

Curriculum Scheme: Revised 2016

Examination: Second Year Semester III

Course Code: CSC301

Course Name: Applied Mathematics-III

Time: 1 hour

Max. Marks: 50

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

Q1.	$L[f(t)] = F(s)$ then $L[t^n f(t)] =$
Option A:	$(-1)^n \frac{d^n}{ds^n}(F(s))$
Option B:	$(-1)^{n+1} \frac{d^n}{ds^n}(F(s))$
Option C:	$\frac{d^n}{ds^n}(F(s))$
Option D:	$(-1)^{n+1} \frac{d^{n+1}}{ds^{n+1}}(F(s))$
Q2.	Find $L[2t^3 + \cosh 4t]$
Option A:	$\frac{12}{s^4} + \frac{s}{s^2 + 16}$
Option B:	$\frac{48}{s^4} + \frac{s}{s^2 + 16}$
Option C:	$\frac{12}{s^4} + \frac{4}{s^2 + 16}$
Option D:	$\frac{12}{s^4} + \frac{s}{s^2 - 16}$
Q3.	Find $L^{-1}(2 \tanh^{-1} s)$
Option A:	$\left(\frac{2}{t} \sinh 2t\right)$
Option B:	$\left(\frac{2}{t} \sin ht\right)$
Option C:	$\left(\frac{2}{t} \cosh 2t\right)$
Option D:	$\left(\frac{2}{t} \cos ht\right)$
Q4.	Find $L^{-1}\left(\frac{s+2}{s^2+4s+7}\right)$
Option A:	$e^{-t} \cdot \sin \sqrt{3}t$
Option B:	$e^{-3t} \cdot \cosh \sqrt{3}t$

Option C:	$e^{-2t} \cdot \cos\sqrt{3}t$
Option D:	$e^{-4t} \cdot \cos 6t$
Q5.	Find $L^{-1}\left(\frac{2s}{s^4+4}\right)$
Option A:	$4\cos t \cdot \sinh t$
Option B:	$2\cos t \cdot \cos ht$
Option C:	$\sin 3t \cdot \sinh t$
Option D:	$\sin t \cdot \sinh t$
Q6.	Find $L[e^{at}f(t)]$, if $L[f(t)]=F(s)$
Option A:	$\frac{1}{s}F\left(\frac{s}{a}\right)$
Option B:	$\frac{1}{a}F\left(\frac{s}{a}\right)$
Option C:	$\frac{1}{s}F\left(\frac{a}{s}\right)$
Option D:	$\frac{1}{a}F\left(\frac{a}{s}\right)$
Q7.	Find a_0 of the function $f(x) = \sqrt{\frac{1-\cos x}{2}}$ in $(0, 2\pi)$
Option A:	$\frac{4}{\pi}$
Option B:	$\frac{2}{\pi}$
Option C:	$\frac{\pi}{4}$
Option D:	$\frac{\pi}{2}$
Q8.	Find a_n if the function $f(x) = x - x^3$
Option A:	Finite value
Option B:	Infinite value
Option C:	Zero
Option D:	Cannot be found
Q9.	Find b_n , when we have to find the half range sine series of the function x^2 in the interval 0 to 3.
Option A:	$-18\frac{\cos(n\pi)}{n\pi}$
Option B:	$18\frac{\cos(n\pi)}{n\pi}$
Option C:	$-18\frac{\cos(n\pi/2)}{n\pi}$
Option D:	$18\frac{\cos(n\pi)}{n\pi}$

Q10.	What is the for parseval's relation in fourier series expansion?
Option A:	$\int_{-l}^l (f(x))^2 dx = l \left[\frac{a_0^2}{2} + \sum_{n=1}^{\infty} (a_n^2 + b_n^2) \right]$
Option B:	$\int_{-l}^l (f(x))^2 dx = l \left[\frac{a_0^2}{2} + \sum_{n=1}^{\infty} (a_n^2) \right]$
Option C:	$\int_{-l}^l (f(x))^2 dx = \frac{l}{2} \left[\frac{a_0^2}{2} + \sum_{n=1}^{\infty} (a_n^2 + b_n^2) \right]$
Option D:	$l \int_{-l}^l (f(x))^2 dx = \left[\frac{a_0^2}{2} + \sum_{n=1}^{\infty} (a_n^2 + b_n^2) \right]$
Q11.	In the interval $(-L, L)$, the b_n co-efficient is
Option A:	$b_n = \frac{1}{L} \int_{-l}^l f(x) \sin \left(\frac{n\pi x}{L} \right) dx$
Option B:	$b_n = \frac{2}{\pi} \int_{-l}^L f(x) \sin (n\pi) dx$
Option C:	$b_n = \frac{1}{\pi} \int_{-L}^L f(x) \sin (n\pi) dx$
Option D:	π
Q12.	Find a harmonic conjugate $v(x, y)$ of $u(x, y) = 2x - x^3 + 3xy^2$
Option A:	$v(x, y) = 2y - 3x^2y + y^3$
Option B:	$v(x, y) = 2 - 3x^2 + y^3$
Option C:	$v(x, y) = 2y - x^3y + 3xy^2$
Option D:	$v(x, y) = 2x - x^3 + y^3$
Q13.	The function $f(x + iy) = x^3 + ax^2y + bxy^2 + cy^3$ is analytic only if
Option A:	$a = 3i, b = -3, c = -i$
Option B:	$a = 3i, b = 3, c = -i$
Option C:	$a = 3i, b = -3, c = i$
Option D:	$a = -3i, b = -3, c = -i$
Q14.	If the real part of an analytic function $f(z)$ is $x^2 - y^2 - y$, then the imaginary part is
Option A:	$2xy$
Option B:	$x^2 + 2xy$
Option C:	$2xy - y$
Option D:	$2xy + x$
Q15.	If u and v are harmonic function then $f(z) = u + iv$ is
Option A:	Need not be analytic function
Option B:	Analytic function

Option C:	Analytic function at $z=0$
Option D:	Analytic function at $z=i$
Q16.	If $\varphi(x, y)$ and $\phi(x, y)$ are function with continuous second derivatives then $\varphi(x, y) + i\phi(x, y)$ can be expressed as an analytic function of $x + iy$ ($i = \sqrt{-1}$) when
Option A:	$\frac{\partial \varphi}{\partial x} = -\frac{\partial \phi}{\partial x}, \frac{\partial \varphi}{\partial y} = -\frac{\partial \phi}{\partial y}$
Option B:	$\frac{\partial \varphi}{\partial y} = -\frac{\partial \phi}{\partial x}, \frac{\partial \varphi}{\partial x} = \frac{\partial \phi}{\partial y}$
Option C:	$\frac{\partial^2 \varphi}{\partial x^2} + \frac{\partial^2 \varphi}{\partial y^2} = \frac{\partial^2 \phi}{\partial x^2} + \frac{\partial^2 \phi}{\partial y^2} = 1$
Option D:	$\frac{\partial \varphi}{\partial x} + \frac{\partial \varphi}{\partial y} = \frac{\partial \phi}{\partial x} + \frac{\partial \phi}{\partial y} = 1$
Q17.	If $f(z) = x + ay + i(bx + cy)$ is analytic then a, b, c equals to
Option A:	$c=1$ and $a = -b$
Option B:	$a=1$ and $c = -b$
Option C:	$b=1$ and $a = -c$
Option D:	$a = b = c = 1$
Q18.	What is the Z-transform of the $f(k) = a^k, k \geq 0$
Option A:	$\frac{z}{z-a}, ROC: z > a $
Option B:	$\frac{z}{z-a^{-1}}, ROC: z > a $
Option C:	$\frac{z}{z-1}, ROC: z > a $
Option D:	$\frac{1}{z-a}, ROC: z > a $
Q19.	Find the Z-transform of the $f(k) = k^2, k \geq 0$
Option A:	$\frac{(z+1)}{(z-1)^3}, ROC: z > 1$
Option B:	$\frac{z(z+1)}{(z-1)^3}, ROC: z > 1$
Option C:	$\frac{z}{(z-1)^3}, ROC: z > 1$
Option D:	$\frac{z(z+1)}{(z-1)}, ROC: z > 1$
Q20.	The region of convergence of the Z-transform of $3(2^k) - 4(3^k), k \geq 0$
Option A:	$ROC: z > 3$
Option B:	$ROC: z > 2$
Option C:	$ROC: z > 0$
Option D:	$ROC: z > 1$

Q21.	Calculate the rank correlation co-efficient from the following data: X : 15 , 20 , 28 , 12 , 40 , 60 , 20 , 80 Y : 40 , 30 , 50 , 30 , 20 , 10 , 30 , 60
Option A:	0.5429
Option B:	0.33
Option C:	0.2546
Option D:	0
Q22.	The normal equation for regression line y on x , by using least square method
Option A:	$\sum y = na + b \sum x$ $\sum xy = a \sum x + b \sum x^2$
Option B:	$\sum x = na + b \sum x$ $\sum xy = a \sum x + b \sum x^2$
Option C:	$\sum x = na + b \sum x$ $\sum y = a \sum x + b \sum x^2$
Option D:	none of these
Q23.	The sign of β_{XY} and β_{YX} which are two regression co-efficient , they have
Option A:	Same sign
Option B:	Opposite sign
Option C:	Either same or opposite sign
Option D:	Nothing can be said
Q24.	The lines of regression intersect at the point
Option A:	(X, Y)
Option B:	(\bar{X}, \bar{Y})
Option C:	$(0,0)$
Option D:	$(1,1)$
Q25.	The Regression Co-efficient y on x
Option A:	$b_{yx} = \frac{\sigma_x}{\sigma_y}$

Option B:	$b_{yx} = r \frac{\sigma_x}{\sigma_y}$
Option C:	$b_{yx} = r \frac{\sigma_y}{\sigma_x}$
Option D:	none of these