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Paper Code : GE3B-04 Mathematics for Computing

UPID : 2510004

Time Allotted : 3 Hours *Full Marks : 70*

The Figures in the margin indicate full marks.

Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

[1 x 10 = 10]

1 Answer *any ten* of the following :

(i) .if x=acost and y=bsint then $\frac{dy}{dx} =$ _____.

(ii) Fill in the blanks

$\int x^n dx = \frac{x^{n+1}}{n+1}$ is not true when n=_____

(iii) What is the solution of xdy+ydx+xdx=0

(iv) amp(√3-i)

=?

(v) If $A=\begin{bmatrix} 2 & 0 \\ -1 & 2 \\ 0 & 4 \end{bmatrix}$ then A^T=?

(vi) Fill in the blanks $\lim_{n\to 0} \frac{sin2x}{3x}$=_____

(vii) the variance of 1,5,6 is

(viii) fill in the blanks

1. If sec θ = 17/8 and θ lies in 1st quadrant then cosecθ=_____

(ix) what is mutually exclusive events?

(x) Fill in the blanks

If P={1,2,3}, Q =={4,2,3},then the set ={(x, y): (x, y) ∈ PXQ and x≥y} is _____

(xi) Fill in blanks $\int tan^2 x dx =$ _____

(xii) what is the integration factor of $(x^2+y^2+x)dx+xydy=0$

Group-B (Short Answer Type Question)

Answer *any three* of the following : [5 x 3 = 15]

2. If $x=a+b\omega+c\omega^2, y=a\omega+b\omega^2+c, z=a\omega^2+b+c\omega$, [5]

Prove that $\frac{x^2}{yz}+\frac{y^2}{zx}+\frac{z^2}{xy}=3$

3. [5]

Evaluate $\int \frac{xe^x dx}{(1+x)^2}$

4. [5]

Prove that $\cos\frac{\pi}{15}\cos\frac{2\pi}{15}\cos\frac{4\pi}{15}\cos\frac{8\pi}{15}=-\frac{1}{16}$

5. [5]

Find $\frac{dy}{dx}$ where $x=a\sec^2\theta, y=a\tan^3\theta$

6. [5]

Evaluate $\lim_{x\to a}\frac{\sqrt{a+2x}-\sqrt{3x}}{\sqrt{3a+x}-2\sqrt{x}} (a\neq 0)$

Group-C (Long Answer Type Question)

Answer *any three* of the following : [15 x 3 = 45]

7. (a) evaluate the integral [12]

Evaluate $\int \frac{dx}{\sin(x-a)\sin(x-b)}$

(b) evaluate the integral [3]

Evaluate the integral

$\int_{-\frac{1}{2}}^{\frac{1}{2}} \cos x \log\frac{1+x}{1-x}\,dx$

8. (a) define continuity of function? [2]

(b) without using graph paper draw the graph of the function f(x)=2x+1 [5]

(c) evaluate [8]

Evaluate $\lim_{n\to\infty}(\sqrt{1+x+x^2}-x)$

9. (a) solve [8]

Solve xdy-ydx=$\sqrt{x^2+y^2}dx$

(b) prove that [7]

Prove that e^{x^2} is an integrating factor of the equation $(x^2+xy^4)dx+2y^3dy=0$

10. (a) find [10]

Find $\frac{dy}{dx}$ where $y=(\sin x)^{\cos x}+(\cos x)^{\sin x}$

(b) find [5]

Find $\frac{dy}{dx}$ where $y=\sin^m x\cos^n x$

11. (a) prove that [10]

Prove that $\begin{vmatrix} 1 & 1 & 1 \\ a^2 & b^2 & c^2 \\ a^3 & b^3 & c^3 \end{vmatrix} = (b-c)(c-a)(a-b)(ab+bc+ca)$

(b) find the value of a [5]

Find the value of a in order that $\begin{bmatrix} 2 & 3 & 5 \\ 1 & a & 2 \\ 0 & 1 & -1 \end{bmatrix}$ is a singular matrix

*** END OF PAPER ***