5. Attempt <u>any two</u> of the following: 10×2=20

(a) Using Green's theorem evaluate $\int_c[(y-\sin x)dx+\cos x.dy]$ where C is the plane triangle enclosed by the lines $0, x=T1/2$ *and* $y=\frac{2x}{\pi}$

(b) Verify stoke's theorem for F=(x²+y²) I-2xyJ taken around the rectangle bounded by the lines $x=\pm a, y=0, y=b.$

(c) State & Prove Leibrity theorem.

—x—

Printed Pages :4

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NBC-101

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 294101

Roll No. | | | | | | | | | | |

MCA (Dual Degree)

(Sem. -I) CARRY OVER THEORY EXAMINATION,2015-16

MATHMATICS-I

Time : 3 Hours] *[Total Marks : 100*

Note: Attempt all questions. All questions are compulsory.

1. Answer any <u>four</u> of the following: 5×4=20

(a) Ig $y=\log(x+\sqrt{1+x^2})$. Find $\frac{d^2y}{dx^2}$

(b) Find characteristics roots of the matrix.

$$\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$$

(c) Expand sin x in power.

(d) Write short note on Caley- Hamilton theorem.

(e) Find eigen value is A.

$$\begin{bmatrix} 1 & 0 & -1 \\ 1 & 2 & 1 \\ 2 & 2 & 3 \end{bmatrix}$$

(f) Find the area between curve. $y^2 = 4ax \;\&\; x^2 = 4ay$

2. Attempt any four of the following: 5×4=20

(a) Evaluate $\int_0^{\pi/2}\int_0^{\pi/2} \frac{\sqrt{\sin x}}{\sqrt{\sin x}+\sqrt{\cos x}}.dx\,dy$

(b) If then. $f(x,y) = x^3 + y^3 + xy$ find rt – s²

(c) Evaluate $\lim_{x\to 1} \frac{x^5 - x^2}{x^4 - 2x^3 + 2x - 1}$

(d) if z= $u^2 + v^2$ and $u = at^2, v = 2at$ *find* $\frac{dz}{dt}$

(e) Evaluate $\int_{-1}^{1}\int_{-2}^{2}\int_{-3}^{3} dx.dy.dz$

(f) Write short note on Taylor's series.

3. Attempt any two of the following: 10×2=20

(a) If $\bar{r} = xi + y\hat{j} + z\hat{k}$ and $r = |r|$ show that div $\frac{\bar{r}}{|\bar{r}|^3} = 0$

(b) Find the area enclosed by the pair of curve.

$$y = 2 - x \;\&\; y^2 = (2 - x)$$

(c) Evaluate: $\iiint_R (x - 2y + z)\,dx\,dy\,dz$

Where R= $0 \le x \le 1,\ 0 \le y \le x^2,\ \ 0 \le z \le x + y$

4. Attempt any two of the following: 10×2=20

(a) Prove that:

$$\nabla x(\bar{F}x\bar{G}) = F(\nabla.\bar{G}) - \bar{G}(\nabla.\bar{F}) + (\bar{G}.\nabla)\bar{F} - (\bar{F}.\nabla)\bar{G}$$

(b) Find the inverse of matrix Elementary Transformation.

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

(c) Varify Cayley's Hamilton theorem.

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