (4)

(b) If $A + B + C = 180^\circ$ Prove that $\cot A \cot B + \cot B \cot C + \cot C \cot A = 1$ (8)

(OR)

(c) Show that $\frac{\sin 3A - \sin A}{\cos A - \cos 3A} = \cot 2A$ (4)

(d) Prove that $\cos 3x = 4 \cos^3 x - 3 \cos x$ (8)

13. (a) Differentiate $y = e^x \log x$ with respect to x (4)

(b) Find $\frac{dy}{dx}$, when $y = \frac{\sqrt{x} - 1}{\sqrt{x} + 1}$ with respect to x (8)

(OR)

(c) If $y = \frac{1}{1 + x^2 - 2x}$ then find $\frac{dy}{dx}$ (4)

(d) Differentiate, $\frac{e^x + \cos x}{1 - \sin x}$ with respect to x (8)

14. (a) Evaluate $\int (e^x + 5) dx$ (4)

(b) Evaluate: $\int \sqrt{1 + \sin 2x} dx$ (8)

(OR)

(c) Evaluate: $\int \frac{1}{4x^2 - 9} dx$ (4)

(d) Evaluate $\int \frac{\cos x}{3 + 5 \sin x} dx$ (8)

15. (a) Solve the following simultaneous equations : $8x + 6y = 56, 8x - 6y = 8$ (4)

(b) Show that the points $(2, -2), (8, 4), (5, 7)$ and $(-1, 1)$ are vertices of a rectangle. (8)

(OR)

(c) Find the value of a so that the points $(-1, 4), (2, 7), (3, a)$ are collinear. (4)

(d) Find the mean of the following grouped frequency distributions: (8)

Marks	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50
Number of Students	7	10	15	8	10

INDIAN INSTITUTE OF HANDLOOM TECHNOLOGY

BARGARH/GUWAHATI/FULIA/JODHPUR/SALEM/VARANASI/CHAMPA/KANNUR/KHTI-GADAG/SPKM IIHT VENKATAGIRI

DIPLOMA IN HANDLOOM AND TEXTILE TECHNOLOGY (Regulation – 2014)
SEMESTER (REGULAR & BACK PAPER) EXAMINATION-NOV./DEC.- 2018

Year / Semester: I Year

Time: 3 Hours

Subject Code & Name: 1.2 APPLIED MATHEMATICS

Max.Marks:80

PART – A

Answer the following questions.

(02x10=20)

Q. (1) Find the value of determinant $\begin{vmatrix} 1 & 3 \\ 2 & 1 \end{vmatrix}$

Q. (2) If $A = \begin{bmatrix} 1 & 5 \\ 2 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & -2 \\ -2 & 1 \end{bmatrix}$, then find AB.

Q. (3) Find the value of $\sin 75^\circ$.

Q. (4) Find the value of $\frac{\sin 41^\circ}{\cos 49^\circ}$

Q. (5) If $y = x^2 + 2x$, Find $\frac{dy}{dx}$

Q. (6) Find $\frac{dy}{dx}$, if $y = (x^3 + 7)^3$

Q. (7) Evaluate : $\int (x^5 + x^2 + 2) dx$

Q. (8) Evaluate : $\int \sin 3x dx$

Q. (9) Find the distance between two points P(3, -1) and Q(-1, 1).

Q. (10) Find the Mode of the data

4, 5, 6, 7, 6, 7, 6, 5

PART – B

Q. (11)

a) Find the value of determinant $\begin{vmatrix} 1 & 1 & 2 \\ 3 & -4 & 6 \\ 1 & -6 & 2 \end{vmatrix}$ (4)

b) Solve the equations by using Cramer's rule. (8)
 $2x + y + 2z = 2, 3x + 2y + z = 2, -x + y + 3z = 6$

OR

c) Find x and y where, (4)
 $\begin{bmatrix} 1 & 3 \\ 2 & -1 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 4 \\ 1 \end{bmatrix}$

d) Find the inverse of matrix $\begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$ (8)

Contd....P/2

P/2

Q. (12)

a) Prove that, $\frac{\cos \theta}{1 + \sin \theta} = \frac{1 - \sin \theta}{\cos \theta}$ (4)

b) Prove that, $\frac{1 - \sin \theta}{1 + \sin \theta} = (\sec \theta - \tan \theta)^2$ (8)

OR

c) If $\sin \theta = \frac{3}{5}$, Find the value of $\cos \theta$ and $\tan \theta$ (4)

d) Prove that, $\cot A - \operatorname{cosec} 2A = \cot 2A$ (8)

Q. (13)

a) If $y = ax^2 + b \tan x + 8$ then find $\frac{dy}{dx}$. (4)

b) Differentiate, $x \sin x - \frac{e^x}{1+x^2}$ with respect to x (8)

OR

c) If $y = \sqrt{ax^2 + bx + c}$, then find $\frac{dy}{dx}$ (4)

d) Differentiate, $\ln \tan \left(\frac{\pi}{4} + \frac{x}{2} \right)$ with respect to x (8)

Q. (14)

a) Evaluate: $\int (4x^3 + 3x^2 + x + 5) dx$ (4)

b) Evaluate: $\int x^2 e^x dx$ (8)

OR

c) Evaluate: $\int (x + 3)(x + 2) dx$ (4)

d) Evaluate: $\int_0^{\frac{\pi}{2}} (3x^2 + 2x + \cos x) dx$ (8)

Q. (15)

a) Solve the following simultaneous equation (4)

$$3x - 5y + 1 = 0$$

$$x - y + 1 = 0$$

b) Show that the points (0, -1), (-2, 3), (6, 7) and (8, 3) are vertices of a rectangle. (8)

OR

c) If the distance between the points (3, a) and (4, 1) is $\sqrt{10}$, find the value of a. (4)

d) Find the mean of the following grouped frequency distribution. (8)

Classes	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100
Frequency	15	18	21	29	17

INDIAN INSTITUTE OF HANDLOOM TECHNOLOGY
 BARGARH/FULIA/GUWAHATI/JODHPUR/SALEM/VARANASI/CHAMPA/KHTI-GADAG/SPKM IIHT VENKATGIRI
DIPLOMA IN HANDLOOM & TEXTILE TECHNOLOGY (Regulation-2014)
SEMESTER (REGULAR & BACK PAPER) EXAMINATION - APRIL/MAY-2019

YEAR/SEMESTER: I Year

Subject Code & Name: 1.2 APPLIED MATHEMATICS

TIME: 3 HOURS

MAX. MARKS: 80

PART - A

Answer the following questions

02x10 = 20

- 1) If $\begin{vmatrix} x & 2 \\ 12 & 2 \end{vmatrix} = \begin{vmatrix} 6 & 2 \\ 1 & 6 \end{vmatrix}$, then find x.
- 2) Find the value of x, y, t and z from the following equations.

$$\begin{bmatrix} x-1 & z \\ y+2 & t-5 \end{bmatrix} = \begin{bmatrix} 6 & 2 \\ 5 & 8 \end{bmatrix}$$
- 3) Find the value of $\frac{\tan 25^\circ + \tan 20^\circ}{1 - \tan 25^\circ \tan 20^\circ}$.
- 4) Express in the form of a product: $\sin 6\theta - \sin 4\theta$
- 5) Find $\frac{dy}{dx}$, if $y = (9x^2 + x + 4)$
- 6) Differentiate: $y = \frac{x}{1-x}$ with respect to x.
- 7) Integrate: $\int (\sin x + \tan x) dx$
- 8) Evaluate: $\int_0^{\pi/4} \cos x dx$
- 9) Find the solution of the equation: $x + 2y = 2$ and $x - 2y = 1$
- 10) Find the mean of the first six odd natural numbers.

PART - B

Answer following questions.

- 11) A. Find the value of the determinant

04

$$\begin{vmatrix} 3 & -1 & 2 \\ 2 & 5 & -1 \\ 0 & 4 & 5 \end{vmatrix}$$

- B. Solve the following equations by using CRAMER'S Rule

$$\begin{aligned} 3x + y - z &= 2 \\ 2x + 3y &= 4 \\ x + y + 5z &= 7 \end{aligned}$$

08

OR

- C. Find AB, Where

04

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & -1 \end{bmatrix} \text{ and } B = \begin{bmatrix} 1 & 2 \\ 3 & 4 \\ -1 & 1 \end{bmatrix}$$

- D Find the adjoint of the matrix :

$$\begin{bmatrix} 2 & 3 & 4 \\ 4 & 3 & 1 \\ 1 & 2 & 4 \end{bmatrix}$$

08

P.T.O.

- 12) A. Prove that $\frac{\cos(A+B)}{\cos A \cos B} = 1 - \tan A \tan B$ 04
- B. Find the value of $\tan 75$ and hence prove that $\tan 75 + \cot 75 = 4$ 08

OR

- C. Prove that $\frac{\sin 3A - \sin A}{\cos A - \cos 3A} = \cot 2A$ 04
- D. If $A + B + C = 180^\circ$, then prove that $\cos A + \cos B + \cos C = 1 + 4 \sin \frac{A}{2} \sin \frac{B}{2} \sin \frac{C}{2}$ 08

- 13) A. Find $\frac{dy}{dx}$, if $y = 4 \operatorname{cosec} x - 5 \cot x + 7 \log x - 9$ 04

- B. By using quotient rule, find $\frac{dy}{dx}$,
if $y = \frac{x^2 + 3}{x \cos x}$ 08

OR

- C. Differentiate: $\log(a x^2 + b x + c)$ with respect to x 04

- D. Find $\frac{dy}{dx}$, if $y = \log\left(\frac{x^2 + x + 1}{x^2 - x + 1}\right)$ 08

- 14) A. Evaluate: 04

$$\int_0^1 (x^2 + 2x + 3) dx$$

- B. Evaluate: $\int x^3 \log x dx$ 08

OR

- C. Evaluate: $\int \frac{1}{x^2 - 3} dx$ 04

- D. Evaluate: $\int \frac{dx}{2x^2 - 2x + 3}$ 08

- 15) A. Solve the following simultaneous linear equations 04

$$2x + y = 7$$

$$4x - 3y + 1 = 0$$

- B. Prove that the points A (3, 5), B (6, 0), C (1, -3) and D (-2, 2) are the vertices of a square 08

OR

- C. Find the value of x for which the distance between the points P(x, -1) and Q(5, 3) is 5 units 04

- D. Find the missing frequency in the following distribution if sum of frequencies is 100 and mean is 42. 08

C.I	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80
f	7	10	x	13	y	10	14	9

INDIAN INSTITUTE OF HANDLOOM TECHNOLOGY

BARGARH/GUWAHATI/FULIA/JODHPUR/SALEM/VARANASI/CHAMPA/KANNUR/KHITI-GADAG/SPKM IIHT VENKATAGIRI

DIPLOMA IN HANDLOOM & TEXTILE TECHNOLOGY (REGULATION - 2014)

ANNUAL / SEMESTER EXAMINATION - NOV/DEC -2019

Year/Semester: I Year Back Paper

Time: 3Hours

Subject Code & Name: 1.2 APPLIED MATHEMATICS

Max. Marks: 80

PART-A

Answer the following questions (02x10=20)

1. Solve: $\begin{vmatrix} 4 & 5 \\ 3 & x \end{vmatrix} = 1$

2. If $A = \begin{pmatrix} 2 & 3 & 0 \\ 5 & 2 & -1 \end{pmatrix}$, $B = \begin{pmatrix} 3 & -1 & 4 \\ 2 & 6 & 7 \end{pmatrix}$. Find $3A - 2B$.

3. Find the value of $\sin 60^\circ \cos 25^\circ + \cos 65^\circ \sin 25^\circ$.

4. Find $2 \sin 15^\circ \cos 15^\circ$.

5. Find $\frac{dy}{dx}$ if $y = e^x + \sin x$.

6. Find $\frac{dy}{dx}$ if $y = \log(\sec x)$.

7. Evaluate: $\int \sqrt{x} dx$.

8. Evaluate: $\int \cos(2-7x) dx$.

9. Find the distance between the two points if A(3,4) and B(-2,1)

10. Find the median of the observation 4,7,3,6,8,5,9

PART-B

Answer the following questions(5X12=60 MARKS)

11. A) Find the value of the determinant $\begin{vmatrix} 16 & 19 & 13 \\ 15 & 18 & 12 \\ 14 & 17 & 11 \end{vmatrix}$ (4)

B) Solve the following using cramer's rule $3x + y - z = 2$, $2x - y + 2z = 6$, $2x + y - 2z = -2$ (8)

(OR)

C) If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ Prove that $A^2 - 4A - 5I = 0$ (4)

D) Find the inverse of the matrix $A = \begin{bmatrix} 1 & 1 & -1 \\ 2 & 1 & 0 \\ -1 & 2 & 3 \end{bmatrix}$. (8)

12. A) Prove that $\cos 20^\circ \cos 40^\circ \cos 80^\circ = \frac{1}{8}$. (4)

B) If $A+B=45^\circ$, prove that $(1+\tan A)(1+\tan B)=2$. Hence find the value of $\tan(22\frac{1}{2}^\circ)^2$. (8)

(OR)

C) Prove that $\cot A - \tan A = 2 \cot 2A$. (4)

D) If $A+B+C=180^\circ$, Prove that $\cot A \cot B + \cot B \cot C + \cot C \cot A = 1$. (8)

13. A) Differentiate $y = e^x \tan x$ with respect to x . (4)

B) Differentiate $\frac{e^x + \cos x}{1 - \sin x}$ with respect to x . (8)

(OR)

C) Find $\frac{dy}{dx}$, if $y = (4x^2 - 1)(2x + 3)$. (4)

D) Differentiate $\frac{\log x - x^2}{\log x + x^2}$ with respect to x . (8)

14. A) Evaluate $\int (4x^3 - 5x^2 + 6x) dx$. (4)

B) Evaluate $\int \frac{2x+1}{x^2+x+5} dx$. (8)

(OR)

C) Evaluate $\int x^2 e^{mx} dx$. (4)

D) Evaluate $\int_0^{\frac{\pi}{2}} (3x^2 + 2x + \cos x) dx$. (8)

15. A) Solve the following simultaneous linear equation $8x + 5y = 9$, $3x + 2y = 4$. (4)

B) Show that the points $(0,-1), (-2,3), (6,7)$ and $(8,3)$ are vertices of a rectangle. (8)

(OR)

C) Verify that the points $(2,-2), (-3,8)$ and $(-1,4)$ are collinear. (4)

D) Find the mean of the following distributions (8)

CI	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	1	7	24	36	25	6	1
