

I B. Tech II Semester Supplementary Examinations, Nov/Dec - 2019
MATHEMATICS-III

(Com to AE,AME,CE,CSE,IT,EIE,EEE,ME,ECE,Metal E, Min E, E Com E, Agri E, Chem E, PCE,PE)
 Time: 3 hours Max. Marks: 70

- Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)
 2. Answering the question in **Part-A** is Compulsory
 3. Answer any **FOUR** Questions from **Part-B**

PART -A

1. a) If $A = \begin{bmatrix} 123 \\ 246 \\ 4812 \end{bmatrix}$ then find rank of A. (2M)
- b) If 1,2,3 are the Eigen values of matrix A , then Eigen values of A^{-1} . (2M)
- c) What is the Nature of the quadratic form If 1 0,-1 are Eigen values of form the quadratic form. (2M)
- d) What is an asymptote of the curve? (2M)
- e) Find $\beta(1,1)$ (2M)
- f) Prove that $3y^4z^2\bar{i} + z^3x^2\bar{j} - 3x^2y^2\bar{k}$ is a solenoidal vector. (2M)
- g) State Gauss divergence theorem. (2M)

PART -B

2. a) Solve the equations $x + y - 2z + 3w = 0, x - 2y + z - w = 0, 4x + y - 5z + 8w = 0, 5x - 7y + 2z - w = 0$. (7M)
- b) Solve the system of equations $x + y + z = 6, x - y + 2z = 5, 3x + y + z = 8, 2x - 2y + 3z = 7$ by Gauss Jordan method. (7M)
3. a) Verify Cayley -Hamilton theorem for $A = \begin{bmatrix} -1 & 2 & -2 \\ 1 & 2 & 1 \\ -1 & -1 & 0 \end{bmatrix}$ also find A^{-1} (7M)
- b) Find Rank index and signature of quadratic form $10x^2 + 2y^2 + 5z^2 - 4xy - 10xz + 6yz$ by orthogonal reduction. (7M)
4. a) Trace the curve $ay^2 = x^2(a - x)$ (7M)
- b) Find the volume of the sphere $x^2 + y^2 + z^2 = a^2$ using triple integration. (7M)



5. a) Evaluate $\int_0^{\infty} x^6 e^{-2x} dx$ (7M)
- b) Show that $\int_0^{\infty} \frac{x^a}{a^x} dx = \frac{\Gamma(a+1)}{(\log a)^{a+1}}$ ($a > 1$) (7M)
6. a) if \vec{f} , ϕ be differentiable vector and scalar functions respectively, then prove that $\nabla \cdot (\phi \vec{f}) = (\nabla \phi) \cdot \vec{f} + \phi (\nabla \cdot \vec{f})$ (7M)
- b) Prove that $\nabla \left(r \nabla \left(\frac{1}{r^3} \right) \right) = \frac{3}{r^4}$ (7M)
7. a) Apply Green's theorem to evaluate $\oint_C (2xy - x^2) dx + (x^2 + y^2) dy$ where C is bounded by $y = x^2$ and $x = y^2$. (7M)
- b) If $\vec{F} = 6z \vec{i} + (2x + y) \vec{j} - x \vec{k}$, then Evaluate $\iint_S \vec{F} \cdot \hat{n} ds$ where S is the region bounded by the cylinder $x^2 + y^2 = 9$, $x = 0, y = 0, z = 0$ and $y = 8$. (7M)



I B. Tech II Semester Supplementary Examinations, Nov/Dec - 2019**ENGINEERING CHEMISTRY**

(Com. to ECE, EEE, EIE, Bio-Tech, E Com E, Agri E)

Time: 3 hours

Max. Marks: 70

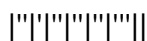
- Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is Compulsory
3. Answer any **THREE** Questions from **Part-B**

PART -A

1. a) Write a note on sterilization of drinking water. (4M)
- b) Define primary and secondary battery with examples. (3M)
- c) What is meant by metal cladding? Give one example. (3M)
- d) Differentiate thermoplastics and thermosetting plastics. (4M)
- e) Define combustion. Calculate the weight of air required for combustion of 6 kg of carbon. (4M)
- f) Explain how cement concrete deteriorates when exposed to CO₂ and SO₂. (4M)

PART -B

2. a) What are boiler troubles? Explain caustic embrittlement. (8M)
- b) Explain the working of glass electrode. Mention its advantages and limitations. (8M)
3. a) Define corrosion. Explain how temperature, position of metal in galvanic series, overvoltage and pH affect the rate of corrosion. (8M)
- b) Discuss the mechanical properties with stress-strain graph of polymers. (8M)
4. a) Discuss estimation of moisture, volatile matter and ash by proximate analysis. (8M)
- b) Explain chemical vapour deposition method and arc discharge method of preparation of nanotubes. (8M)
5. a) Explain how bullet proof plastics are prepared and their applications. (8M)
- b) Discuss about organic surface coatings. (8M)
6. a) Explain the application of Kohlrausch law in determination of degree of dissociation and solubility of sparingly soluble salts. (8M)
- b) How is natural gas obtained? Explain its applications. (8M)
7. a) Explain how polyvinyl chloride is prepared. Mention the difference between rigid and plasticized PVC and their applications. (8M)
- b) Explain ion exchange process and its advantages. (8M)



I B. Tech II Semester Supplementary Examinations, Nov/Dec - 2019
MATHEMATICS-II (MM)

(Com. to CE, ME, CSE, PCE, IT, Chem E, Aero E, Auto E, Min E, Pet E, Metal E & Textile Engg)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)
 2. Answering the question in **Part-A** is Compulsory
 3. Answer any **THREE** Questions from **Part-B**

PART -A

1. a) Find the Root of the equation $2x = \cos x$ using iteration method. (4M)
- b) Prove that $\mu\delta = \frac{1}{2}[\Delta + \nabla]$ (4M)
- c) Find $y(0.1), y(0.2)$ using Euler's formula if $\frac{dy}{dx} = e^x + y, y(0)=1$. (4M)
- d) Find a half range of Sine Series for $f(x) = ax + b$ in $0 < x < 1$. (4M)
- e) Write the Dirichlet conditions for Fourier transforms. (3M)
- f) Find $Z(a^n)$. (3M)

PART -B

2. a) Find the real root of the $xe^x = 3$ using bisection method. (8M)
- b) Find the real root of the $x \log_{10} x = 1.2$ using False position method. (8M)
3. a) Find the Missing terms in the following data. (8M)

x	45	50	55	60	65
y	3	--	2	--	-2.4

- b) Use Lagrange's formula to calculate $f(3)$ from the following table. (8M)

X	0	1	2	4	5	6
Y	1	14	15	5	6	19

4. a) Solve $\frac{dy}{dx} = x + y^2$ using Picard's method for $x=0.1$ given that $y(0)=1$. (8M)
- b) By Runge kutta method of fourth order find $y(0.1)$ given that (8M)

$$\frac{dy}{dx} = 3x + y^2, y(0) = 1$$

5. a) Find Fourier expansion for the function $f(x) = x - x^2$ $-1 < x < 1$. (8M)
- b) Find the Half range cosine series for $f(x) = \begin{cases} kx & 0 < x < \frac{\pi}{2} \\ k(\pi - x) & \frac{\pi}{2} < x < \pi \end{cases}$ (8M)
6. a) Find the Fourier transform of $f(x)$ defined by $f(x) = e^{-\frac{x^2}{2}}$, $-\infty < x < \infty$ (8M)
- b) Find the Fourier sine transform of $\frac{x}{a^2 + x^2}$ (8M)
7. a) State and prove final value theorem. (8M)
- b) Evaluate $Z^{-1} \left[\frac{z^2}{(z-1)(z-2)} \right]$, using convolution theorem. (8M)

