

University of Mumbai

Examination 2020

Program: Computer Engineering

Curriculum Scheme: Rev 2012

Examination: **Second** Year Semester: **III**

Course Code: CSC301 and Course Name: Applied Mathematics III

Time: 1 hour

Max. Marks: 50

For the students:- All the Questions are compulsory and carry equal marks .

Q1.	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:	$\frac{-a}{s}(1 - e^{-bt})$
Q2.	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:	$\frac{8}{s^3} + \frac{3}{s^2 + 3^2} + \frac{1}{s - 2}$
Q3.	Find the Laplace transform of $e^{4t} \cdot \sin^3 t$
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:	$\frac{6}{(s^2 - 7s + 17)(s^2 - 8s + 25)}$
Q4.	Find the Inverse Laplace transform $\frac{1}{s(s+a)}$
Option A:	$\frac{1 - e^{-at}}{ab}$
Option B:	$\frac{1 - e^{-at}}{a}$
Option C:	$\frac{1 - e^{-t}}{a}$
Option D:	$\frac{1 - e^{at}}{a}$

University of Mumbai
Examination 2020

Q5.	Find $L^{-1}\left[\frac{1}{s(s^2+4)}\right]$
Option A:	$\frac{1}{4}(1 - \cos 2t)$
Option B:	$\frac{1}{45}(1 - \sin 2t)$
Option C:	$\frac{1}{4}(1 - \cot 2t)$
Option D:	$\frac{1}{4}(1 - \tan 2t)$
Q6.	If $A = \nabla(xy + yz + zx)$, value of $\nabla \cdot A$
Option A:	0
Option B:	$i(y) + j(x) + k(x)$
Option C:	$i(y + z) + j(x + z) + k(x + y)$
Option D:	1
Q7.	If $A = \nabla(xy + yz + zx)$, value of $\nabla \times A$
Option A:	0
Option B:	$i(y) + j(x) + k(x)$
Option C:	$i(y + z) + j(x + z) + k(x + y)$
Option D:	1
Q8.	What is condition for solenoidal
Option A:	$\text{div } F = 0,$
Option B:	$\text{Curl } F = 0$
Option C:	$\text{div } F = 1$
Option D:	$\text{Curl } F = 1$
Q9.	What is condition for solenoidal
Option A:	$\text{div } F = 0,$
Option B:	$\text{Curl } F = 0$
Option C:	$\text{div } F = 1$
Option D:	$\text{Curl } F = 1$
Q10.	A function satisfy the Laplace equation is known as
Option A:	Analytic function
Option B:	harmonic
Option C:	holomorphic
Option D:	Non holomorphic
Q11.	Find the value of an for $x \cos x$ in $(-\pi, \pi)$
Option A:	1/n
Option B:	0
Option C:	2/n
Option D:	4
Q12.	In Fourier integral an is zero when function is

University of Mumbai
Examination 2020

Option A:	Even
Option B:	Odd
Option C:	Real
Option D:	Neither even nor odd
Q13.	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
Q14.	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
Q15.	Find the Laplace transform of $\sin 5t$
Option A:	$\frac{5}{s^2 + 5^2}$
Option B:	$\frac{s}{s^2 + 5^2}$
Option C:	$\frac{5}{s^2 - 5^2}$
Option D:	$\frac{s}{s^2 - 5^2}$
Q16.	Find the z transformation of ${}^n c_p$
Option A:	$(1 - z^{-1})^n$
Option B:	$(1 + z^{-1})^n$
Option C:	$(1 - z^{-1})^{-n}$
Option D:	$(1 + z^{-1})^{-n}$
Q17.	Find $z\{a^n\}$
Option A:	$\frac{z}{z + a}$
Option B:	$\frac{z}{z - a}$
Option C:	$\frac{a}{z - a}$
Option D:	$\frac{a}{z + a}$
Q18.	Find $z\{a^{n-1}\}$
Option A:	$\frac{1}{a} \left[\frac{z}{z + a} \right]$
Option B:	$\frac{1}{a} \left[\frac{z}{z - a} \right]$
Option C:	$\frac{1}{a} \left[\frac{-a}{z + a} \right]$

University of Mumbai
Examination 2020

Option D:	$\frac{1}{a} \left[\frac{a}{z-a} \right]$
Q19.	Find $z\{na^n\}$
Option A:	$\frac{az}{z+a}$
Option B:	$\frac{az}{(z-a)^2}$
Option C:	$\frac{a}{(z-a)^2}$
Option D:	$\frac{a}{(z+a)}$
Q20.	Find $z\{1\}$
Option A:	$\frac{z}{z+1}$
Option B:	$\frac{z}{z-1}$
Option C:	$\frac{1}{z-1}$
Option D:	$\frac{1}{z+1}$
Q21.	$\lim_{z \rightarrow i} \frac{z^2+1}{z^6+1}$ find the given limit.
Option A:	$\frac{2}{3}$
Option B:	$\frac{1}{3}$
Option C:	$\frac{1}{4}$
Option D:	$\frac{1}{5}$
Q22.	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:	$f(z) = \int e^z . dz = e^z + c$
Q23.	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:	$z e^{bz} + c$

University of Mumbai
Examination 2020

Q24.	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:	$\log z + c$
Q25.	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:	$x^4 + c$