



MAHATMA GANDHI INSTITUTE OF TECHNOLOGY
(Autonomous)
B.Tech. I Semester End Examinations
(Model Question Paper)

Course Title: Matrices and Calculus
Time: 3 hours

Course Code: MA101BS
Max. Marks : 60

Note: Answer ALL Questions
Part-A (10 x 1 = 10 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
1. a)	Define rank of a matrix?	1	1	1	1
1. b)	Find the inverse of an orthogonal matrix $\begin{bmatrix} \cos \theta & 0 & \sin \theta \\ 0 & 1 & 0 \\ \sin \theta & 0 & \cos \theta \end{bmatrix}$. Prove that the matrix $A = \begin{bmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{bmatrix}$ is orthogonal.	1	4	1	1
Unit-II					
1. c)	State Cayley-Hamilton theorem?	1	1	2	1
1. d)	Obtain the matrix corresponding to the following Quadratic form $x_1^2 + 5x_2^2 + 7x_3^2$.	1	3	2	2
Unit-III					
1. e)	Write the relation between Beta and Gamma function.	1	1	3	1
1. f)	Find the value of 'C', if $f(x) = 3 \sin 2x$ is continuous in $[0, \pi]$ using Rolle's theorem.	1	3	3	2
Unit-IV					
1. g)	Define limit and continuity of function of two variables.	1	1	4	1
1. h)	State Euler's theorem	1	1	4	1
Unit-V					
1. i)	Evaluate $\int_0^1 \int_0^2 x \, dx \, dy$	1	5	5	2
1. j)	Evaluate $\int_0^1 \int_0^2 \int_2^3 xyz \, dx \, dy \, dz$	1	5	5	2

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
2. a)	Reduce the matrix 'A' into canonical form and find its rank. Where $A = \begin{bmatrix} 1 & 2 & 1 & 0 \\ -2 & 4 & 3 & 0 \\ 1 & 0 & 2 & -8 \end{bmatrix}$	5	2	1	2
2. b)	Show that the system of equations $x + 2y - z = 3$, $3x - y + 2z = 1$, $2x - 2y + 3z = 2$ are consistent and solve them.	5	2	1	2
OR					
2. c)	Solve the system of equations $2x + y + z = 10$, $3x + 2y + 3z = 18$ and $x + 4y + 9z = 16$ using Gauss – Elimination method.	5	4	1	2
2. d)	Using Gauss- Seidel iteration method, solve the following system $x + 3y + 3z = 5$, $2x + 4y + z = 4$ and $8x + y + z = 8$	5	3	1	2
Unit-II					
3. a)	Find the Eigen values and Eigen Vectors of $A = \begin{bmatrix} -1 & 1 & 0 \\ 1 & -1 & 0 \\ 0 & 0 & 0 \end{bmatrix}$	5	1	2	1
3. b)	Reduce the Quadratic form $-x_1^2 - x_2^2 + 2x_1x_2$ in to Canonical form using orthogonal transformation.	5	2	2	2
OR					
3. c)	Verify Caley-Hamilton theorem for $A = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix}$ and find its inverse.	5	2	2	1

3. d)	Diagonalize the matrix $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$	5	4	2	2
Unit-III					
4. a)	Verify Rolle's theorem for $f(x) = (x + 2)^3(x - 3)^4$ in $[-2, 3]$	5	2	3	1
4. b)	Evaluate $\int_0^2 (8 - x^3)^{\frac{1}{3}} dx$	5	5	3	2
OR					
4. c)	If $a < b$, prove that $\frac{b-a}{1+b^2} < \tan^{-1} b - \tan^{-1} a < \frac{b-a}{1+a^2}$ using Legranges mean value theorem and deduce $\frac{\pi}{4} + \frac{3}{25} < \tan^{-1} \frac{4}{3} < \frac{\pi}{4} + \frac{1}{6}$	5	3	3	2
4. d)	Evaluate $\int_0^{\frac{\pi}{2}} \sin^5 \theta \cos^7 \theta d\theta$	5	5	3	2
Unit-IV					
5. a)	If $x = u(1 - v), y = uv$, prove that $j \cdot j' = 1$	5	2	4	2
5. b)	Find the maximum and minimum values of $x^3 + y^3 - 3axy$	5	1	4	1
OR					
5. c)	Show that the functions $u = \frac{x+y}{1-xy}$ and $v = \tan^{-1} x + \tan^{-1} y$ are functionally related. Find the relation between them.	5	2	4	2
5. d)	Find the rectangular parallelepiped maximum value that can be inscribed in a sphere	5	1	4	2
Unit-V					
6. a)	Evaluate $\iint xy dx dy$, where 'R' is the region bounded by R $x - axis$, ordinate $x = 2a$ and the curve $x^2 = 4ay$.	5	5	5	2
6. b)	Transform the following to Polar form and hence evaluate $\int_0^a \int_0^{\sqrt{a^2-x^2}} y\sqrt{x^2+y^2} dx dy$	5	2	5	2
OR					
6. c)	Change the order of integration and evaluate $\int_0^{4a} \int_{\frac{x^2}{4a}}^{2\sqrt{ax}} dx dy$	5	2	5	2
6. d)	Find the area enclosed by the parabolas $x^2 = y$ and $y^2 = x$	5	1	5	1

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome



Course Title: **Applied Physics**

Course Code: **PH101BS**

Time : 3 hrs

Max. Marks : 60

Note: Answer all questions

Part - A (10×1=10 Marks)

Q. No.	Stem of the question	M	L	CO	PO
Unit – I					
1. a)	Define a Blackbody?	1	1	1	1
1. b)	What is De-Broglie's hypothesis?	1	1	1	1
Unit – II					
1. c)	Distinguish between the direct and indirect band gap semiconductors.	1	2	2	2
1. d)	Draw the notation for the npn and pnp transistors.	1	1	2	1
Unit – III					
1. e)	Define the terms dielectric constant and polarizability.	1	1	3	1
1. f)	Define Bohr magneton.	1	1	3	1
Unit – IV					
1. g)	What is quantum confinement?	1	1	4	1
1. h)	List any four applications of nanomaterials.	1	1	4	1
Unit – V					
1. i)	Write the characteristics of lasers.	1	1	5	1
1. j)	Explain the principle of optical fiber	1	1	5	1

Part - B (5×10 = 50 Marks)

Q. No.	Stem of the question	M	L	CO	PO
Unit – I					
2. a)	Explain Planck's hypothesis and derive the expression for Planck's radiation law.	6	1	1	1
2. b)	The uncertainty in the momentum Δp of a ball travelling at 20 m/s is 1×10^{-6} kg m/s. Calculate the uncertainty in position Δx ? Mass of the ball is given as 0.5 kg.	4	3	1	2
(or)					
2. c)	Derive an expression for energy quantization in particle in 1 D box.	6	1	1	1
2. d)	An electron is confined in an infinite potential well of width 5 Å. Calculate the energy and their corresponding de-Broglie wavelength of the electron in its ground state and first excited state.	4	3	1	2
Unit – II					
3. a)	Compare the construction, principle of operation and characteristics of P-N Junction diode and Zener diode.	7	2	2	1
3. b)	Current flowing in a p-n junction is 0.2 mA at room temperature when a large reverse bias voltage is applied. Calculate the current when a forward bias of 0.1 V is applied.	3	3	2	2
(Or)					
3. c)	Explain the structure and working principle of Light Emitting Diode (LED) and mention the characteristics of LED.	6	1	2	1
3. d)	A light emitting diode is made of GaAsP having a band gap of 1.9 eV. Determine the wavelength and also mention the colour of radiation emitted.	4	3	2	2
Unit – III					

4. a)	Derive an expression for electronic polarizability	6	1	3	1
4. b)	The dielectric constant of a Helium gas at NTP is 1.0000684. Calculate the electronic polarizability of Helium atoms if the gas contains 2.7×10^{26} atoms/m ³ .	4	3	3	2
	(Or)				
4. c)	Define Hysteresis and distinguish between hard and soft magnetic materials based on Hysteresis	6	1	3	1
4. d)	Find the relative permeability of the ferromagnetic material if a magnetic field of strength 220 A/m produces magnetization of 3300 A/m in it.	4	3	3	2
	Unit – IV				
5. a)	What are nanomaterials? Discuss the properties of various kinds of nanomaterials with examples.	5	2	4	1
5. b)	Show that surface area to volume ratio is decreasing with increasing the dimensions in the case of cube.	5	3	4	2
	(or)				
5. c)	Discuss in detail about the solgel method to prepare nanoparticles.	7	2	4	1
5. d)	Apply Bragg's law and calculate the d-spacing of a nanocrystalline nickel if the lattice parameter is 0.93 Å for (110) plane.	3	3	4	2
	Unit – V				
6. a)	Explain the construction, working, energy level diagram and applications of carbon dioxide laser.	7	1	5	1
6. b)	Calculate the ratio of rate of spontaneous emission to rate of stimulated emission if the wavelength of the radiation is 5500 Å.	3	3	5	2
	(or)				
6. c)	Classify optical fibers based on refractive index profile and discuss various attenuation mechanisms occur in optical fiber	6	2	5	1
6. d)	Find the numerical aperture and acceptance angle of a fibre of core index 1.4 and fraction change of refractive index (Δ) is 0.02.	4	3	5	2

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MAHATMA GANDHI INSTITUTE OF TECHNOLOGY
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B.Tech. I Semester End Examinations
(Model Question Paper)

MR-22

Course Title: Engineering Chemistry
Time: 3 hours

Course Code: CH101BS
Max. Marks: 60

Note: Answer ALL Questions
Part-A (10 x 1 = 10 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
1. a)	Define temporary and permanent hardness. How is it caused?	1	1	1	1
1. b)	Why water should not be fed to boiler immediately drawing from source?	1	3	1	2
Unit-II					
1. c)	How does fuel cell differ from battery?	1	4	2	5
1.d)	Why galvanized sheets are not advised in making utensils?	1	3	2	3
Unit-III					
1. e)	What are the monomers of Nylon 6,6 and Terylene	1	2	3	1
1.f)	Why Bakelite is more tough and rigid? Explain	1	3	3	1
Unit-IV					
1. g)	Define HCV and LCV	1	1	4	1
1.h)	What is Trans esterification?	1	2	4	7
Unit-V					
1. i)	Define Viscosity and Viscosity index	1	1	5	1
1.j)	Explain the role of gypsum in setting and hardening of cement	1	3	5	6

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
2.a)	Explain the Ion-Exchange method for softening of hard water with a neat labelled diagram.	5	1	1	1
2.b)	Discuss about the principle and working of reverse osmosis. Enlist the advantages and limitations	5	3	1	6
OR					
2.c)	What are scale and sludge? Discuss the consequences of their formation in boilers and mention their preventions.	6	2	1	2
2.d)	Calculate the temporary and permanent hardness of water when the following dissolved salts are present per litre: $\text{Ca}(\text{HCO}_3)_2 = 162\text{mg}$, $\text{Mg}(\text{HCO}_3)_2 = 73\text{ mg}$, $\text{CaCl}_2 = 222\text{ mg}$, $\text{MgCl}_2 = 9.5\text{ mg}$, $\text{CaSO}_4 = 13.6\text{mg}$ and $\text{NaCl} = 100\text{ mg}$.	4	3	1	2
Unit-II					
3.a)	Explain the construction and working of Lithium-ion battery	5	1	2	6
3.b)	What are fuel cells? Give the construction and working of Methanol- O_2 fuel cell.	5	2	2	5
OR					
3.c)	Write the principle of cathodic protection and discuss sacrificial anodic method along with its advantages	5	1	2	3
3.d)	Discuss and explain concentration corrosion with a suitable example.	5	4	2	2
Unit-III					
4. a)	Write the preparation, properties and applications of polystyrene.	5	1	3	1
4. b)	What are Biodegradable Polymers? Give the preparation, properties and applications of (i) Polylactic acid (ii) Poly vinyl Alcohol	5	2	3	1
OR					
4. c)	How can you differentiate thermoplastic from thermosetting resins?	4	3	3	1
4. d)	Discuss the mechanism of Conductance in polyacetylene	6	2	3	3
Unit-IV					

5. a)	How to evaluate coal by Proximate analysis? Explain it.	5	3	4	2
5. b)	Define cracking. Explain the following terms i) knocking ii) octane number iii) cetane number	5	1	4	1
OR					
5. c)	A gaseous fuel has the following composition by volume H ₂ =20%, CH ₄ =6%, CO= 22%, CO ₂ =4%, O ₂ =4%. Find the volume of air required if 20% excess air is supplied per 100 m ³ of fuel.	4	3	4	2
5.d)	What are CNG & LPG? Write their composition, characteristics and uses	6	2	4	7
Unit-V					
6. a)	Enumerate the characteristics of a good lubricant	4	2	5	1
6. b)	What are refractories? How are they classified? Give any two essential requirements of good refractories.	6	2	5	6
OR					
6. c)	What are Shape memory materials? Write a note on Thermo response materials.	5	2	5	5
6.d)	Write a brief account on setting and hardening of cement.	5	1	5	6

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome



B.Tech. I Semester End Examinations
(Model Question Paper)

Course Title: C Programming and Data Structures
Time: 3 hours

Course Code: CS102ES
Max. Marks : 60

Note: Answer ALL Questions

Part-A (10 x 1 = 10 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
1. a)	What are the steps followed in Program Development?	1	2	1	2
1. b)	List the Precedence of Operators.	1	1	1	1
Unit-II					
1. c)	What are the applications of an Array?	1	1	2	1
1. d)	Differentiate between Break and Continue.	1	2	2	1
Unit-III					
1. e)	Define a Pointer. Declare and initialize a pointer to an integer.	1	2	2	1
1. f)	List various String Input/Output functions?	1	1	2	1
Unit-IV					
1. g)	Define Structure. Discuss the operations on Structures.	1	2	4	1
1. h)	List some of the library functions used to write data into files?	1	2	4	1
Unit-V					
1. i)	What is the difference between File Structure and Data Structure?	1	2	5	1
1. j)	What is Abstract Data type?	1	2	5	1

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
2. a)	Explain the various Operators used in C programming.	5	2	1	1
2. b)	What is Type Conversion? Discuss Implicit and Explicit Type Conversion with example.	5	2	1	2
OR					
2. c)	What are the various Computing Environments? Explain.	5	2	1	1
2. d)	Discuss Bitwise operators in detail.	5	2	1	1
Unit-II					
3. a)	What are the conditional and unconditional Statements? Explain.	5	3	2	1
3. b)	Write a C program to find the Factorial of the given number using recursion.	5	4	2	2
OR					
3. c)	What is 2-Dimensional Array? Explain its implementation with example.	5	1	2	1
3. d)	Explain the Switch statement in C. Write a menu driven C program that takes 2 integers and an operator as input and gives the output as sum, difference, product and division.	5	2	2	2
Unit-III					
4. a)	What is a Pointer? Write a C program to illustrate pointer-to-pointer.	5	3	3	1
4. b)	Explain the given String Manipulation functions. i) Strlen() ii) Strcmp() iii) Strcpy()	5	2	3	1
OR					
4. c)	Build a C program to concatenate two strings without using built-in functions	5	2	3	1
4. d)	What is an array of Pointers? Illustrate with an example.	5	2	3	1
Unit-IV					
5. a)	Explain Union in C with example? What are the differences between Structure and Union?	5	2	4	1
5. b)	What is a Structure? Write a program to access the elements of the Structure.	5	3	4	1
OR					
5. c)	What is Enumerated datatype? Illustrate with an example.	5	2	4	2
5. d)	Write a program to read last 'n' characters of the file using appropriate file functions.	5	2	4	1
Unit-V					
6. a)	Explain how Binary Search works and mention its pros and cons.	5	2	5	2
6. b)	Apply Insertion Sort on {22,11,66,44,99,55,88}.	5	3	5	2
OR					
6. c)	Devise an algorithm for Bubble Sort and explain with an illustration.	5	3	5	2
6. d)	Discuss the various Stack Operations in detail.	5	2	5	2

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome



MAHATMA GANDHI INSTITUTE OF TECHNOLOGY
(Autonomous)
B.Tech. I Semester End Examinations
(Model Question Paper)

MR-22

Course Title: Programming for Problem Solving
Time: 3 hours

Course Code: CS101ES
Max. Marks : 60

Note: Answer ALL Questions
Part-A (10 x 1 = 10 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
1. a)	Develop an algorithm to find the whether the given number is even or odd.	1	3	1	2
1. b)	Discuss operator precedence and associativity.	1	2	1	1
Unit-II					
1. c)	List the applications of an array?	1	1	2	1
1. d)	Define a pointer. Declare and initialize a pointer to an integer.	1	1	2	1
Unit-III					
1. e)	Write a function that checks whether a given year is leap year or not.	1	3	3	1
1. f)	Discuss about the limitations in recursion	1	2	3	1
Unit-IV					
1. g)	Describe the pre-processor directives.	1	2	4	1
1. h)	Determine some of the library functions used to write data into files?	1	3	4	1
Unit-V					
1. i)	Discuss the time complexity of the bubble sort.	1	2	5	1
1. j)	Define sorting? What are the importances of sorting.	1	1	5	1

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
2. a)	Explain the various operators used in c programming.	5	2	1	1
2. b)	Write a C program to check whether the given number is Palindrome or not.	5	3	1	2
OR					
2. c)	Discuss the various symbols used in flowchart with example.	5	2	1	1
2. d)	Describe various conditional and unconditional statements used in C with example.	5	2	1	1
Unit-II					
3. a)	What is structure? Write a C Program to illustrate the concept of structure.	5	3	2	1
3. b)	Construct a C program to concatenate two strings without using built-in functions	5	3	2	2
OR					
3. c)	Write a C program to multiply two matrices.	5	3	2	1
3. d)	Demonstrate using pointers to compute the sum of all elements stored in an array.	5	3	2	2
Unit-III					
4. a)	List out the any five pre-processor directives and explain them with an example.	5	1	3	1
4. b)	Explain various random-access function in files	5	2	3	1
OR					
4. c)	Write a program to read last 'n' characters of the file using appropriate file functions.	5	3	3	1
4. d)	Explain macros with suitable example.	5	2	3	1
Unit-IV					
5. a)	Demonstrate passing arrays to functions with an example.	5	3	4	1
5. b)	Differentiate call by value and call by reference with an example.	5	2	4	1
OR					
5. c)	Write a C program to generate Fibonacci series using recursion.	5	3	4	2
5. d)	Explain dynamic memory allocation functions with suitable example.	5	2	4	1
Unit-V					
6. a)	Explain how binary Search works and mention its pros and cons.	5	2	5	2
6. b)	Apply insertion sort on {22,11,66,44,99,55,88}.	5	3	5	2
OR					
6. c)	Devise an algorithm for bubble sort and explain with an illustration.	5	4	5	2
6. d)	Write a program in 'C' to print list of integers in ascending order using selection sort.	5	3	5	2

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome

**Course Title: English for Skill Enhancement**

Time: 3 hours

Course Code: EN101HS

Max. Marks : 60

*Note: Answer ALL Questions**Part-A (10 x 1 = 10 Marks)*

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
1. a)	He is ----- honest person. (Fill in the blank the with appropriate article)	1	1	1	10
1. b)	Give the meaning of the suffix 'phobia'	1	1	1	10
Unit-II					
1. c)	Write an example for homophones.	1	1	2	10
1. d)	Correct the misspelt word in the following sentence. There is no sugar in the cofee.	1	1	2	10
Unit-III					
1. e)	The wrestler was a large man with a flowing beard weighing 130 kg (Rewrite the sentence, moving the misplaced modifier to its correct position	1	2	3	10
1. f)	Synchronous learning is -----	1	1	3	10
Unit-IV					
1. g)	We must encourage new innovation. (spot the redundant word)	1	2	4	10
1. h)	Expand the abbreviation ASAP	1	1	4	10
Unit-V					
1. i)	Give the plural form of the word 'scarf'.	1	6	5	10
1. j)	Identify the correct collocation in the following sentences a. He has a hard handsake b. He has a firm handshake.	1	2	5	10

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
2. a)	Explain the term "Bharat brand English" used by the author in 'Toasted English"	5	2	1	10
2. b)	Define Compounding and Blending processes of word formation. Illustrate your answer with two examples of each process.	5	1	1	10
OR					
2. c)	What does the author of Toasted English mean by 'the American National Expression'	5	1	1	10
2. d)	List out the essential features of a good Paragraph	5	1	1	10
Unit-II					
3. a)	State why Sudha Murthy took the decision of quitting her job at TELCO.	5	1	2	10
3. b)	Write a note on Skimming and Scanning, underlining the article & preposition in your write up.	5	2	2	10
OR					
3. c)	Describe Sudha Murthy's first experience of gender discrimination.	5	2	2	10
3. d)	Expand the idea 'Actions speak louder than words' into a Paragraph in about 250 words	5	4	2	10
Unit-III					
4. a)	List out the four takeaways related to online learning that should be retained post-pandemic.	5	1	3	10
4. b)	Elaborate the elements of a Formal Letter.	5	3	3	10
OR					
4. c)	Differentiate between synchronous and asynchronous learning.	5	4	3	10
4. d)	Prepare your Resume/CV	5	3	3	10
Unit-IV					
5. a)	How do the different arts influence human civilisation?	5	4	4	10

5. b)	Explain SQ3R method in detail.	5	2	4	10
OR					
5. c)	Kalam believed that ‘Students of art and literature are important contributors to transforming India into a developed nation’. Discuss.	5	2	4	10
5. d)	Write a narrative/descriptive essay on ‘the happiest moment of your life’.	5	2	4	10
6. a)	What was Bagchi’s first lesson in success?	5	2	5	10
6. b)	Prepare a project report on the problems people faced with the advent of Covid-19.	5	3	5	10
OR					
6. c)	Justify the circumstances that created in Bagchi a sense of interconnectedness with a larger world.	5	5	5	10
6. d)	Prepare a report on the following situation choosing a suitable format for your report. A car manufacturing company asks an agency to prepare a marketing report on how to improve the sales of its latest model of car.	5	6	5	10

M: Marks; L: Bloom’s Taxonomy Level; CO: Course Outcome; PO: Programme Outcome



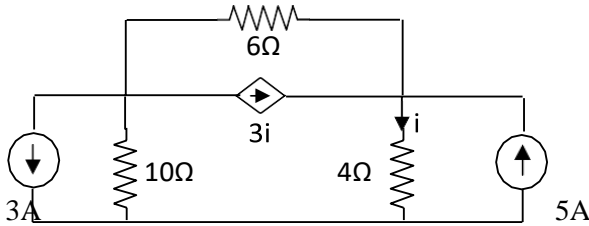
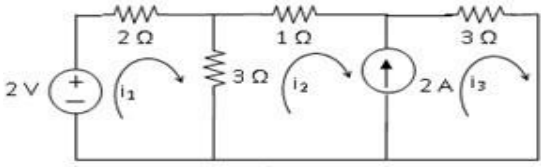
Course Title: Electrical Circuit Analysis -1
Time: 3 hours

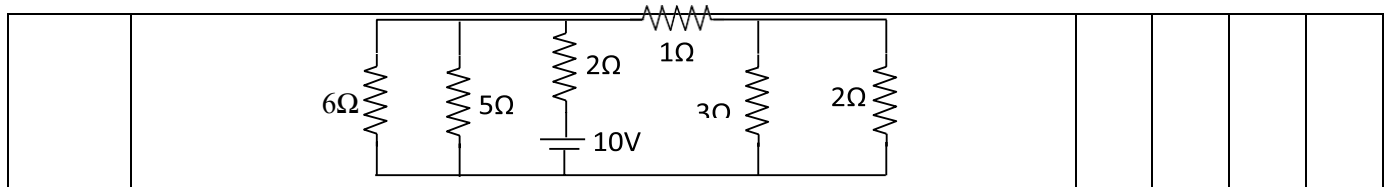
Course Code: EE101PC
Max. Marks: 60

Note: Answer ALL Questions
Part-A (10 x 1 = 10 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
1. a)	Give the volt-ampere relations of R, L, and C parameters	1	1	1	1
1. b)	What is the use source transformation. Convert the voltage source to current source and vice-versa with an example.	1	2	1	1
Unit-II					
1. c)	Define form factor and crest factor	1	1	2	1
1.d)	What is a resonance in RLC circuit	1	2	2	1
Unit-III					
1. e)	Write the statement of superposition theorem.	1	2	3	1
1.f)	State the Thevenin's theorem	1	2	3	1
Unit-IV					
1. g)	What is the relation between line current and phase current in a three phase star connected system and also relation between line voltage and phase voltage in a three phase star connected system	1	2	4	1
1.h)	What is the current in the neutral wire of a balanced three phase 4 wire connected load .	1	3	4	2
Unit-V					
1. i)	Define connected graph, oriented graph, and planar graph	1	2	5	1
1.j)	What is self-inductance and mutual inductance	1	1	5	1

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
2.a)	Determine the "i" in the network shown in figure using nodal analysis 	5	3	1	2
2.b)	Calculate the mesh currents in the network shown in Figure 2(b)  Figure 2(b)	5	2	1	1
OR					
2. c)	State and explain Kirchhoff's laws with an example	4	2	1	1
2.d)	What is the magnitude of current drained from the 10V source in the circuit shown in figure below?	6	1	1	1



Unit-II

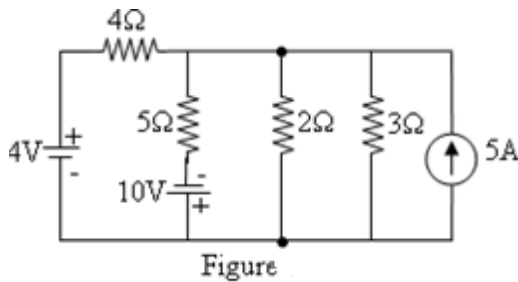
3. a)	Derive the Resonance frequency and Band width of a series RLC circuit	5	3	2	1
3. b)	A series RLC circuit consists of resistance $R=20\Omega$, $L=0.01H$ and $C=0.04\mu F$. Calculate resonance frequency, lower cut off frequency, higher cut off frequency, Band width and Quality factor	5	2	2	2

OR

3. c)	A Resistor of 100Ω in series with a capacitance of $50\mu F$ is connected to a supply of $200V$, $50Hz$. Find: (i) impedance (ii) current (iii) phase angle (iv) voltage across the resistor & capacitor.	5	3	2	1
3.d)	A resistance and inductance are connected in series across a voltage given by $v(t) = 283 \sin wt$. The power drawn by the series combination is $400 W$ and the current has a maximum value of $4 A$. Determine the circuit parameters and the power factor of the circuit.	5	2	2	2

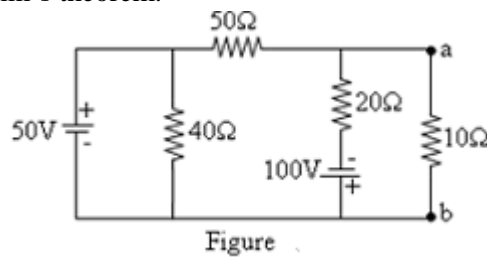
Unit-III

4. a)	Define Maximum Power Transfer theorem.	2	3	3	1
4. b)	Find the current through 2Ω resistor in Figure, using Millman's theorem.	8	2	3	2



OR

4. c)	Find voltage across 10Ω resistance in the network shown in Figure, using the Thevenin's theorem.	6	4	3	2
4.d)	State and explain compensation theorem.	4	2	3	1

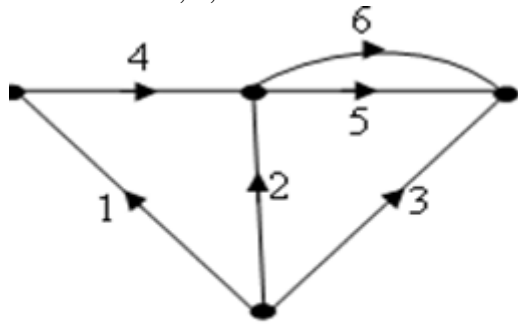


Unit-IV

5. a)	Derive the relation between line and phase voltage also relation between line and phase current in a three phase Delta connected system	4	3	4	1
5. b)	A Delta connected load $(8+j6)\Omega$ per phase is supplied from three phase $440V$ source. Find the line voltage, Line current, Power factor, Total Power and Power per phase.	6	2	4	2

OR

5. c)	Three impedances of $(7+j4)\Omega$, $(3+j2)\Omega$, and $(9+j2)\Omega$ are connected between neutral and three phases respectively of 3 phase 4 wire system; the line	5	2	4	1
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	voltage is 440V. Calculate (i) the current in each line (ii) current in the neutral wire				
5.d)	The currents in RY, YB, BR branches of a mesh connected system with symmetrical voltages are 20A at 0.7 lagging power factor, 20A at 0.8 leading power factor, 10A at UPF respectively. Calculate the current in each line .Phase sequence is RYB	5	5	4	2
Unit-V					
6. a)	Two coupled coils with $L_1 = 0.01$ H and $L_2 = 0.04$ H and $k = 0.6$ can be connected in four different ways such as series aiding, series opposing, parallel aiding and parallel opposing. Find equivalent inductance in each case.	5	3	5	2
6. b)	Derive the expression for coefficient of coupling between pair of magnetically coupled coils.	5	2	5	1
OR					
6. c)	Define: (i) Graph (ii) Path (iii) Connected graph.	3	1	5	1
6.d)	Determine the basic cutset matrix for the oriented graph given in Figure where the elements 1, 2, 3 are free branches. <div style="text-align: center;">  <p>Figure</p> </div>	8	3	5	2

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome



B.Tech. I Semester End Examinations
(Model Question Paper)

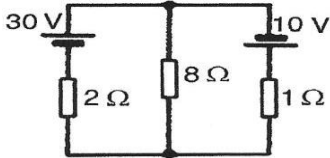
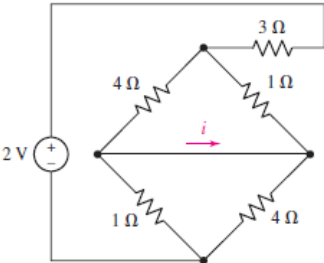
Course Title: Basic Electrical Engineering
Time: 3 hours

Course Code: EE101ES
Max. Marks: 60

Note: Answer ALL Questions
Part-A (10 x 1 = 10 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
1. a)	State Ohm's Law.	1	1	1	1, 2, 3, 4, 6, 12
1. b)	What is the difference between a loop and a mesh?	1	2	1	1, 2, 3, 4, 6, 12
Unit-II					
1. c)	Define form factor.	1	1	2	1, 2, 3, 4, 6, 12
1. d)	Determine the periodic time for the following frequencies: (i) 2.5 Hz (ii) 100 kHz	1	2	2	1, 2, 3, 4, 6, 12
Unit-III					
1. e)	Draw the phasor diagram for an ideal transformer.	1	2	3	1, 2, 3, 4, 6, 12
1. f)	What is an autotransformer?	1	1	3	1, 2, 3, 4, 6, 12
Unit-IV					
1. g)	Define slip of an induction motor.	1	1	4	1, 2, 3, 4, 6, 12
1. h)	Draw a flow diagram for different types of DC generators?	1	2	4	1, 2, 3, 4, 6, 12
Unit-V					
1. i)	What are the different types of batteries?	1	1	5	1, 2, 3, 4, 6, 12
1. j)	Expand the abbreviations MCB, MCCB, ELCB.	1	1	5	1, 2, 3, 4, 6, 12

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
2.a)	Classify the different types of elements.	5	2	1	1, 2, 3, 4, 6, 12
2.b)	Develop the necessary equations to convert a given π to T network.	5	3	1	1, 2, 3, 4, 6, 12
OR					
2. c)	Use the superposition theorem to find the current in the $8\ \Omega$ resistor. 	5	3	1	1, 2, 3, 4, 6, 12
2. d)	Employing mesh analysis procedures, obtain a value for the current labelled i in the circuit. 	5	4	1	1, 2, 3, 4, 6, 12

Unit-II					
3. a)	Obtain the form factor for a sinusoidal wave using the analytical method.	5	2	2	1, 2, 3, 4, 6, 12
3. b)	Prove that the power in an R-L circuit is $P = VI \cos \phi$	5	2	2	1, 2, 3, 4, 6, 12
OR					
3. c)	An alternating current varies with time over half a cycle as follows: Current (A) 0 0.7 2.0 4.2 8.4 8.2 2.5 1.0 0.4 0.2 0 Time (ms) 0 1 2 3 4 5 6 7 8 9 10 The negative half cycle is similar. Plot the curve and determine: (a) the frequency (b) the instantaneous values at 3.4 ms and 5.8 ms (c) its mean value, and (d) its r.m.s. value.	5	4	2	1, 2, 3, 4, 6, 12
3. d)	Three inductive loads, each of resistance 4Ω and reactance 9Ω are connected in delta. When connected to a 3-phase supply the loads consume 1.2 kW. Calculate (a) the power factor of the load, (b) the phase current, (c) the line current and (d) the supply voltage.	5	3	2	1, 2, 3, 4, 6, 12
Unit-III					
4. a)	Draw the equivalent circuit of a practical transformer and the hence develop the phasor diagram for a resistive load considering all the elements of the equivalent circuit.	5	5	3	1, 2, 3, 4, 6, 12
4. b)	Derive the equation for copper saving in an autotransformer in comparison to a two-winding transformer.	5	3	3	1, 2, 3, 4, 6, 12
OR					
4. c)	A transformer takes a current of 1 A when its primary is connected to a 300 V, 50 Hz supply, the secondary being on open circuit. If the power absorbed is 120 watts, calculate (a) the iron loss current, (b) the power factor on no-load, and (c) the magnetizing current.	5	4	3	1, 2, 3, 4, 6, 12
4. d)	Determine the efficiency of a 15 kVA transformer for the following conditions: (i) full-load, unity power factor (ii) 0.8 full-load, unity power factor (iii) half full-load, 0.8 power factor. Assume that iron losses are 200 W and the full-load copper loss is 300 W.	5	3	3	1, 2, 3, 4, 6, 12
Unit-IV					
5. a)	Prove that the resultant flux of the RMF in a three-phase induction motor is 1.5 times the main flux.	5	3	4	1, 2, 3, 4, 6, 12
5. b)	A 12-pole, 3-phase, 50 Hz induction motor runs at 475 rev/min. Calculate (a) the slip speed, (b) the percentage slip and (c) the frequency of the rotor currents.	5	4	4	1, 2, 3, 4, 6, 12
OR					
5. c)	A separately excited generator develops a no-load e.m.f. of 180 V at an armature speed of 15 rev/s and a flux per pole of 0.20 Wb. Calculate the generated e.m.f. when (a) the speed increases to 20 rev/s and the flux per pole	5	4	4	1, 2, 3, 4, 6, 12

	<p>remaining unchanged,</p> <p>(b) the speed remains at 15 rev/s and the pole flux is decreased to 0.125 Wb, and</p> <p>(c) the speed increases to 25 rev/s and the pole flux is decreased to 0.18 Wb.</p>				
5. d)	Compare and contrast the different rotor configurations for a synchronous generator.	5	3	4	1, 2, 3, 4, 6, 12
Unit-V					
6. a)	Explain any one earthing technique in detail.	5	2	5	1, 2, 3, 4, 6, 12
6. b)	<p>A consumer has the following loads connected:</p> <p>a. six lamps of 40 Watt each used for 5 hours a day</p> <p>b. two fans of 60 Watt each used for 12 hours a day</p> <p>c. one heater of 1000 Watt used for 2 hours a day</p> <p>d. one refrigerator of 250 Watt used for 10 hours a day.</p> <p>If each unit costs Rs. 1.90/-, then calculate the total bill for the month of September.</p>	5	2	5	1, 2, 3, 4, 6, 12
OR					
6. c)	What are the disadvantages of low power factor?	5	2	5	1, 2, 3, 4, 6, 12
6. d)	Differentiate between MCB and MCCB.	5	2	5	1, 2, 3, 4, 6, 12

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome



MAHATMA GANDHI INSTITUTE OF TECHNOLOGY
(Autonomous)
B.Tech. I Semester End Examinations
(Model Question Paper)

MR-22

Course Title: Engineering Graphics
Time: 3 hours

Course Code: ME101ES
Max. Marks: 60

Answer any FIVE Questions
(Each question carries 12 marks)

Q. No.	Stem of the question	M	L	CO	PO
Unit-I					
1.	A circle of 50 mm diameter rolls along a line for one revolution clock wise. Draw the locus of a point on the curve which is in contact with the line. Also, draw a tangent and normal to the curve, at a point 40 mm from the directing line.	12	2	1	1
Unit-II					
2.	A regular pentagonal lamina of 30 mm side has one side on the ground. Its plane is inclined at 60° to the horizontal plane (H.P) and perpendicular to the vertical plane (V.P). Draw its front view, top view and side view projections.	12	2	2	1
Unit-III					
3.	A hexagonal prism has one of its rectangular faces parallel to the ground. Its axis is perpendicular to the vertical plane (V.P) and 40 mm above the ground. Draw its front view and top view projections when the nearer end is 15 mm in front of V.P. The hexagonal prism side of base 30 mm and axis 65 mm long.	12	3	3	10
Unit-IV					
4.	A vertical cylinder of 60 mm diameter is completely penetrated by another cylinder of 50 mm diameter, their axes bisecting each other at right angles. Draw their projections showing curves of penetration, assuming the axis of the penetrating cylinder parallel to the V.P.	12	3	4	10
Unit-V					
5.	Draw the front view, top view and right side view for the part shown in fig.1. All dimensions are in mm.	12	4	5	10

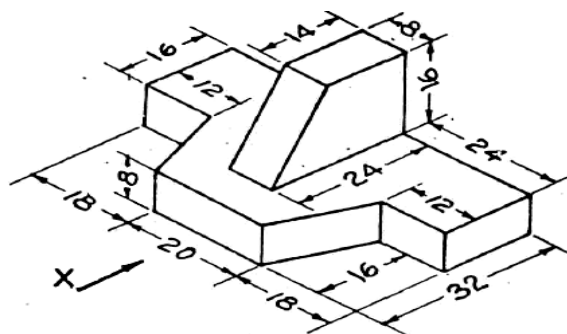


Fig. 1

6a. Unit-I 6b. Unit-II					
6. a)	Construct a hyperbola when the distance of the focus from the directrix is equal to 60 mm and eccentricity is $3/2$	6	2	1	1
6. b)	The top view of a 80 mm long line measures 65 mm, while its front view is 56 mm. It's one end A is 12 mm above horizontal plane (H.P) and 18 mm in front of vertical plane (V.P). Draw the front view & top view projections of the line.	6	2	2	2
7a. Unit-III 7b. Unit-IV					
7. a)	A pentagonal pyramid, side of base 30 mm and axis 60 mm long, with its base on H.P. and one of the edge of the base is perpendicular to V.P. It is cut by a section plane perpendicular to V.P. and passing through the axis at a point 35 mm above the base. Draw the sectional front view and the sectional top view.	6	2	3	10
7. b)	Draw the development of the lateral surface of Hexagonal pyramid, side 30 mm and its axis 65 mm.	6	2	4	1
8a. Unit-V 8b. Unit-I/II/III/IV/V					
8. a)	Draw the isometric view of hexagonal plane, side 30 mm.	8	2	5	12
8. b)	State editing commands used in AUTOCAD.	4	1	1	12

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome



MAHATMA GANDHI INSTITUTE OF TECHNOLOGY
(Autonomous)
B.Tech. I Semester End Examinations
(Model Question Paper)

Course Title: **Environmental Science**
Time: **3 hours**

Course Code: **MC101BS**
Max. Marks: **60**

Note: Answer ALL Questions

Part-A (10 x 1 = 10 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
1. a)	Define biomagnification.	1	1	1	1
1. b)	What is meant by carrying capacity?	1	2	1	2
Unit-II					
1. c)	Give examples for renewable energy resources.	1	1	2	1
1. d)	Write the classification of natural resources.	1	1	2	1
Unit-III					
1. e)	Write the various levels of biodiversity.	1	2	3	1
1. f)	What is meant by biosphere?	1	1	3	1
Unit-IV					
1. g)	Differentiate primary and secondary pollutants.	1	3	4	2
1. h)	What are ozone depleting substances?	1	2	4	6
Unit-V					
1. i)	Define hazardous waste with suitable examples.	1	1	5	3
1. j)	Write any two features of Green building.	1	2	5	7

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
2. a)	Explain the structural components of an ecosystem with suitable examples.	5	2	1	1
2. b)	Discuss briefly about energy flow in an ecosystem.	5	2	1	1
OR					
2. c)	Evaluate food chain, food web and their significance.	5	3	1	2
2. d)	Illustrate how Nitrogen cycle maintaining in an ecosystem	5	4	1	6
Unit-II					
3. a)	Give an account of upstream and downstream problems of big dams.	5	3	2	2
3. b)	Explain briefly about different renewable energy resources.	5	2	2	7
OR					
3. c)	Summarize the reasons, effects and prevention methods of deforestation.	5	3	2	2
3. d)	Write the uses of minerals & Discuss environmental effects of mining.	5	2	2	2
Unit-III					
4. a)	Explain the various use value of biodiversity.	5	1	3	8
4. b)	Discuss the In-situ conservation methods of biodiversity.	5	2	3	9
OR					
4. c)	Explain various threats to biodiversity.	5	1	3	2
4. d)	Define hotspots? Discuss the various hot spots present in India.	5	2	3	1
Unit-IV					
5. a)	What are ODS? Illustrate the effects of ozone layer depletion.	5	3	4	6
5. b)	Enlist the adverse effects of water pollution?	5	2	4	2
OR					

5. c)	Discuss the effects of air pollution on Plants and human beings.	5	2	4	1
5. d)	Give the detailed note on Kyoto protocol and Montreal protocol.	5	1	4	7
Unit-V					
6. a)	Explain the main features of Air (Prevention and Control of pollution) Act-1981.	5	2	5	1
6. b)	Explain the steps involved in environmental impact assessment (EIA).	5	1	5	11
OR					
6. c)	Discuss the Biomedical Waste Management and Handling Rules.	5	3	5	1
6. d)	Write a brief note on Ecological foot print and low carbon life style.	5	2	5	9

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome