BSM-01

Roll No. 2 0 2 1 0 3 1 0 0 7

B. Tech.
Year: I Semester: I
Test-I (Examination): 2021-22
Calculus and Linear Algebra

Time: 1 Hr. Max Marks: 20

Note: Attempt ALL questions. ALL questions carry equal marks.

Que 1.		Attempt any Two parts of the following. Q. 1 (a) is compulsory.	Marks	CO	BL	PO	PI Code
	a)	(i) Show that the functions $u = \frac{x+y}{1-xy}$, $v = \tan^{-1} x + \tan^{-1} y$ are functionally related. Hence find the relation between them. (ii) Find the shortest and longest distance from the point $(1, 2, -1)$ to the sphere $x^2 + y^2 + z^2 = 24$.	6	1	2/3	1	1.1.1
	b)	(i) Show that n^{th} derivative of $\frac{1}{x^2+a^2}$ is $\frac{(-1)^n n!}{a^{n+2}} \sin(n+1)\theta \sin^{n+1}\theta$, where $\theta = \tan^{-1}\frac{a}{x}$. (ii) If $\phi(cx - az, cy - bz) = 0$, then show that $a\frac{\partial z}{\partial x} + b\frac{\partial z}{\partial y} = c$.	4	1	3	1	1.1.1
	c)	Find the Taylor series expansion of $f(x, y) = \cot^{-1} xy$ in powers of $(x + 0.5)$ and $(y - 2)$ up to the second-degree term. Hence compute $f(-0.4, 2.2)$ approximately.	4	1	3	1	1.1.1
Que 2.		Attempt any Two parts of the following. Q. 2 (a) is compulsory					
	a)	(i) Verify Cayley-Hamilton theorem for matrix A and hence find matrix $A^8 - 5A^7 + 7A^6 - 3A^5 + 8A^4 - 5A^3 + 8A^2 - 2A + I$ If matrix $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$. (ii) Reduce the matrix $\begin{bmatrix} 1 & 0 & -1 & 1 \\ 2 & 1 & 2 & 1 \\ 2 & -1 & 1 & 2 \\ 1 & 2 & 0 & 1 \end{bmatrix}$ to the normal form. Hence find the rank.	6	1	2/3	1	1.1.1
	b)	Solve the system of equations $2x + y + 2z = 10, 2x + 2y + z = 9$ and $x + 2y + 2z = 11$, by finding the inverse using elementary transformations.	4	1	2/3	1	1.1.1
	c)	Find all the eigen values and eigen vectors of following matrix $A = \begin{bmatrix} 3 & -4 & 4 \\ 1 & -2 & 4 \\ 1 & -1 & 3 \end{bmatrix}$	4	1	3	1	1.1.1

BSM-127

Roll No. | | | | | | | | | | | |

B. tech-1st Year
(SEM-I) Odd Semester
TEST-1 (EXAMINATION) 2021 - 2022

Engineering Physics (ECE)

Time: 1 Hrs. **Max. Marks: 10**

Note: Attempt all questions.

Q.1 Attempt any two parts of the following. Q.1 (a) is compulsory.

(a) Write down the number of atoms in a unit cell and coordination number of BCC (Body Centred Cubic) lattice. Find out atomic packing factor (APF) for this lattice. 3

(b) Find out the miller indices of a lattice plane which intercepts at (a, b/2, 3c) in a simple cubic unit cell. Discuss all steps. 2

(c) Draw the continuous and characteristic spectra of X-Ray. Explain the Bragg's law of X-Ray diffraction and derive the relation $2d \sin\theta = n\lambda$, where symbols have usual meaning. 2

Q.2 Attempt any two parts of the following. Q.2 (a) is compulsory.

(a) Write down the Schrodinger equation for a particle in one dimensional potential well. Find the wave functions and energy spectrum for the first three bound state. 3

(b) Derive the time dependent and time independent Schrodinger wave equation. 2

(c) Describe the Davisson-Germer experiment to demonstrate the wave nature of particle? 2

Sub.-Code: BEE-101

Roll No. | | | | | | | | | | | |

B. Tech.
Year: 1st Semester: 1st
Test-I (Examination): 2021-22
Fundamental of Electrical Engineering

Time: 1 Hr. Max Marks: 10

Note: Attempt ALL questions. ALL questions carry equal marks.

Q1. Attempt any Two parts of the following. Q. 1 (a) is compulsory. Marks

a) Differentiate between the following. Giving examples of each. 3
   I) Loop and Mesh
   II) Active element and passive element
   III) Linear network and non-linear network
   IV) Unilateral network and bilateral network.

b) Determine the current in the branches of the network in given Fig.(1) using nodal analysis. 2

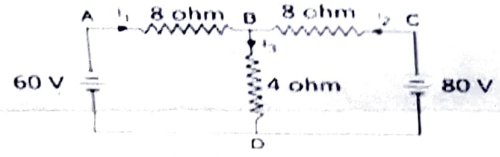

Fig.(1)

c) Determine the equivalent Thevenin' s circuits which may be used to represent the given network shown in Fig.(2) at the terminals AB. 2

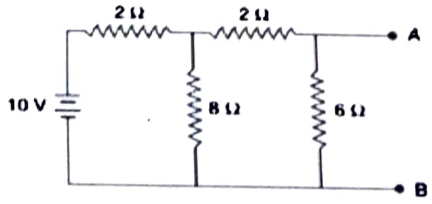

Fig.(2)

Q2. Attempt any Two parts of the following. Q. 2 (a) is compulsory.

a) A series circuit, with R = 10Ω and L = 20 mH, has current i = 4 sin 400t Ampere. Obtain total voltage v and the angle by which i lags v. 3

b) For the sinusoidal wave form derive the following values, where v(t) = 312sin100t 2
   i) RMS Value, ii) Average Value, iii) Form Factor and iv) Peak Factor

c) For the circuit shown in Fig.(3) source voltage is 220V rms, determine the value of resonance frequency and quality factor. 2

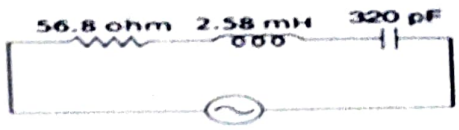

Fig.(3)

BSM-142 Roll No. | | | | | | | | | | |

B.Tech./M.B.A./M.C.A./M.Tech./M.Sc.

Odd Semester (Ist Semester)
MINOR TEST 2021-2022

Subject Name: Advanced Environmental Chemistry (ECE)

Time: 1 Hrs. **Max. Marks: 10**

Note: Answer all questions.

Q1. Attempt any three of the following questions. Q1(a) is compulsary.

(a) (i) List the reactions involved in ozone layer depletion. 1

(ii) What are the methods by which Nitroen fixation takes place in nature? 1

(iii) What is the natural and man made sources of SO_2 in the atmospheres. Briefly explain the any one method to control SO_2 pollution. 1

(b) What is Carbon cycle? With a neat sketch explain carbon cycle. 2

(c) Explain the biogeochemical cycle of Sulphur. 2

Q2. Attempt any three of the following questions. Q2. (a) is compulsary.

(a) (i) what is photochemical smog. 1

(ii) Differentiate between primary and secondary air pollutants with example. 1

(iii) What is the effect of acid rain on plants and animal? 1

(b) List the major air pollutants and explain their effects on human beings. 2

(c) Explain the working of any air pollution control equipments, mentioning their advantages, disadvantages and applications. 2

Subject Code: BHM-101/151 **Roll No** | | | | | | | | | | |

B.Tech

SEM I ODD SEMESTER

TEST-1 (EXAMINATION) 2021-2022

Subject Name: Professional Communication (BHM-101/151)

Time: 1 Hr. **Max. Marks: 20**

Note- Answer All the Questions

Q.1 Attempt any **Two** parts of the following. Q.1(a) is compulsory.

A) What is received pronunciation? What steps will you initiate to activate your passive Vocabulary? **6**

B) What are the soft skills? Is it Necessary to have soft skills for job holders in today's scenario? Discuss. **4**

C) What preparations you will do to attend an interview for the job? Discuss. **4**

Q.2 Attempt any **Two** parts of the following. Q.2(a) is compulsory.

a) What is Skimming? How does it differ from scanning? Where do we use skimming and scanning? Discuss. **6**

b) What is prediction? How it is different from guessing? **4**

c) How visuals and graphics help us to understand better about the subject. **4**