Total No. of Pages: 2

5288

Register Number:

Name of the Candidate:

B.Sc. DEGREE EXAMINATION, May 2015

(CHEMISTRY)

(SECOND YEAR)

(PART-III)

660/650: MATHEMATICS-II

(GROUP-B: ANCILLARY-I)

(Common with B.Sc(Electronic Science) &(Physics) &(Applied Chemistry))

Time: Three hours Maximum: 75 marks

Answer any FIVE questions (5×15=75)

1. a) Obtain a reduction formula for $\int \cos^n x\,dx$ (where n is a positive integer) and hence evaluate $\int_0^{\frac{\pi}{2}} \cos^n x\,dx$.

   b) Evaluate $\int_0^{\frac{\pi}{2}} \cos^8 x\,dx$ ss

2. Evaluate $\iint_s F.n\,dS$, where **F** = $4xz\mathbf{i}-y^2\mathbf{j}+yz\mathbf{k}$ and S is the surface of the cube bounded by x =0, x=1, y=0, y=1,z=0, z=1

3. a) Solve $(D^2- 3D+2)y = e^{2x}$

   b) Solve $(D^2-5D+6)y = \sin 3x$

4. a) Solve $\frac{dy}{dx} = \frac{x+2y-3}{2x+y-3}$

   b) Solve $x-yp=ap^2$ where $p = \frac{dy}{dx}$

5. a) Solve $(y+z)p+(z+x)q=(x+y)$

   b) Obtain the general solution of the partial differential equation p+q=pq

6. a) Solve $z = px +qy+P^2+q^2$

   b) Solve q-p=y-x

7. Express f(x)=x^2 as Fourier series with period 2π, to be valid in the interval $-\pi$ to π. Deduce from this that $\frac{1}{1^2}+\frac{1}{2^2}+\frac{1}{3^2}+.....=\frac{\pi^2}{6}$

8. Find a Fourier cosine transform for f(x) defined by

$$f(x)=\begin{cases}1 & for\ |x|<1\\ 0 & for\ |x|>1\end{cases}$$

Hence deduce that $\int_0^{\infty}\frac{\sin t}{t}dt=\frac{\pi}{2}$

9. a) Find $L\left[\frac{e^{-2t}}{3}(3\cos 3t-5\sin 3t)\right]$

b) Find $L^{-1}\left[\frac{1}{(s^2((s^2+1)(s^2+9)}\right]$

10. Solve the equation $\frac{d^2y}{dx^2}-3\frac{dy}{dx}+2y=4$, given that y =2, $\frac{dy}{dx}=3$ when x = 0.

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