Program: **Computer Engineering**
Curriculum Scheme: Rev2019
Examination: SE Semester III
Course Code: CSC301 and Course Name: Engineering Mathematics

Time: 2 hour   Max. Marks: 80

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Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	Find the Laplace transform of f(t), f(t)=a, 0< t <b and f(t)=0, t>b
Option A:	$\frac{ab}{s}(1-e^{-bt})$
Option B:	$\frac{b}{s}(1-e^{-bt})$
Option C:	$\frac{a}{s}(1-e^{-bt})$
Option D:	$\frac{-a}{s}(1-e^{-bt})$
2.	Find the Laplace transform of $4t^2+\sin 3t+e^{2t}$
Option A:	$\frac{9}{s^3}+\frac{3}{s^2+3^2}+\frac{1}{s-2}$
Option B:	$\frac{8}{s^3}+\frac{8}{s^2+3^2}+\frac{1}{s-2}$
Option C:	$\frac{8}{s^3}+\frac{3}{s^2+3^2}+\frac{4}{s-2}$
Option D:	$\frac{8}{s^3}+\frac{3}{s^2+3^2}+\frac{1}{s-2}$
3.	Find the Laplace transform of $e^{4t}.\sin^3 t$
Option A:	$\frac{6}{(s^2-8s+17)(s^2-8s+25)}$
Option B:	$\frac{64}{(s^2-8s+17)(s^2-8s+25)}$
Option C:	$\frac{6}{(s^2-8s+17)(s^2-8s+20)}$
Option D:	$\frac{6}{(s^2-7s+17)(s^2-8s+25)}$
4.	Find the Inverse Laplace transform $\frac{1}{s(s+a)}$
Option A:	$\frac{1-e^{-at}}{ab}$

Option B:	$\dfrac{1 - e^{-at}}{a}$
Option C:	$\dfrac{1 - e^{-t}}{a}$
Option D:	$\dfrac{1 - e^{at}}{a}$
5.	Find $L^{-1}\left[\dfrac{1}{S(S^2+4)}\right]$
Option A:	$\dfrac{1}{4}(1 - cos2t)$
Option B:	$\dfrac{1}{45}(1 - sin2t)$
Option C:	$\dfrac{1}{4}(1 - Cot2t)$
Option D:	$\dfrac{1}{4}(1 - tan2t)$
6.	The equations of the two lines of regression are $5x - y = 22$ and $64x - 45y = 24$. Find x and y.
Option A:	$x = 6, y = 8$
Option B:	$x = 3, y = 8$
Option C:	$x = 4, y = 8$
Option D:	$x = 6, y = 5$
7.	Given $N = 5, \sum d_i^2 = 8$. Find the rank correlation coefficient R.
Option A:	$R = 0.6$
Option B:	$R = 0.5$
Option C:	$R = 0.4$
Option D:	$R = 0.3$
8.	Given $\sum d_x d_y = 186, \sum d_x = 11, \sum d_y = 7, N = 10, \sum d_x^2 = 215, \sum d_y^2 = 163$ Find the correlation coefficient r.
Option A:	0.99
Option B:	0.88
Option C:	0.77
Option D:	0.55
9.	Calculate the correlation coefficient for the following data | X	3	5	4	6	2
Y	3	4	5	2	6	
Option A:	1
Option B:	-.5
Option C:	.7
Option D:	.9
10.	A function satisfy the Laplace equation is known as
Option A:	Analytic function
Option B:	harmonic
Option C:	holomorphic

Option D:	Non holomorphic
11.	Find the value of an for xcosx in (- π , π)
Option A:	1/n
Option B:	0
Option C:	2/n
Option D:	4
12.	In Fourier integral an is zero when function is
Option A:	Even
Option B:	Odd
Option C:	Real
Option D:	Neither even nor odd
13.	If f(x) is odd function then Fourier integral f(x) reduced to
Option A:	Cosine
Option B:	Sine
Option C:	Cosine and sine
Option D:	0
14.	What are periodic signals?
Option A:	The signals which change with time
Option B:	The signals which change with frequency
Option C:	The signal that repeats itself in time
Option D:	The signals that repeat itself over a fixed frequency
15.	Find the Laplace transform of sin5t
Option A:	$\dfrac{5}{s^2 + 5^2}$
Option B:	$\dfrac{s}{s^2 + 5^2}$
Option C:	$\dfrac{5}{s^2 - 5^2}$
Option D:	$\dfrac{s}{s^2 - 5^2}$
16.	Construct an analytic function whose real part is $e^x \cos y$
Option A:	$f(z) = \int e^z . dz = ea^z + c$
Option B:	$f(z) = \int e^z . dz = a^z + c$
Option C:	$f(z) = \int e^z . dz = e^{az} + c$
Option D:	$f(z) = \int e^z . dz = e^z + c$
17.	Construct an analytic function whose imaginary part is $e^{-x}(y \cos y - x \sin y)$
Option A:	$z\, e^{-z} + c$
Option B:	$z\, e^{z} + c$
Option C:	$z\, e^{az} + c$
Option D:	$z\, e^{bz} + c$

18.	Construct an analytic function whose imaginary part is $\tan^{-1}\frac{y}{x}$
Option A:	tan z +c
Option B:	sec z +c
Option C:	e^x z +c
Option D:	log z +c
19.	Construct an analytic function whose real part is x^4-6x^2y^2+y^4
Option A:	z^4+c
Option B:	ez^4+c
Option C:	e^4+c
Option D:	x^4+c
20.	Given $N = 10, \sum d_i^2 = 96$. Find the rank correlation coefficient R.
Option A:	$R = 0.41$
Option B:	$R = 0.51$
Option C:	$R = 0.25$
Option D:	$R = 0.35$

Q2 (20 Marks)	Solve any Four out of Six 5 marks each
A	Find the Laplace transform of $\frac{1}{t}e^{-t}sint$
B	Find the inverse Laplace transform of $\frac{1}{\sqrt{2s+1}}$
C	Show that the function, $f(z) = sinhz$ is analytic and find $f'(z)$ in terms of z.
D	Find the Fourier series for f (x)=x in (0,2π).
E	Find the equation of line of regression y on x for the following data | X	5	6	7	8	9	10	11
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Y	11	14	14	15	12	17	16	
F	Calculate the coefficient of correlation 	x	2	3	4	7	4
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y	8	7	3	1	1	

Q3 (20 Marks)	Solve any Four out of Six 5 marks each
A	Find the Laplace transform of $cost\ cos2t\ cos3t$
B	Find the inverse Laplace transform of $\frac{s+2}{s^2(s+3)}$
C	Determine whether the function $f(z) = x^2 - y^2 + 2ixy$ is analytic and if so Find its derivative.
D	Find the Fourier series for $f(x) = e^{-|x|}$ in (-π,π).

E	Find the equation of line of regression y on x for the following data							
	X	10	12	13	16	17	20	25
	Y	19	22	24	27	29	33	37

F	Calculate the spearman rank coefficient of correlation									
	X	85	74	85	50	65	78	74	60	74	90
	Y	78	91	78	58	60	72	80	55	68	70