AR16

CODE: 16BS1002 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech. II Semester Regular & Supplementary Examinations, June-2018

ENGINEERING MATHEMATICS – II
(Common to all branches)

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a Using Newton- Raphson method find the root of the equation $f(x) = e^x - 3x$ that lie between 0 and 1 — 7M

   b Find Y(25) given that $Y_{20} = 24$, $Y_{24} = 32$, $Y_{28} = 35$, $Y_{32} = 40$, using Newton forward interpolation formula. — 7M

(OR)

2. a The following are the measurements T made on a curve recorded by the oscinography representing a change of current I due to a change in the conditions of an electric current — 7M

T	1.2	2	2.5	3
I	1.36	0.58	0.34	0.20

   Using Lagrange's formula , find I at T = 1.6

   b Using Iteration method , find a real root of $f(x) = x^2 - 3x + 1$ correct up to three decimal places starting with x = 1 — 7M

UNIT-II

3. Evaluate $\int_0^1 \frac{1}{1+x}\,dx$ — 14M

   (i) by Trapezoidal rule (ii) by Simpson's 1/3 rule (iii) by Simpson's 3/8 rule

(OR)

4. Using R-K method to evaluate y(0.1) and y(0.2) given that $y^1 = x + y$, $y(0) = 1$ — 14M

UNIT-III

5. Differential Equation $\frac{d^2y}{dt^2}+2\frac{dy}{dt}-3y=\sin t$, using Laplace transform, given that $y=\frac{dy}{dt}=0 \quad when \quad t=0$ 14M

(OR)

6. a Evaluate the inverse Laplace transform of $\left[\frac{1}{s(s^2+4)}\right]$ by convolution theorem 7M

   b Find the Laplace transforms of $te^{2t}Sin3t$ 7M

UNIT-IV

7. Find the Fourier Series to represent the function e^{-ax} in $-\pi<x<\pi$. From this deduce $\frac{\pi}{\sinh\pi}=2\left[\frac{1}{2^2+1}-\frac{1}{3^2+1}+\frac{1}{4^2+1}-.....\right]$. 14M

(OR)

8. Find half-range Fourier sine series for f(x) = x (π-x), in 0<x< π. Deduce that $\frac{1}{1^3}-\frac{1}{1^3}+\frac{1}{1^3}-\frac{1}{1^3}+.....=\frac{\pi^3}{32}$ 14M

UNIT-V

9. a Form the partial diff. equation by eliminating the arbitrary function from $F(x+y+z,x^2+y^2-z^2)=0$ 7M

   b Solve yzp – xzq = xy 7M

(OR)

10. Solve by the method of separation of variables $u_x=2u_t+u$ where u (x, 0) = 6 e^{-3x}. 14M

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AR13

CODE: 13BS1003 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, June-2018
ENGINEERING MATHEMATICS -III
(Common to CE, ME, CSE, IT, ECE & EEE)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

1. a) Define Rank of a matrix.
   b) Define when a Homogeneous system of equations is inconsistent.
   c) Define Quadratic form.
   d) State Cayley – Hamilton theorem.
   e) Define Eigen value and Eigen vector.
   f) Define Fourier transform of a function f(t).
   g) State Shifting property in Fourier Transforms.
   h) State Convolution theorem in Z-transform.
   i) Evaluate $\left\lceil \frac{7}{2} \right\rceil$.
   j) Define Beta function.

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a) Find the rank of the matrix $A=\begin{bmatrix} 0 & 1 & -3 & -1 \\ 1 & 0 & 1 & 1 \\ 3 & 1 & 0 & 2 \\ 1 & 1 & -2 & 0 \end{bmatrix}$. 6 M

   b) Using Gauss Jordan method solve the following system of equations 6 M

   $x + 3y + 3z = 16$, $x + 4y + 3z = 18$, $x + 3y + 4z = 19$.

(OR)

3. a) Using Gauss Seidel method ,solve the following system of equations 6 M

   $10x + y + z = 12$, $2x + 10y + z = 13$, $2x + 2y + 10z = 14$.

   b) Find the values of K for which the following system of equations has a non-trivial solution.
   $(3K - 8)x + 3y + 3z = 0$, $3x + (3K - 8)y + 3z = 0$, 6 M
   $3x + 3y + (3K - 8)z = 0$.

UNIT-II

4. a) Using Cayley – Hamilton theorem find A^3 if $A=\begin{bmatrix}1 & 2 & 0\\ 2 & -1 & 0\\ 0 & 0 & -1\end{bmatrix}$. 6 M

b) Using Cayley – Hamilton theorem find A^{-1} if $A=\begin{bmatrix}1 & 2 & 0\\ 2 & -1 & 0\\ 0 & 0 & -1\end{bmatrix}$. 6 M

(OR)

5. Reduce the Quadratic form $x^2+5y^2+z^2+2yz+6zx+2xy$ into canonical form by using Orthogonal transformation . Also find its signature, index and nature. 12 M

UNIT-III

6. a) Find Fourier series of $f(x)=\begin{cases}\pi x & 0\le x\le 1\\ \pi(2-x) & 1\le x\le 2\end{cases}$. 6 M

b) Solve the integral equation $\int_0^\infty f(x)\cos\alpha x\,dx = e^{-\alpha}$. 6 M

(OR)

7. a) Find Half range cosine series of the function $f(x)=(x-1)^2$ in the interval $0<x<1$. 6 M

b) Find Fourier cosine transform of e^{-x^2} . 6 M

UNIT-IV

8. a) State Final value theorem in Z – transforms. 3 M

b) Solve the Difference equation $y_{n+2}+6y_{n+1}+9y_n=2^n$ given that $y_0=y_1=0$ using Z-transform. 9 M

(OR)

9. a) Find $Z^{-1}\left(\frac{3z^2-18z+26}{(z-2)(z-3)(z-4)}\right)$. 6 M

b) If $U(z)=\frac{2z^2+5z+14}{(z-1)^4}$, find u_2 & u_3 . 6 M

UNIT-V

10. a) Derive the relation between Beta and Gamma functions. 6 M

b) Evaluate $\int_0^1 x^5\left(\log\left(\frac{1}{x}\right)\right)^3 dx$. 6 M

(OR)

11. a) Prove that $\beta(p,q)=\int_0^1 \frac{x^{p-1}+x^{q-1}}{(1+x)^{p+q}}\,dx$. 6 M

b) Evaluate $\int_0^{\pi/2}\sqrt{\cot\theta}\,d\theta$. 6 M

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CODE: 16CE1001 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

I B.Tech II Semester Supplementary Examinations, June-2018

Building Materials and Construction

(Civil Engineering)

Time: 3 Hours **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

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UNIT-I

1.	a)	Write about the Composition of good brick earth.	8M
	b)	Write any four physical & Mechanical properties of building stone	6M
		(OR)	
2.	a)	Explain any four types of cements	8M
	b)	Discuss various methods of preservation of timber.	6M

UNIT-II

3.	a)	What is a concrete? Explain step wise procedure for manufacturing of concrete.	8M
	b)	Explain any three advantages of alloys over concrete.	6M
		(OR)	
4.	a)	Explain the manufacturing process of Glass.	8M
	b)	Explain any three advantages of plastics.	6M

UNIT-III

5.	a)	Explain English bond & Flemish bond with neat sketches?	8M
	b)	Explain the classification of foundations in brief	6M
		(OR)	
6.	a)	Explain any two water proofing methods.	8M
	b)	Compare the random rubble & coursed rubble masonry.	6M

UNIT-IV

7.	a)	Define pitched roof? Mention its advantages & disadvantages.	8M
	b)	List out the types of stairs. Explain any two of them	6M
		(OR)	
8.	a)	Explain the components of a floor.	8M
	b)	What are the functions of a ventilator? Explain in detail.	6M

UNIT-V

9.	a)	Explain the purpose of form work & write its importance in Civil Engineering Applications.	8M
	b)	Briefly explain white washing & distempering	6M
		(OR)	
10.	a)	Explain about plastering & pointing.	8M
	b)	What are the Constituents of paints? Explain in brief.	6M

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