Program: SE

Curriculum Scheme: Revised 2012

Examination: Second Year Semester III

Course Code: ISC301 **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 .

Laplace , inv laplace,matrices,lin alg, calculus

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 $L[2t^3 + cosh4t]$
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 $L^{-1}(2tanh^{-1}s)$
Option A:	$\left(\frac{2}{t}sinh2t\right)$
Option B:	$\left(\frac{2}{t}sinht\right)$
Option C:	$\left(\frac{2}{t}cosh2t\right)$
Option D:	$\left(\frac{2}{t}cosht\right)$
Q4.	Find $L^{-1}\left(\frac{s+2}{s^2+4s+7}\right)$
Option A:	$e^{-t}.sin\sqrt{3}t$

Option B:	$e^{-3t}.cosh\sqrt{3}t$
Option C:	$e^{-2t}.cos\sqrt{3}t$
Option D:	$e^{-4t}.cos6t$
Q5.	Find $L^{-1}\left(\frac{2s}{s^4+4}\right)$
Option A:	$4cost.sinht$
Option B:	$2cost.cosht$
Option C:	$sin3t.sinht$
Option D:	$sint.sinht$
Q6.	If $f(t)=\begin{cases} t+1 & 0\le t\le 2 \\ 3 & t>2 \end{cases}$ then $L\{f(t)\}=$
Option A:	$\frac{1}{s}+\frac{1}{s^2}(1-e^{-2s})$
Option B:	$\frac{3}{s}+\frac{1}{s^2}(1-e^{-2s})$
Option C:	$\frac{1}{s}-\frac{1}{s^2}(1-e^{-2s})$
Option D:	$\frac{1}{s^2}(1-e^{-2s})$
Q7.	Find the Laplace Transform of $\int_0^t sin2udu$
Option A:	$\frac{2s}{s(s^2+4)}$
Option B:	$\frac{2}{s(s^2+4)}$
Option C:	$\frac{2}{(s^2+4)}$
Option D:	$\frac{2}{s(s^2+8)}$
Q8.	$L\{f(t)H(t-a)\}=$
Option A:	$e^{-as}L\{f(t-a)\}$
Option B:	$e^{-as}L\{f(t+a)\}$
Option C:	$e^{-s}L\{f(t+a)\}$
Option D:	$e^{-s}L\{f(t-a)\}$
Q9.	$L^{-1}\{e^{-as}\}$
Option A:	$\delta(t+a)$
Option B:	$e^{-as}\delta(t-a)$
Option C:	$\delta(t-a)$
Option D:	$e^{as}\delta(t+a)$

Q10.	Find a_0 of the function $f(x) = \sqrt{\frac{1-cosx}{2}}$ in $(0,2\pi)$
Option A:	$\frac{4}{\pi}$
Option B:	$\frac{2}{\pi}$
Option C:	$\frac{\pi}{4}$
Option D:	$\frac{\pi}{2}$
Q11.	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
Q12.	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$\frac{\cos(n\pi)}{n\pi}$
Q13.	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:	$l\int_{-l}^{l} (f(x))^2\, dx = \left[\frac{{a_0}^2}{2} + \sum_{n=1}^{\infty}({a_n}^2 + {b_n}^2)\right]$
Q14.	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
Q15.	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:	$v(x,y) = 2x - x^3 + y^3$
Q16.	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:	$a = -3i\,, b = -3\,, c = -i$
Q17.	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:	$2xy + x$
Q18.	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:	u and v satisfy Laplace equation .
Q19.	If $\varphi(x,y)$ and $\emptyset(x,y)$ are function with continuous second derivatives then $\varphi(x,y) + i\emptyset(x,y)$ can be expressed as an analytic function of $x + iy$ $\left(i = \sqrt{-1}\right)$ when
Option A:	$\frac{\partial\varphi}{\partial x} = -\frac{\partial\emptyset}{\partial x}\,, \frac{\partial\varphi}{\partial y} = -\frac{\partial\emptyset}{\partial y}$
Option B:	$\frac{\partial\varphi}{\partial y} = -\frac{\partial\emptyset}{\partial x}\,, \frac{\partial\varphi}{\partial x} = \frac{\partial\emptyset}{\partial y}$
Option C:	$\frac{\partial^2\varphi}{\partial x^2} + \frac{\partial^2\varphi}{\partial y^2} = \frac{\partial^2\emptyset}{\partial x^2} + \frac{\partial^2\emptyset}{\partial y^2} = 1$
Option D:	$\frac{\partial\varphi}{\partial x} + \frac{\partial\varphi}{\partial y} = \frac{\partial\emptyset}{\partial x} + \frac{\partial\emptyset}{\partial y} = 1$
Q20.	The Extremal of $\int_{X1}^{X2} \frac{y'^2}{x^2}\,dx$

Option A:	y=c1(x)^3+c2
Option B:	y=c1(x)^2+c2x+c3
Option C:	y=c1x+c2
Option D:	y=c1(x)^4+c2
Q21.	The directional derivative of $\emptyset$ in the direction of $\bar{a}$ is
Option A:	$\frac{\nabla\emptyset.\bar{a}}{\lvert\bar{a}\rvert}$
Option B:	$\frac{\nabla\emptyset.2\bar{a}}{\lvert\bar{a}\rvert}$
Option C:	$\frac{\nabla\emptyset.\bar{a}}{\lvert\bar{a}\rvert^2}$
Option D:	$\frac{\nabla\emptyset.\overline{a^2}}{\lvert\bar{a}\rvert}$
Q22.	The value of the Bessels Function $J_{-3/2}(x) =$
Option A:	$-\sqrt{\frac{2}{\pi x}}\left(\frac{cosx}{x} sinx\right)$
Option B:	$\sqrt{\frac{2}{\pi x}}\left(\frac{cosx}{x} + sinx\right)$
Option C:	$-\sqrt{\frac{2}{\pi x}}\left(\frac{cosx}{x} + sinx\right)$
Option D:	$-\sqrt{\frac{2}{\pi x}}\left(\frac{cosx}{x} + cosx\right)$
Q23.	Find a,b,c if $\bar{\mathrm{F}} = (axy + bz^3)i + (3x^2 - cz)j + (3xz^2 - y)k$ is irrotational.
Option A:	a=6,b=1,c=-1
Option B:	a=4,b=4,c=-2
Option C:	a=6,b=1,c=1
Option D:	a=4,b=0,c=-1
Q24.	Evaluate $\int_A^B (ydx + xdy)\quad along\ y = x^2$ from $A(0,0)\ to\ B(1,1)$
Option A:	1
Option B:	10
Option C:	5
Option D:	-10
Q25.	The Divergence and curl of $\bar{\mathrm{F}} = (x^2 - y^2)i + 2xyj + (y^2 - xy)k$ is
Option A:	$Div\bar{\mathrm{F}} = 0\,, curl\bar{\mathrm{F}} = (2yx)i + (y)j + 4yk$

Option B:	$Div\bar{F} = 5xz + 2xy\, , curl\bar{F} = (2 + x)i + (y)j + 6zk$
Option C:	$Div\bar{F} = 4xy\, , curl\bar{F} = (2y)i + (y)j + 4yk$
Option D:	$Div\bar{F} = 4x\, , curl\bar{F} = (2y - x)i + (y)j + 4yk$