Program: BE Electronics Engineering

Curriculum Scheme: Revised 2012

Examination: Second Year Semester III

Course Code: EXS301 **Course Name: Applied Mathematics-III**

Time: 1 hour **Max. Marks: 50**

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Note: All the questions are compulsory and carry equal marks.

Q1.	Find L[e^t cost]
Option A:	$\frac{1}{(s+2)^2+5}$
Option B:	$\frac{2}{(s+1)^2}$
Option C:	$\frac{s}{(s-1)^2+1}$
Option D:	$\frac{2}{s}$
Q2.	Find L[cos2t sint]
Option A:	$\frac{3}{s^2+9}$
Option B:	$-\frac{1}{s^2+1}$
Option C:	$\frac{9}{s^2+1}$
Option D:	$\frac{1}{2}\left[\frac{3}{s^2+9}-\frac{1}{s^2+1}\right]$
Q3.	Find L[$\sin^2 t$]
Option A:	$\frac{1}{2}\left[\frac{1}{s}-\frac{s}{s^2+4}\right]$

Option B:	$\frac{s}{s^2+4}$
Option C:	$\frac{1}{2}\frac{s}{s^2+4}$
Option D:	$\frac{1}{s}$
Q4.	Find L[e^t]
Option A:	1 / $(s-1)^2$
Option B:	1 / (s-1)
Option C:	2 / s
Option D:	3 / $(s-1)^2$
Q5.	Find $L^{-1}\left[\frac{s}{s^2+4}\right]$
Option A:	e^{-t} sin2t
Option B:	cos2t
Option C:	sin2t
Option D:	e^{-t}
Q6.	Find $L^{-1}\left[\frac{1}{s+5}\right]$
Option A:	(1 - e^{25t})
Option B:	e^{-5t}
Option C:	1 - e^{-5t}
Option D:	e^{-5t} / 5
Q7.	Find half range sine series for f(x) = x in (0 , π)
Option A:	$-\sum_{n=1}^{\infty}\frac{2(-1)^n}{n}\sin nx$
Option B:	$\sum_{n=1}^{\infty}\frac{1-(-1)^n}{2n}\cos nx$
Option C:	$\sum_{n=1}^{\infty}\frac{1-(-1)^n}{2n}$

Option D:	$\sum_{n=1}^{\infty} \cos nx$
Q8.	Which of the following function is odd?
Option A:	$f(x) = x^2$
Option B:	$f(x) = x^2 - x$
Option C:	$f(x) = x$
Option D:	$f(x) = x^3 + x$
Q9.	The function f(x) = sinx is periodic function with period
Option A:	π
Option B:	2π
Option C:	3π
Option D:	4π
Q10.	A vector $\overline{F}$ is Irrotational if $curl\overline{F}$ is
Option A:	1
Option B:	0
Option C:	2
Option D:	4
Q11.	Find the analytic function whose real part is $x^3 - 3xy^2$
Option A:	z^3+c
Option B:	z+c
Option C:	z-c
Option D:	3z+c
Q12.	The integral of the normal component of the curl of a vector $\bar{F}$ over a surface S is equal to the line integral of the tangent component of $\bar{F}$ around the curve bounding S *i.e.* $$\iint_S \bar{N} \cdot (\nabla \times \bar{F}) ds = \int_C \bar{F} \cdot d\bar{r}$$ where $\bar{N}$ is the unit outward normal vector to the element ds.
Option A:	Stoke's Theorem
Option B:	Green's Theorem
Option C:	Gauss-Divergence Theorem
Option D:	Pythagoreans Theorem
Q13.	If $f(z) = r^2 \cos 2\theta + ir^2 \sin p\theta$ is analytic then the value of 'p' is
Option A:	3
Option B:	2

Option C:	4
Option D:	-2
Q14.	Find a_0 of the function $f(x)=\frac{1}{4}(\pi-x)^2$
Option A:	$\frac{\pi^2}{6}$
Option B:	$\frac{\pi^2}{12}$
Option C:	$\frac{5\pi^2}{6}$
Option D:	$\frac{5\pi^2}{12}$
Q15.	If $\overline{F}=x^2\,i+xy\,j+y^2\,k$ then $div\overline{F}$ is
Option A:	X
Option B:	2x
Option C:	3x
Option D:	4x
Q16.	Find the fixed points of the bilinear transformation of $w=\frac{z-4}{2z-5}$
Option A:	1,2
Option B:	-1,2
Option C:	-1,-2
Option D:	1,-2
Q17.	Find grad(ϕ) if $\phi=2x^2+y^2$
Option A:	x i – y j – z k
Option B:	4x i +2 y j
Option C:	x i + y j + z k
Option D:	x i – z k
Q18.	If $div\overline{F}=0$ then $\overline{F}$ is
Option A:	Soleinodal
Option B:	Irrotational
Option C:	Convergent
Option D:	Constant
Q19.	Evaluate $\int_A^B (2y\,dx+x\,dy)$ along $y=x$ from A(0,0) to B(2,2)
Option A:	1
Option B:	6

Option C:	-1
Option D:	3
Q20.	If $\overline{F} = i - xy\,j + y^2\,k$ then $curl\overline{F}$ is
Option A:	(2y - x) i + y j – 2y k
Option B:	x i + y j + z k
Option C:	z i – y k
Option D:	i + 3 j + 2 k
Q21.	The Laplace's equation is
Option A:	$\frac{\partial^2 \phi}{\partial x^2} + \frac{\partial^2 \phi}{\partial y^2} = 0$
Option B:	$\frac{\partial^2 \phi}{\partial x^2} - \frac{\partial^2 \phi}{\partial y^2} = 0$
Option C:	$\frac{\partial^2 \phi}{\partial y^2} = 0$
Option D:	$\frac{\partial^2 \phi}{\partial x^2} = 0$
Q22.	The Cauchy-Riemann equations are
Option A:	$\frac{\partial u}{\partial x} = \frac{\partial v}{\partial y}$ and $\frac{\partial u}{\partial y} = -\frac{\partial v}{\partial x}$
Option B:	$\frac{\partial u}{\partial x} = -\frac{\partial v}{\partial y}$ and $\frac{\partial u}{\partial y} = -\frac{\partial v}{\partial x}$
Option C:	$\frac{\partial u}{\partial x} = \frac{\partial v}{\partial y}$ and $\frac{\partial u}{\partial y} = \frac{\partial v}{\partial x}$
Option D:	$\frac{\partial u}{\partial x} = -\frac{\partial v}{\partial y}$ and $\frac{\partial u}{\partial y} = \frac{\partial v}{\partial x}$
Q23.	The function $\phi = x^2 - 5x + y + 2$ is Harmonic?
Option A:	Yes
Option B:	No
Option C:	Sometimes Yes
Option D:	Sometimes No

Q24.	The Laplace Transform of $\delta(t)$
Option A:	1
Option B:	O
Option C:	∞
Option D:	2
Q25.	$J_{\frac{1}{2}}(x)$ is given by
Option A:	$\sqrt{\frac{2\pi}{x}}\sin x$
Option B:	$\sqrt{\frac{2\pi}{x}}\cos x$
Option C:	$\sqrt{\frac{\pi}{2x}}\cos x$
Option D:	$\sqrt{\frac{2}{\pi x}}\sin x$