University of Mumbai

Examination 2020

Program: ___BE________ Engineering

Curriculum Scheme: Rev2016/2012/2019

Examination: First Year Semester I

Course Code: FEC101_____ and Course Name: Applied Mathematics I

Time: 1 hour Max. Marks:50

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

Q1.	cos(hz) =
Option A:	$\log(z+\sqrt{z^2-1})$
Option B:	$\log(z-\sqrt{z^2-1})$
Option C:	$\log(z^2 + z-1)$
Option D:	$\log(z^2 + z +1)$
Q2.	What is the value of $(1+i)^{100} + (1-i)^{100}$
Option A:	2^{51}
Option B:	-2^{51}
Option C:	2^{50}
Option D:	0
Q3.	If α and β are roots of the equation $x^2+ x +1$ then $\alpha^n +\beta^n =$
Option A:	$2\cos(2n\pi/3)$
Option B:	$2\tan(2n\pi)$
Option C:	$2\sin(2n\pi)$
Option D:	$-2\cos(2n\pi/3)$
Q4.	If $\sin^3\theta \cos^4\theta = a_1 \cos\theta + a_3 \cos3\theta + a_5 \cos5\theta + a_7 \cos7\theta$ then $a_1 + 9a_3 + 5a_5 + 49a_7 =$
Option A:	1
Option B:	2
Option C:	3
Option D:	0
Q5.	If $\alpha\ \beta\ \gamma\ \sigma$ are the roots of the equation $x^4 + x^3 + x^2 + x + 1 = 0$ then $(1-\alpha)(1-\beta)(1-\gamma)(1-\sigma) =$
Option A:	5
Option B:	4
Option C:	3

Option D:	2
Q6.	Represent i^i in terms of e.
Option A:	e^{-} π/3
Option B:	e−3π/2
Option C:	e−π/2
Option D:	e−π/6
Q7.	The Taylor series for $f(x)=7x^2-6x+1$ at x=2 is given by $a+b(x-2)+c(x-2)^2$. Find the value of a+b+c.
Option A:	-1
Option B:	0
Option C:	17
Option D:	46
Q8.	$f(x, y)=x^3+y^3x^9 +y^9 x^8 +y^{9\ 9}$ find the value of fy at (x,y) = (0,1).
Option A:	101
Option B:	-96
Option C:	210
Option D:	0
Q9.	For a homogeneous function if critical points exist the value at critical points is?
Option A:	1
Option B:	equal to its degree
Option C:	0
Option D:	-1
Q10.	The point (0,0) in the domain of f(x, y) = sin(xy) is a point of ____________
Option A:	Saddle
Option B:	Minima
Option C:	Maxima
Option D:	Constant
Q11.	Test for consistency and solve to find the value of x. 5x + 3y + 7z = 4, 3x + 26y + 2z = 9, 7x + 2y + 10z = 5
Option A:	Consistent, x=1
Option B:	Consistent, x=-1
Option C:	Inconsistent system, solution does not exist
Option D:	Consistent, infinite number of solutions possible
Q12.	Solve the following equations using Gauss Elimination Method and find the value of x and z. x + y + 2z + 3w = 1, 2x + 3y - 2z + 4w = 2, 2x + 3y + z - w = 0, 3x - 2y + z - 3w = 3
Option A:	x=1.1 and z=-0.2
Option B:	x=0.3 and z=-0.2

Option C:	x=1.1 and z=0.3
Option D:	x=0.3 and z=-0.6
Q13.	In Euler theorem x ∂z/∂x + y ∂z/∂y = nz, here ‘n’ indicates?
Option A:	order of z
Option B:	degree of z
Option C:	neither order nor degree
Option D:	constant of z
Q14.	Value of $x\frac{\partial u}{\partial x}+y\frac{\partial u}{\partial y}$ if $u=\frac{Sin^{-1}(\frac{y}{x})(\sqrt{x}+\sqrt{y})}{x^3+y^3}$ is?
Option A:	-2.5 u
Option B:	-1.5 u
Option C:	0
Option D:	-0.5 u
Q15.	For two complex numbers p and q, if Arg(p)-Arg(q)=π/2 as well as |pq|=1, what is the value of $\bar{p}q$?
Option A:	-i
Option B:	-1
Option C:	i
Option D:	1
Q16.	Find the Taylor series expansion of the function cosh(x) centered at x = 0.
Option A:	$1-x^2/2!+x^4/4!+\ldots\infty$
Option B:	$x/1!+x^3/3!+x^5/5!\ldots\infty$
Option C:	$1+x^2/2!+x^4/4!+\ldots\infty$
Option D:	$1+x/1!+x^2/2!+\ldots\infty$
Q17.	Let Mclaurin series of some f(x) be given recursively, where an denotes the coefficient of x□ in the expansion. Also given an = a□$_{-1}$ / n and a_0 = 1, which of The following functions could be f(x)?
Option A:	e^x
Option B:	e^{2x}
Option C:	$c + e^x$
Option D:	No closed form exists
Q18.	If every minor of order ‘r’ of a matrix is zero then ρ (A) =?
Option A:	>r
Option B:	=r
Option C:	≤r
Option D:	<r
Q19.	Real Part of sin(x +iy) =
Option A:	sin(x)

Option B:	cos(y)
Option C:	sin(x) cos(hy)
Option D:	sin(x)sin(hy)
Q20.	The argument of(1-i√3)/(1+i√3)
Option A:	210^0
Option B:	90^0
Option C:	240^0
Option D:	45^0
Q21.	If z =$e^{i\alpha}$ the 1+i/1-i =
Option A:	itan(α)
Option B:	-itan(α)
Option C:	cot(α)
Option D:	cos(α)
Q22.	The Common roots of x^4 +1 =0and x^6 -1 =0 are
Option A:	+- [cos(3π/4+isin3π/4)]
Option B:	+-[cos2π/4 + isin2π/4)]
Option C:	+-[cos5π/4 + isin5π/4]
Option D:	+-[cos5π/4 - isin5π/4]
Q23.	Find the value of log2(-3).
Option A:	log3+i8πlog2
Option B:	log3+3iπlog2
Option C:	log3+iπlog2
Option D:	log2+iπlog3
Q24.	Find the Taylor Series for the function f(x)=e^{-6x} about x=-4.
Option A:	∑ (−6)n/n!$e^{12(x+4)}$ n
Option B:	∑(−6)n/n!$e^{24(x-4)}$
Option C:	∑(−6)n/n!$e^{24(x+4)}$ n
Option D:	∑(−4)n/n!$e^{24(x+4)}$ n
Q25.	f(x,y)=x^9 .y^8 sin(x^2+y^2xy)+cos(x^3 x^2y+yx^2)x^{11}.y6 Find the value of f_x at (1,0).
Option A:	23
Option B:	16
Option C:	17(sin(2) + cos(1⁄2))
Option D:	90