B-Tech. sem-IV, (2014 course), Computer winter-2018

B.Tech. SEM -IV (Computer) 2014 Course (CBCS) : WINTER - 2018

SUBJECT: ENGINEERING MATHETICS – III

W-2018-2337

Day : Tuesday
Date: 13/11/2018

Time : 02.30 PM TO 05.30 PM
Max. Marks : 60

N. B. :

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Use of non-programmable calculator is **ALLOWED**.
4) Assume suitable data, if necessary.

Q. 1 **a)** Solve: $(D^3 + 4D)y = \sin 5x \cdot \cos 3x$. **(05)**

b) Solve: $\frac{dx}{y} = \frac{dy}{-x} = \frac{dz}{x\,e^{x^2+y^2}}$ **(05)**

OR

a) Solve: $(D^2 + 9)\,y = \frac{1}{1+\sin 3x}$ by the method of variation of parameters. **(05)**

b) Solve: $(1+x)^2 \frac{d^2y}{dx^2} + (1+x)\frac{dy}{dx} + y = 2\sin\left[\log(1+x)\right]$. **(05)**

Q. 2 **a)** Show that the function e^z is analytic. **(05)**

b) Evaluate $\int_{1-i}^{2+i} (2z+4)\,dz$ along the path $x = t+1,\ y = 2t^2 - 1$. **(05)**

OR

a) Find the map of the circle $|z - i| = 1$ under the mapping $w = \frac{1}{z}$, into the w – plane. **(05)**

b) Evaluate $\oint_c \frac{4z^2 + z}{(z-1)^2}\,dz$, where 'c' is the contour $|z-1| = 2$. **(05)**

Q. 3 **a)** Find the Fourier Cosine transform of $f(x) = 2e^{-5x} + 5e^{-2x}$. **(05)**

b) Find the Fourier transform of $f(x) = \begin{cases} -3, & |x| \le 1 \\ 0, & |x| > 1 \end{cases}$ **(05)**

Hence evaluate $\int_0^\infty \frac{\sin\lambda \cos\lambda x}{\lambda}\,d\lambda$

OR

P. T. O.

a) Find $Z\{f(k)\}$ if $f(k)=\left(\frac{1}{2}\right)^{|k|}$ for all k. **(05)**

b) Find $Z^{-1}\left[\frac{z}{(z-1)(z-2)}\right]$, $|z|\geq 2$. **(05)**

Q. 4 a) Find Laplace transform of $e^{-3t}\int_0^t t\sin 2t\ dt$. **(05)**

b) Find the inverse Laplace transform of $\frac{2s+5}{(s+1)(s-2)}$ **(05)**

OR

a) Using Laplace transform solve the following differential equation: **(05)**

$$\frac{d^2y}{dt^2}+2\frac{dy}{dt}+y=te^{-t}, y(0)=1, y'(0)=-2.$$

b) Find the Laplace transform of $L[\sin t\ U(t-4)]$. **(05)**

Q. 5 Solve the equation by LU decomposition method: **(10)**

$$2x+3y+z=9,$$
$$x+2y+3z=6,$$
$$3x+y+2z=8.$$

OR

a) Find a real root of the equation $x^3-2x-5=0$ by the method of Regula-Falsi to three decimal places. **(05)**

b) Evaluate: $\int_0^1 \frac{dx}{1+x^2}$ using Trapezoidal rule and Simpson's $\left(\frac{1}{3}\right)^{rd}$ rule taking $h=\frac{1}{4}$. **(05)**

Q. 6 a) In 256 sets of 12 tosses of a coin, in how many cases one can expect 8 heads and 4 tails. **(05)**

b) A bag contains 8 white and 6 red balls. Find the probability of drawing 2 balls of the same colour. **(05)**

OR

Compute the first four moments about the mean, coefficient of skewness and kurtosis for the following frequencies distribution : **(10)**

Number of jobs completed	0-10	10-20	20-30	30-40	40-50
Number of workers	6	26	47	15	6

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