Program: SE Information Technology

Curriculum Scheme: Rev-2019

Examination: Second year semester III

Course Code: ITC301 and Course Name: Engineering Mathematics-III

MCQ_SECTION

Time: 2hours and 30 minutes Max. Marks: 20

1] All questions are Compulsory

2] Assume suitable data wherever required.

1	L[$t^{\frac{5}{2}}$] is
Option A:	$\frac{3}{4s^{\frac{3}{2}}}$
Option B:	$\frac{3\sqrt{\pi}}{4s^{\frac{5}{2}}}$
Option C:	$\frac{5\sqrt{\pi}}{4s^{\frac{5}{2}}}$
Option D:	$\frac{15\sqrt{\pi}}{8s^{\frac{7}{2}}}$
2	L [f(t)] = $\frac{1}{s\sqrt{s+1}}$ then L [$e^{-2t}f(t)$] is
Option A:	$\frac{1}{(s+2)\sqrt{s+3}}$
Option B:	$\frac{1}{(s+2)\sqrt{s+2}}$
Option C:	$\frac{1}{(s-2)\sqrt{s-1}}$

Option D:	$\frac{1}{(s-1)\sqrt{s}}$
3	Find $L^{-1}\left[\frac{s+2}{(s+2)^2-16}\right]$
Option A:	$e^{2t}cosh4t$
Option B:	$e^{-2t}sinh4t$
Option C:	$e^{-2t}cosh4t$
Option D:	$e^{2t}sinh4t$
4	Find $L^{-1}\left[\frac{1}{(s+4)^{3/2}}\right]$
Option A:	$2e^{4t}\sqrt{\frac{\pi}{t}}$
Option B:	$e^{-4t}\sqrt{\frac{\pi}{t}}$
Option C:	$e^{4t}\sqrt{\frac{t}{\pi}}$
Option D:	$2e^{-4t}\sqrt{\frac{t}{\pi}}$
5	The probability that a 3-card hand drawn at random and without replacement from an ordinary deck consist entirely of black card is:
Option A:	$\frac{1}{17}$
Option B:	$\frac{3}{17}$
Option C:	$\frac{2}{17}$
Option D:	$\frac{1}{8}$
6	The probability density function of a discrete random variable X is given by the formula $P(x) = kx^2$, $x = 0,1,2,3$; the value of constant k is:
Option A:	$\frac{1}{14}$

Option B:	$\frac{3}{2}$
Option C:	$\frac{1}{6}$
Option D:	6
7	The analytic function corresponding to real part $e^{-x}siny$ is
Option A:	$f(z) = e^z + c$
Option B:	$f(z) = e^{-z} + c$
Option C:	$f(z) = ie^z + c$
Option D:	$f(z) = ie^{-z} + c$
8	$The\ fourier\ series\ for\ f(x) = \lvert sinx \rvert$ in $[-\pi, \pi]$
Option A:	Will have sine terms
Option B:	Will have cosine terms
Option C:	Is zero
Option D:	Doesn't exist
9	If f(x) = x^2 in $[-\pi, \pi]$ then what is the value of the first term in the series $\frac{a_0}{2} + \sum_{n=1}^{\infty} a_n \cos nx + \sum_{n=1}^{\infty} b_n sinnx$
Option A:	$\frac{2\pi^2}{3}$
Option B:	$\frac{\pi^2}{6}$
Option C:	$\frac{\pi^2}{2}$
Option D:	$\frac{\pi}{3}$
10	Let the regression equation of y on x be x – 2y + 5 = 0 then b_{yx} is equal to
Option A:	-2
Option B:	1
Option C:	5
Option D:	½

DESCRIPTIVE_SECTION

Attempt all questions.

Q2	**Solve any Four out of six** **5 Marks each**
A	Find Laplace Transformation of $t\sqrt{1+\sin t}$
B	Find $L^{-1}\left(\frac{(s+3)}{(s^2+6s+13)^2}\right)$using Convolution Theorem
C	If $f(x)=9-x^2$ for -3<x<3, obtain Fourier series of f(x) in [-3, 3].
D	Construct the analytic function whose real part is $e^{2x}(x\cos 2y - y\sin 2y)$
E	The no. of pairs of observation of x and y are 1000. $\sigma_x = 4.5 \quad ; \sigma_y = 3.6 \quad ; \sum (x-\bar{x})(y-\bar{y}) = 4800$ Calculate the coefficient of correlation between x and y series.
F	In a certain college, 4% of the boys and 1% of the girls are taller than 1.8m. Furthermore 60% of the students are girls. If the students are selected at random and found to be taller than 1.8m, what is the probability that the student is a girl?
Q3	**Solve any Four out of six** **5 Marks each**
A	Find Laplace transformation of $\frac{e^{-2t}\sin(2t)\cosh t}{t}$
B	Find the half range sine series of $f(x)=x^2$in $(0, \pi)$
C	Find the orthogonal trajectories of the family of curves $3x^2y - y^3 = c$

D	The two regression lines are $4x - 5y + 33 = 0; 20x - 9y = 107$ and variance of x = 25. Find i) mean of x & y ii) Coefficient of correlation iii) Variance of y
E	Two persons A and B toss an unbiased coin alternately on the understanding that the first who gets head wins. If A starts the game, find their respective chance of winning.
F	Find $L^{-1}\left(\frac{2s^2 - 15s - 11}{(s+2)(s-3)^2}\right)$

Q4	**Solve any Four out of six** **5 Marks each**
A	Find Laplace Transformation of $\frac{e^{-2t}\, sin2t\, cosht}{t}$
B	Find $L^{-1}\left(\frac{s}{(s^2+a^2)(s^2+b^2)}\right)$using Convolution Theorem
C	If $f(x) = 4 - x^2$ for - π <x<π, obtain Fourier series of f(x) .
D	Find Harmonic Conjugate of the function $y^3 - 3x^2y$
E	Calculate rank correlation for the following data <table><tr><td>X</td><td>12</td><td>17</td><td>22</td><td>27</td><td>32</td></tr><tr><td>Y</td><td>113</td><td>119</td><td>117</td><td>115</td><td>121</td></tr></table>
F	Following table is probability density function of discrete random variable X. <table><tr><td>X</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr><tr><td>P(X)</td><td>0</td><td>k</td><td>2k</td><td>2k</td><td>3k</td><td>K^2</td><td>2 K^2</td><td>7 K^2+k</td></tr></table>Find k, Mean and variance of X