BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – B.Sc.(Ag)-Hons-2024
Course Name – Elementary Mathematics
Course Code - RC-BAG102-A
(Semester I)

Full Marks : 50 **Time : 2:0 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A
(Multiple Choice Type Question) 1 x 20=20

1. *Choose the correct alternative from the following :*

(i) Identify the value of x so that the points (1,2), (2,4) and (x,6) are collinear.

a) 3 b) 4

c) 0 d) None of these

(ii) Select the correct option: the slope and intercept on y axis in the straight line $y + x = 0$ is,

a) 1,0 b) -1,1

c) -1,0 d) 2,1

(iii) Identify the correct option: the slope and inclination of the straight line joining (0,0) and$(\sqrt{3}, 1)$ are, respectively

a) $\sqrt{3}, 30^0$ b) $\frac{1}{\sqrt{3}}, 30^0$

c) $\frac{1}{\sqrt{3}}, 60^0$ d) $3, 30^0$

(iv) Identify the correct option: the x and y intercept of the straight line $3x + 4y = 12$ are,

a) 3,3 b) 4,5

c) 4,3 d) None of these

(v) Identify the correct option: the x and y intercept of the straight line $3x + y = 0$ are,

a) 3, 1
b) 5, 3
c) 2, 2
d) None of these

(vi) Choose the correct option: if $f(x-1) = 7x - 5$ *then* $f(x+2) =$

a) $x + 16$
b) $x + x^2$
c) $7x + 16$
d) None of these

(vii) Choose the correct option: if $f(x) = \frac{1-x}{1+x}$ then $f(\text{cosec}\, 2\theta) =$

a) $\cot^2\theta$
b) $\sin^2\theta$
c) $\tan^2\theta$
d) $cosec^2\theta$

(viii) Choose the correct option: if $g(x) = \frac{x+1}{x^2-3x-4}$ then $g(x)$ is undefined for,

a) $x = -1$
b) $x = -2$
c) $x = -\frac{1}{4}$
d) $x = \frac{1}{6}$

(ix) Choose the correct option: if $\emptyset(x) = \sqrt{5x - 3 + 2x^2}$ then $\emptyset(-2) =$

a) 1
b) 0
c) 4
d) None of these

(x) Choose the correct option: if $f(x) = 5^x$ then $\frac{f(x+1)}{f(x-1)} =$,

a) $\frac{1}{25}$
b) 5
c) 25
d) None of these

(xi) Choose the correct option: the domain of the function $f(x) = \sqrt{8 - x}$ is ,

a) $x < 8$
b) $x = 8$
c) $x \leq 8$
d) None of these

(xii) Choose the correct option: the domain of the function $f(x) = \frac{1}{\sqrt{4-x^2}}$ is

a) [-2,2]
b) (-2,∞)
c) (2,∞)
d) (-2,2)

(xiii) Choose the correct option: the domain of the function $f(x) = \sqrt{x+1} + \sqrt{4-x}$ is

a) (-1,4)
b) (-∞, 4]
c) [-1,4]
d) (4,∞)

(xiv) Choose the correct option: the domain of the function $f(x) = log(x - 1)$ is

a) $x > 1$ b) $x \geq 1$

c) $x > 0$ d) None of these

(xv) Choose the correct option: the function $f(x) = \frac{2^x+1}{2^x-1}$ is

a) Even function b) Odd function

c) Periodic function d) None of these

(xvi) Compute the value of $\int \frac{cos2xdx}{(sinx+cosx)^2}$

a) $\log|sinx + \cos x|$ b) $\log|\sin x - \cos x|$

c) $-\log|\sin x + \cos x|$ d) None of these

(xvii) Compute the value of $\int \frac{cos\sqrt{x}}{\sqrt{x}} dx$

a) $2\cos\sqrt{x}$ b) $2\cos x$

c) $2\sin\frac{1}{\sqrt{x}}$ d) $2\sin\sqrt{x}$

(xviii) Compute the value of $\int tan^2 x dx$

a) $x - tanx + c$ b) $tanx - x + c$

c) $x + tanx + c$ d) None of these

(xix) Compute the value of $\int_1^e \frac{logx}{x} dx =$

a) $\frac{1}{2}$ b) 2

c) $\frac{1}{e}$ d) e

(xx) Compute the value of $\int_0^1 \frac{dx}{1+x^2} =$

a) $\frac{\pi}{4}$ b) $\frac{\pi}{2}$

c) $\frac{2\pi}{3}$ d) None of these

Group-B

(Short Answer Type Questions) 2.5 x 10=25

2. Illustrate $\int e^{3\log x} dx$. (2.5)

3. Illustrate $\int \frac{dx}{x\log x}$. (2.5)

4. If p be the length of perpendicular from the origin to the line $\frac{x}{a} + \frac{y}{b} = 1$ then show that $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$. (2.5)

5. If two vertices of an equilateral triangle be (0,0), $(3, \sqrt{3})$ then determine the third vertex. (2.5)

6. If the angle between two line is $\frac{\pi}{4}$ and slope of one of the lines is $\frac{1}{2}$, identify the slope of the other line. (2.5)

7. If $y = e^{x^2 \sin x}$ then identify the value of $\frac{dy}{dx}$. (2.5)

8. If $\begin{bmatrix} 4 & 8 \\ 0 & 12 \end{bmatrix} = \begin{bmatrix} x & 8 \\ 0 & 4y \end{bmatrix}$, then calculate the values of x, y. (2.5)

9. If $A = \begin{bmatrix} 2 & -1 & 0 \\ 0 & 2 & 4 \end{bmatrix}$ then calculate $A^T - 3A^T$. (2.5)

10. Evaluate the distance between the points A $(at_1{}^2, 2at_1)$ and B $(at_2^2, 2at_2)$. (2.5)

11. Write the point of discontinuities of the function $f(x)$, where $f(x) = \frac{x^2-5x+6}{x^2-3x+2}$. (2.5)

OR

If $y = x\sin x \log x$ then solve $\frac{dy}{dx}$. (2.5)

Group-C
(Long Answer Type Questions) 5 x 1=5

12. Evaluate $\int_0^2 \frac{x}{x^2+4} dx$. (5)

OR

Evaluate $\int_0^{\frac{\pi}{2}} cos^2 x dx$. (5)

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