SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai — 600 044.
B.Sc.(AI) END SEMESTER EXAMINATIONS NOVEMBER -2023
SEMESTER - II
22UAIAT2002 - Allied Mathematics - II

Total Duration : 2 Hrs 30 Mins. Total Marks : 60

Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. Evaluate $\int x^3 \cos x dx$
2. Find the general solution of the equation y" + y' - 6y = 36x
3. Find the general solution of px + qy = z
4. Show that L$\{e^{at}\} = \frac{1}{s-a}$, for s > a.
5. Compute the inverse Laplace transform of f(t) $= \frac{5s}{s^2+9}$
6. If $\vec{F} = xy^2\ \vec{i} + 2x^2yz\vec{j}$ - $3yz^2\vec{k}$ find $\nabla.\ \vec{F}$ and $\nabla\times\ \vec{F}$ at the point (1,-1,1)
7. Find $div\ \vec{F}$ and $curl\ \vec{F}$ where $\vec{F} = grad(x^3 + y^3 + z^3 - 3xyz)$
8. State Gauss, Stoke's and Green's theorems

Section C

Answer any **THREE** questions $(3 \times 10 = 30$ Marks)

9. If f(x) = sinhx is defined in $-\pi < x < \pi$, find the value of a_0 and a_n.
10. Solve the lagrange's linear equation for general solution p - q = log(x+y)
11. Solve the initial value problem y" - 4y' + 9y = t, y(0) = 0, y'(0) = 1.
12. Find $\nabla(r)$, $\nabla(\frac{1}{r})$, $\nabla(logr)$ where r =$|\ \vec{r}\ |$ and $\vec{r}$= x$\vec{i}$ + y$\vec{j}$ +z$\vec{k}$
13. Using Stoke's theorem, Evaluate $\iint_s curl\ \vec{F}\ .d\ \vec{S}$, where $\vec{F}$=xz$\vec{i}$+yz$\vec{j}$+xy$\vec{k}$, such that S is the part of the sphere $x^2 + y^2 + z^2 = 4$ that lies inside the cylinder $x^2 + y^2 = 1$ and the xy-plane

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