ANURG GROUP OF INSTITUTIONS

Venkatapur (V), Ghatkesar (M),Medchal (Dist) Telangana 500 088

MATHEMATICS II 2ND ASSINGMENT QUEESTIONS

1) Evaluate the integral by changing the order of integration $\int_{x=0}^{\infty}\int_{y=x}^{\infty}\frac{e^{-y}}{y}dydx$

2) Change the order of integration to evaluate $\int_{0}^{4a}\int_{\frac{x^2}{4a}}^{2\sqrt{ax}}dydx$

3) Find the directional derivate of the function f= $x^2-y^2+2z^2$ at the point P(1,2,3) in the direction of the line PQ where Q=(5,0,4).

4) Find the angle between the normal's to the surface x^2 =y z at the points (1,1,1) and (2,4,1).

5) Show that $(x^2-yz)i+(y^2-zx)j+(z^2-xy)k$ is Irrotational and find its scalar potential.

6) a) if $\bar{f}=xy^2i+2x^2yzj-3yz^2k$ find curl $\bar{f}$ at (1,-1,1)
b)Find div $\bar{f}$ if $\bar{f}$ =grad($x^3+y^3+z^3-3xyz$)

7) Find the work done in moving a particle in the force field $\bar{f}$ =3x^2 i+j+2k along the straight line from (0,0,0) to (1,2,3).

8) Evaluate $\int_s \bar{F}.\bar{n}ds$ where $\bar{F}$ =18zi-12j+3yk and s is the part of the surface of the plane 2x+3y+6z=12 .located in the first octant.

9)Find the Fourier series expansion of f(x), if f(x)= $-\pi$ when $-\pi<x<0$
x when $0<x<\pi$.

Hence deduce that $\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+\ldots\ldots=\frac{\pi^2}{8}$

10) Find the Fourier series for f(x) = $|\sin x|$ in $-\pi<x<\pi$.

11) Find the half Range Fourier series expansion of f(x) = $x\sin x$ in $(0,\pi)$

12) Find the Fourier series expansion of f(x)= $\frac{(\pi-x)^2}{4}$ in $(0,2\pi)$

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M III MID II ASSIGNMENT QUESTIONS

1. Evaluate $\int_0^1 \frac{1}{1+x^2}dx$ using Simpson's 3/8 and Weddle's rules. Hence obtain an approximate value of π.

2. The table below shows the velocities of a car at various intervals of time. Find the distance travelled by car using Simpson's Rule.

Time(min.)	0	2	4	6	8	10	12
Velocity(km/hr)	0	22	30	27	18	7	0

3. Derive normal equations of first, second degree equations using the method of least squares.

4. (i) Fit a parabola for the following data using the method of least squares

X	2	4	6	8	10
Y	3.07	12.85	31.47	57.38	91.29

(ii) Fit curves of the form $y=ab^x$, $y= ax^b$ for the following data using the method of least squares

X	2	3	4	5	6
Y	8.3	15.4	33.1	65.2	127.4

5. Using Picard's method up to fourth approximation, Solve $y'=y - x^2$, $y(0) = 1$. Hence find the values of $y(0.1)$, $y(0.2)$

6. Use (i) Milne's, (ii) Adam's Predictor-Corrector methods to obtain a solution at x=0.8. Given that y(0)=0, y(0.2)=0.02, y(0.4)=0.0795 & y(0.6)=0.1762

7.Find y(1.1), y(1.2) and y(1.3) Using (i) RK method IV order formula, (ii) Modified Euler's Formula and (iii) Taylor series method for the IVP $\frac{dy}{dx} = x + y$ with y(1)=0.

8. (i).Form a P.D.E by eliminating arbitrary function from $f(x + y + z, x^2 + y^2 + z^2) =0$

(ii) Form a P.D.E corresponding to the equation $z= a \log\left[\frac{b(y-1)}{1-x}\right]$

9. Solve (i) $y^2zp + x^2zq = y^2x$.

(ii) Solve $(mz-ny)\, p + (nx-lz)\, q = ly-mx$.