14ELU02

PSG COLLEGE OF ARTS & SCIENCE

(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2017

(First Semester)

Branch- **ELECTRONICS**

MATHEMATICS ! .

Time: Three Hours Maximum: 75 Marks

SECTIONS (20 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10x2 = 20)

1 If F = (x + y + l)i + j -(x + y)k, find Focurl F.

2 Find Vx(V<|)).

3 Define Involuntary matrix.

4 If A = $\begin{vmatrix} 0 & 1 & X \\ 1 & 2 & 3 \\ 2 & 3 & 4 \end{vmatrix}$ and B = $\begin{vmatrix} 1 & -2 \\ -1 & 0 \\ 2 & -1 \end{vmatrix}$, find AB?

5 Find $\frac{d}{dt}$(xyz) where x = e^{-t}, y = e^{-t}. $\sin^2 1$. z = sin t.

6 If $y = x^5 + 7x^z - 3x + 8$, find $\frac{d^4y}{dx^4}$ *

7 Find L[sinh 3t].

8 FindL [t e^{5*}].

9 Define Harmonic function? ••

10 Define Analytic function in a domain D?

SECTION - B (25 Marks)

Answer **ALL** Questions

ALL Questions Carry **EQUAL** Marks (5x5 = 25)

11 a If V = (x + y + az)i +(bx + 3y -z)j + (3x + cy + z)k is irrotational, find the values of a, b, c.

OR

b If F = $3xyz^2i+4x^2yj-xy^2k$, find V(V°F) at (-1,2, 1).

12 a Find the inverse of A = $\begin{vmatrix} 2 & 5 & 3 \\ 3 & i & 2 \\ 1 & 2 & 1 \end{vmatrix}$

OR

b Find the rank of $\begin{vmatrix} 1 & -1 & 3 & -3 \\ 1 & 20 & -2 & 25 \\ 5 & -2 & 4 & 7 \end{vmatrix}$

13 a If x = tan (log y), find $(1+x^2)y_{n+1}+(2nx-1)y_n+n(n-1)y_n$.i.

OR

b If $u = \tan^{-1}\frac{x^3+y^3}{x-y}$, find $x\frac{du}{dx} + y\frac{du}{dy}$.

Cont...

14 a Find $L(t^2 \sin 2t)$

OR

Find $L'^{-1}\left\{\frac{1}{s(s+1)(s+2)}\right\}$

15 a Find the poles and residues of $f(z) = \frac{z^2+4}{+2z^2-f-2z}$

OR

Verify Cauchy - Riemann equations for the function $f(z) = e^x (\cos y - i \sin y)$

SECTION - C (30 Marks)

Answer any THREE Questions . *

ALL Questions Cany EQUAL Marks (3 x 10 = 30)

16 Verify the Gauss Divergence theorem for the function

$F = 2xzi + yzj + z\,k$ over the upper half of the sphere $x^z + y^z + z^z = a^z$. $^{2-n2}$

17 Find the eigen values and the corresponding eigen vectors of the matrix

$$\begin{matrix} 2 & 4 & -6 \\ 4 & 2 & -6 \\ -6 & -6 & -15 \end{matrix}$$

18 If $y^{/m} + y^{/m} = 2x$, then using Leibnitz's ' theorem find

$(X^2 - 1)y_{n+2} + (2n+1)x\, y_{,,T}| + (n^2 - mfy,;.$

19 Solve : y'' - 10y' + 24y = 24x, given that y(0) = y' (0)=0.

20 State Cauchy - Riemann theorem?

Evaluate $J\text{----------}$ where c is circle z = 4.

$c\ (z \sim 2)(z+3)$

Z-Z-Z END

/