Reg.No. | | | | | | | | | | |

D.K.M.COLLEGE FOR WOMEN (AUTONOMOUS), VELLORE-1
SEMESTER EXAMINATIONS
APRIL – 2017 **15CAMA2A/15CAMA4A**
ALLIED: MATHEMATICS – II

Time : 3 Hrs **Max. Marks : 75**

SECTION-A (10 x 2 = 20)

Answer ALL questions.

1. *Evaluate* $\int x^2 e^x dx$.
2. *Evaluate* $\int_0^{\frac{\pi}{2}} sin^6 x dx$.
3. *Evaluate* $\int_0^3 \int_0^2 x^2\, dx\, dy$.
4. *Write the formula for Euler's constants* a_0, a_n, b_n *when* $f(x)$ *is defined in* $(0,2\pi)$.
5. *Eliminate the constants a and b from* $z = (x+a)(y+b)$.
6. *Solve* $pq = 1$.
7. *Find* $L[4\, sint\, cost]$.
8. *Find* $L^{-1}\left[\frac{s}{(s+2)^2}\right]$.
9. *Show that* $\nabla\left(\frac{1}{r}\right) = \frac{-\vec{r}}{r^3}$
10. *State Gauss divergence theorem.*

SECTION-B (5 x 5 = 25)

Answer any FIVE of the following questions.

11. *Evaluate* $\int_0^{\frac{\pi}{2}} \frac{\sqrt{sinx}}{\sqrt{\sin x}+\sqrt{\cos x}} dx$.
12. *Evaluate* $\int_0^1 \int_0^{1-x} \int_0^{1-x-y} dxdydz$.
13. *Form the partial differential equation from* $f(x^2+y^2, z-xy) = 0$.
14. *Obtain the complete and singular solution of* $z^2 = P^2x^2 + q^2y^2$.
15. *Find* $L\left[\frac{e^{-3t} sin\, 2t}{t}\right]$.
16. *Find* $L^{-1}\left[\frac{1}{s(s^2+4)}\right]$.
17. *Find the unit vector normal to the surface* $x^2 + y^2 + 2z^2 = 4$ *at the print* $(1,1,1)$.
18. *If* $\vec{A} = axy\vec{i} + (x^2+2yz)\vec{j} + y^2\vec{k}$ *is irrotational, find the value of a.*

SECTION-C (3 x 10 = 30)

Answer ALL questions.

19. (a) If $I_{m,n} = \int_0^{\frac{\pi}{2}} sin^m x cos^n x\, dx$, then prove that $I_{m,n} = \frac{n-1}{m+n} I_{m,n-2}$.

(Or)

(b) Find the Fourier series for the function $f(x) = 1 + \frac{2x}{\pi}, -\pi \leq x \leq 0$

$1 - \frac{2x}{\pi}, 0 \leq x \leq \pi$

Deduce that $\frac{1}{1^2} + \frac{1}{3^2} + \cdots\cdots = \frac{\pi^2}{8}$.

20. (a) Solve $(mz - ny)P + (nx - lz)q = ly - mx$.

(Or)

(b) Solve $\frac{d^2y}{dx^2} + \frac{2dy}{dx} + y = e^{-x}$ using Laplace transform, given that $y(0) = 0, y'(0) = 1$.

21. (a) Using Green's theorem, show that $\int_c (3x + 4y)dx + (2x - 3y)dy = -8\pi$. Where C is the circle $x^2 + y^2 = 4$.

(Or)

(b) Find the area of the circle $x^2 + y^2 = a^2$, using double integral.

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