

FE/F.Y.B.Tech. (All Branches) (Part-I) (Sem-I) Oct./Nov. 2021 Examination

ENGINEERING MATHEMATICS-I (CBCS)

Sub. Code: 71810/59177

Day and Date: Monday, 21-03-2022

Total Marks: 50

Time:11.15 am to 12.15 pm

- Instructions: i) Attempt all questions
 ii) Each question carries 2 marks
 iii) Write the correct option in the box at right
 iv) Use of non-programmable calculator is allowed

		Correct Option	
Q. 1)	The rank of Identity matrix of order m is -----		
	A) 1		B) 0
	C) m		D) $\neq m$
Q. 2)	The system of equations $AX = B$ is inconsistent if -----		
	A) rank of (A) < rank of [A B]		B) rank of (A) = rank of [A B]
	C) rank of (A) > rank of [A B]		D) rank of (A) \leq rank of [A B]
Q.3)	If the rank of matrix $\begin{bmatrix} 1 & -1 & 0 \\ 0 & 1 & 1 \\ 0 & 1 & \mu \end{bmatrix}$ is 2 then $\mu =$		
	A) any row number		B) 3
	C) 1		D) 2
Q. 4)	For homogeneous equations $AX = 0$, If A is 4 x4 matrix of rank 1, then for non trivial solution and it requires -----		
	A) three independent parameters		B) one independent parameter.
	C) two independent parameters.		D) none of these .
Q. 5)	The product of eigen values of matrix A is equal to		
	A) $ A $		B) Trace of A
	C) $\frac{1}{ A }$		D) $\frac{1}{\text{Trace of A}}$
Q. 6)	If 2,2,8 are the eigen values of the 3x3 matrix A and $ A = 4k$ then k = -----		
	A) 4		B) 2
	C) 8		D) none of these
Q. 7)	The sum and product of eigen value of the matrix $\begin{bmatrix} 4 & 2 \\ -2 & 1 \end{bmatrix}$ are ----		
	A) 5 and 0		B) 5 and 8
	C) 5 and -8		D) can not be determined
Q. 8)	If the eigen values of a matrix A are $\lambda_1, \lambda_2, \lambda_3$ then eigen values of A^{-1} are		
	A) $1/\lambda_1, 1/\lambda_2, 1/\lambda_3$		B) $\lambda_1, \lambda_2, \lambda_3$
	C) $\lambda_1^2, \lambda_2^2, \lambda_3^2$		D) $1/\lambda_1^2, 1/\lambda_2^2, 1/\lambda_3^2$

Q. 9)	Polar form of $(a+ib)^n$ is	
	A) $r^n (\cos\theta - i\sin\theta)^n$	B) $r^n (\sin\theta + i\cos\theta)^n$
	C) $r^n (\sin\theta - i\cos\theta)^n$	D) $r^n (\cos\theta + i\sin\theta)^n$
Q. 10)	The modulus and the amplitude of $-\frac{1}{2} + \frac{\sqrt{3}}{2}i$ are	
	A) $1, \frac{2\pi}{3}$	B) $2, \frac{2\pi}{3}$
	C) $2, \frac{\pi}{6}$	D) $-2, \frac{\pi}{6}$
Q. 11)	$(\cos 4\theta + i \sin 4\theta) (\cos 5\theta + i \sin 5\theta)$ is equal to	
	A) $\cos 9\theta - i \sin 9\theta$	B) $\cos \theta + i \sin \theta$
	C) $\cos 9\theta + i \sin 9\theta$	D) $\sin \theta - i \cos \theta$
Q. 12)	If $x = \cos \theta + i \sin \theta$ then $x^n + \frac{1}{x^n}$ is equal to	
	A) $2 i \sin n \theta$	B) $2 i \sin^n \theta$
	C) 0	D) $2 \cos n \theta$
Q. 13)	$(\cos \theta + i \sin \theta)^n$ is equal to	
	A) $\sin n \theta + i \cos n \theta$	B) $\sin n \theta - i \cos n \theta$
	C) $\cos n \theta + i \sin n \theta$	D) $\cos n \theta - i \sin n \theta$
Q. 14)	Which of the following is not an iterative method	
	A) Gauss Seidel Method	B) Gauss Jordan method
	C) Jacobi Method	D) None of these
Q. 15)	Find the values of y in the first iteration by Gauss Seidel method for the following system of equations $x = (1/12)(2y - z + 24)$, $y = (1/12)(x + 2z + 6)$, $z = (1/12)(3x + 2y + 4)$	
	A) $y_1 = 2/3$	B) $y_1 = 3/2$
	C) $y_1 = 2/4$	D) None of these
Q. 16)	Find the values of y in the second iteration (i.e. y_2) by Jacobi method for the following system of equations $20x + 2y - z = 6$, $x + 20y + 2z = 8$, $x + 3y + 20z = 4$	
	A) $y_2 = 0.385$	B) $y_2 = 0.365$
	C) $y_2 = 0.375$	D) None of these
Q. 17)	Gauss Elimination method reduces to a original matrix into	
	A) Upper triangular matrix	B) Skew symmetric matrix
	C) Identity matrix	D) None of these
Q. 18)	If f is maximum at point (a,b) then	
	A) $rt - s^2 > 0, r > 0$	B) $rt - s^2 > 0, r < 0$
	C) $rt - s^2 \leq 0, r = 0$	D) None of these
Q. 19)	If $u = x^3 - 3xy^2$ then $\frac{\partial u}{\partial x}$ at (1,1) is	
	A) 0	B) -3
	C) -2	D) None of these
Q. 20)	If $f(x,y) = x^2 - 3xy$ is implicit function and by using $\frac{dy}{dx} = -\frac{\frac{\partial f}{\partial x}}{\frac{\partial f}{\partial y}}$, then $\frac{dy}{dx}$ at (1,1)	
	A) -1/3	B) 1/3

	C) 5/3	D) None of these	
Q. 21)	If $u = x - y$, $v = x^2 + y^2$ then Jacobian of (u, v) w.r.t (x, y) i.e $J[(u, v)/(x, y)] =$		
	A) $-2(x + y)$	B) $2(x - y)$	
	C) $2(x + y)$	D) None of these	
Q. 22)	$\lim_{x \rightarrow a} \frac{\sin(x - a)}{x - a}$ is		
	A) 1	B) 0	
	C) -1	D) None of these	
Q. 23)	$\lim_{x \rightarrow \pi/2} \frac{x - \pi/2}{\cot x}$		
	A) -1	B) 0	
	C) 1	D) None of these	
Q. 24)	Taylors series in terms of h is		
	A) $f(x) = f(a) + hf'(a) + (h^2/2)f''(a) + \dots$	B) $f(x) = f(a) + hf'(a) + (h^2/2)f'''(a) + \dots$	
	C) $f(x) = f(a) + hf'(a) + (h^2/2)f'''(a) + \dots$	D) None of these	
Q. 25)	Expansion of a^x by Maclaurins series is		
	A) $a^x = 1 + x(\log a) + (x^2/2!)(\log a)^2 + \dots$	B) $a^x = 1 - x(\log a) + (x^2/2!)(\log a)^2 + \dots$	
	C) $a^x = 1 - x(\log a) - (x^2/2!)(\log a)^2 + \dots$	D) None of these	