**R-20**

**Code: 20AC11T**

I B.Tech. I Semester Regular Examinations July 2021
## Algebra and Calculus
( Common to All )

Max. Marks: 70                                      Time: 3 Hours
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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
    2. In Part-A, each question carries **Two mark.**
    3. Answer **ALL** the questions in **Part-A** and **Part-B**

## PART-A
**(Compulsory question)**

| | | | CO | Blooms Level |
|---|---|---|---|---|
| 1. | **Answer ALL the following short answer questions** | ( 5 X 2 = 10M ) | | |
| a) | Find the eigen values of A=$\begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}$ | | 1 | 1,2 |
| b) | Find the symmetric matrix corresponding to the quadratic form $x^2 + 6xy + 5y^2$ | | 2 | 1,2 |
| c) | If $x = r\cos\Theta$, $y = r\sin\Theta$ then find $\dfrac{\partial(x,y)}{\partial(r,_{_{,}})}$ | | 3 | 1.2 |
| d) | Find $\int\limits_{0}^{1}\int\limits_{0}^{x} xy\,dy\,dx$ | | 4 | 1,2 |
| e) | Define Gamma function | | 5 | 1 |

## PART-B
**Answer any *five full* questions by choosing one question from each unit ( 5 x 12 = 60 Marks )**

| | | Marks | CO | Blooms Level |
|---|---|---|---|---|

### UNIT–I

| | | Marks | CO | Blooms Level |
|---|---|---|---|---|
| 2. a) | Reduce the matrix $\begin{bmatrix} 0 & 1 & 2 & -2 \\ 4 & 0 & 2 & 6 \\ 2 & 1 & 3 & 1 \end{bmatrix}$ to normal form and hence find the rank. | 6M | 1 | 1,2 |
| b) | Show that the equations x + y + z = 6, x + 2y + 3z = 14, x + 4y + 7z = 30 are consistent and solve them. | 6M | 1 | 1,2 |

**OR**

| | | Marks | CO | Blooms Level |
|---|---|---|---|---|
| 3. | Find the eigen values and the corresponding eigen vectors of A=$\begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$ | 12M | 1 | 1,2 |

### UNIT–II

| | | Marks | CO | Blooms Level |
|---|---|---|---|---|
| 4. | Verify Cayley-Hamilton theorem for the matrix A=$\begin{bmatrix} 1 & 2 & -1 \\ 2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix}$ and hence find $A^{-1}$ and $A^4$ | 12M | 2 | 1,2 |

**OR**

5. Reduce the quadratic form $3x^2+2y^2+3z^2-2xy-2yz$ to the normal form by orthogonal transformation      12M   2   1,2

**UNIT–III**

6. a) If
$x = r\sin_u \cos w, y = r\sin_u \sin w, z = r\cos_u \; then\, show\, that \dfrac{\partial(x,y,z)}{\partial(r,_u,W)} = r^2 \sin_u$    6M   3   1,2

b) Find the maximum and minimum values of $xy + \dfrac{a^3}{x} + \dfrac{a^3}{y}$    6M   3   1,2

**OR**

7. Find the volume of the greatest rectangular parallelepiped that can be inscribed in the ellipsoid $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} + \dfrac{z^2}{c^2} = 1$    12M   3   1,2

**UNIT–IV**

8. a) Evaluate
$\displaystyle\int_a^{2a} \int_0^{\sqrt{2ax-x^2}} xy\,dy\,dx$    6M   4   1,2

b) Evaluate $\displaystyle\int_0^1 \int_0^{\sqrt{1-x^2}} \int_0^{\sqrt{1-x^2-y^2}} xyz\,dz\,dy\,dx$    6M   4   1,2

**OR**

9. Change the order of integration and evaluate
$\displaystyle\int_0^{4a} \int_{x^2/4a}^{2\sqrt{ax}} dy\,dx$    12M   4   1,2

**UNIT–V**

10. a) Show that $\Gamma\left(\dfrac{1}{2}\right) = \sqrt{f}$    6M   5   1,2

b) Show that $\displaystyle\int_0^1 x^m (\log x)^n dx = \dfrac{(-1)^n n!}{(m+1)^{n+1}}$ where 'n' is a positive integer and $m > -1$    6M   5   1,2

**OR**

11. a) Evaluate $\displaystyle\int_0^1 x^{\frac{3}{2}} (1-x^2)^{\frac{5}{2}} dx$    6M   5   1,2

b) Evaluate $\displaystyle\int_0^{\frac{\Pi}{2}} \sin^{10}{}_u \, d_u$    6M   5   1,2

*** End ***

**R-20**

**Code: 20AC12T**

### I B.Tech. I Semester Regular Examinations July 2021
## Applied Physics
( Common to EEE & ECE )

Max. Marks: 70                                                    Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
    2. In Part-A, each question carries **Two mark.**
    3. Answer **ALL** the questions in **Part-A** and **Part-B**

## PART-A
**(Compulsory question)**

| | | CO | Blooms Level |
|---|---|---|---|
| 1. | **Answer ALL the following short answer questions** ( 5 X 2 = 10M ) | | |
| a) | Mention any four applications of interference in Engineering field. | CO1 | |
| b) | What is Bohr's magneton and give its expression. | CO2 | |
| c) | State the Gauss theorem for divergence? | CO3 | |
| d) | Define drift and diffusion currents | CO4 | |
| e) | Write the applications of nanomaterials. | CO5 | |

## PART-B
**Answer any *five full* questions by choosing one question from each unit ( 5 x 12 = 60 Marks )**

| | | Marks | CO | Blooms Level |
|---|---|---|---|---|

**UNIT–I**

| | | | | |
|---|---|---|---|---|
| 2. a) | Explain interference in thin films by reflection of light. | 8M | CO1 | |
| b) | In Newton's rings experiment, if the radius of the $8^{th}$ and $12^{th}$ rings are 0.25 mm and 0.3mm respectively, find the wavelength of the light used if the radius of curvature of plano-convex lens is 100cm. | 4M | CO1 | |

**OR**

| | | | | |
|---|---|---|---|---|
| 3. a) | Explain diffraction grating experiment to determine the wave length of a monochromatic source. | 8M | CO1 | |
| b) | Calculate the thickness of a quarter wave plate for a monochromatic light of wave length 600nm, if the refractive indices of ordinary and extraordinary rays in the medium are 1.5442and 1.5533 respectively | 4M | CO1 | |

**UNIT–II**

| | | | | |
|---|---|---|---|---|
| 4. a) | Define Ionic polarization and derive an expression for Ionic polarizability | 6M | CO2 | |
| b) | Explain Ferro magnetism through hysteresis with neat figures | 6M | CO2 | |

**OR**

| | | | | |
|---|---|---|---|---|
| 5. a) | Give the classification of magnetic materials into dia, para and ferro magnetic materials on the basis of magnetic moment | 6M | CO2 | |
| b) | Explain in detail about the different types of polarization mechanisms in dielectrics. | 6M | CO2 | |

**UNIT–III**

6. a) State and explain Poynting theorem — 6M CO3

   b) Define acceptance angle and numerical aperture. Calculate the acceptance angle and Numerical Aperture of a given optical fiber, if the refractive index of core and cladding are 1.563 & 1.498 respectively. — 6M CO3

**OR**

7. a) Show that the electromagnetic waves for non-conducting media is transverse in nature and have components of E and H in directions perpendicular to the direction of propagation. — 6M CO3

   b) Discuss the application of optical fibers in Medical field and in industry as a sensor. — 6M CO3

**UNIT–IV**

8. a) Derive an expression for density of holes in an intrinsic semiconductor — 6M CO4

   b) Give the classification of solids into conductors, semiconductors and insulators on the basis of band theory of solids — 6M CO4

**OR**

9. a) What is Hall effect? Derive an expression for Hall coefficient for n-type semiconductor. Mention its applications. — 7M CO4

   b) Differentiate direct and indirect band gap semiconductors with examples — 5M CO4

**UNIT–V**

10. a) Explain Meissner effect. Write notes on magnetic levitation — 6M CO5

    b) Describe the process of "chemical vapour deposition" method of fabrication of nanomaterials. — 6M CO5

**OR**

11. a) Describe BCS theory of superconductivity — 6M CO5

    b) Discuss any one method to characterization of the nanomaterials — 6M CO5

*** End ***

**Code: 20A211T**

R-20

I B.Tech. I Semester Regular Examinations July 2021
## Basic Electrical Engineering
(Electrical and Electronics Engineering)

Max. Marks: 70                                                    Time: 3 Hours
*********
Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
     2. In Part-A, each question carries **Two mark.**
     3. Answer **ALL** the questions in **Part-A** and **Part-B**

## PART-A
### (Compulsory question)

| | | | CO | Blooms Level |
|---|---|---|---|---|
| 1. | **Answer ALL the following short answer questions** ( 5 X 2 = 10M ) | | | |
| | a) Explain the classification of magnets? | | 1 | L1 |
| | b) What are different types of sources? Explain | | 2 | L1 |
| | c) What are different types of wires and cables? | | 3 | L1 |
| | d) Explain the principle of operation of nuclear reactor? | | 4 | L1 |
| | e) What are the different components of wind turbine? | | 5 | L1 |

## PART-B
**Answer any *five full* questions by choosing one question from each unit ( 5 x 12 = 60 Marks )**

| | | Marks | CO | Blooms Level |
|---|---|---|---|---|
| | **UNIT–I** | | | |
| 2. | Briefly explain the hysteresis lop of a magnetic material, and discuss its significance? | 12M | 1 | L1 |
| | **OR** | | | |
| 3. a) | Write short note on Lenz's law? | 4M | 1 | L1 |
| b) | Differentiate between statically induced emf, and dynamically induced emf? | 8M | 1 | L1 |
| | **UNIT–II** | | | |
| 4. a) | Obtain the equivalent resistance R$_{ab}$ for the circuit and use it to find current i? | | | |



| | | 8M | 2 | L1 |
|---|---|---|---|---|
| b) | For the circuit in fig below find voltage v$_1$ and v$_2$? | | | |



| | | 4M | 2 | L1 |
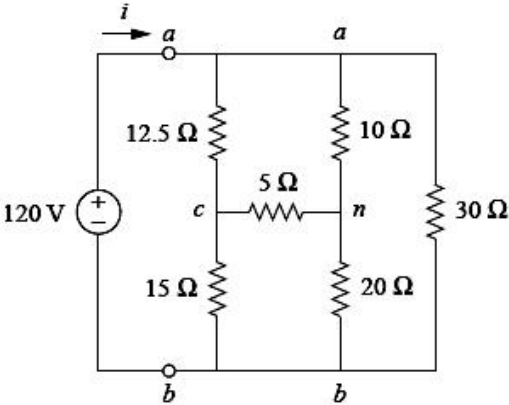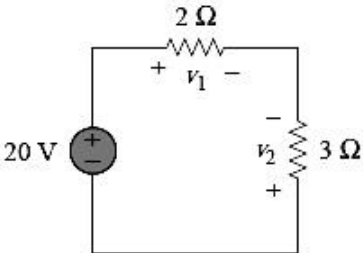
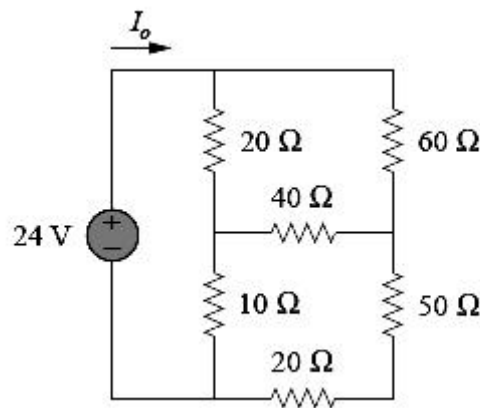**OR**

5.  a)  Use KCL to obtain the currents $i_1, i_2$ and $i_3$ in the circuit shown in fig below?

12 mA

$i_1$

8 mA

$i_2$     $i_3$
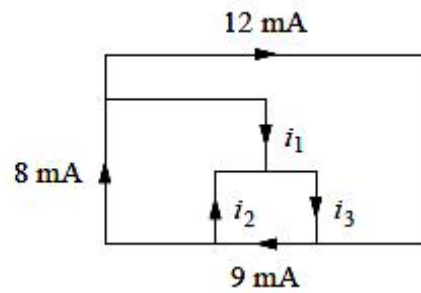
9 mA                                                                        4M    2    L1

b)  Calculate $i_o$ in the circuit shown in fig below?

$I_o$

20 Ω          60 Ω

40 Ω

24 V

10 Ω          50 Ω

20 Ω
                                                                           8M    2    L3

**UNIT–III**

6.      Explain the methods to measure Frequency and Phase.          12M   3    L1

**OR**

7.  a)  Give classification of different types of instruments as per their working principle?                                                                6M    3    L1

b)  Explain with the help of schematic the construction and operation of function generator?                                                          6M    3    L1

**UNIT–IV**

8.  a)  Explain the evolution of power system in India and present day scenario?   8M   4    L1

b)  What is Nuclear fission? Explain                                    4M    4    L1

**OR**

9.      Explain the layout and working principle of hydro power station?   12M   4    L1

**UNIT–V**

10.     With the help of neat schematic explain how power is generated using wind?   12M   5    L1

**OR**

11.     With the help of neat schematic explain how power is generated using solar energy?                                                             12M   5    L1

*** End ***

**Code: 20A312T-D**

I B.Tech. I Semester Regular Examinations July 2021
## Engineering Drawing
( Electrical and Electronics Engineering )

Max. Marks: 70                                                    Time: 3 Hours
Answer *any five full questions* by choosing one question from each unit ( 5x14 = 70 Marks )
*********

|  |  | Marks | CO | Blooms Level |
|---|---|---|---|---|

### UNIT–I

| 1. | Draw an ellipse having a major of 110 mm and minor axis of 70 mm using the concentric circle method. Draw a tangent at any point on the curve. | 14M | CO1 | L1,L2 |

**OR**

| 2. | The diameter of the directing circle is twice that of the generating circle. Show that the hypo – cycloid is a straight line. Choose the diameter of the generating circle as 50 mm. | 14M | CO1 | L1,L2 |

### UNIT–II

| 3. | Two points A and B are on H.P, the point A being 30 mm infront of V.P while B is 45 mm behind V.P. The line joining their top views makes an angle $45^0$ with xy. Find the horizontal distance between the two points. | 14M | CO2 | L1,L2 |

**OR**

| 4. | A line CD, 70 mm long has its C, 20 mm above the H.P and 15 mm in front of V.P.it is inclined at $40^0$ to the V.P and $50^0$ to H.P. Draw the projections. | 14M | CO2 | L1,L2 |

### UNIT–III

| 5. | A semi – circular plate of 80 mm diameter, has its straight edge on V.P and inclined at $30^0$ to H.P, while the surface of the plate is inclined at $45^0$ to V.P. Draw the projections of the plate. | 14M | CO3 | L2, L1, L4 |

**OR**

| 6. | A regular hexagon of 40 mm side has a corner on H.P. Its surface is inclined at $45^0$ to H.P and top view of the longest diagonal through the corner on which it rests makes an angle $60^0$ with xy. Draw its projections. | 14M | CO3 | L2, L1, L4 |

### UNIT–IV

| 7. | Draw the projections of a cylinder of base 30 mm diameter and axis 40 mm long, which lies on H.P on a point of its rim, which its axis inclined at $30^0$ to H.P and $35^0$ inclined to V.P. | 14M | CO4 | L2,L3 |

**OR**

| 8. | A hexagonal pyramid of base side 30 mm and axis length 50 mm rests on the H.P on one of its slant edges. The axis is contained by a plane which is perpendicular to the H.P and inclined at $45^0$ to the V.P. Draw the projections of the pyramid. | 14M | CO4 | L2,L3 |

### UNIT–V

| 9. | Draw the isometric projection of a vertical hexagonal prism of 30 mm sides and 100 mm high, when it rests on its base on the H.P with two of its faces perpendicular to the V.P. | 14M | CO5 | L2,L3 |

**OR**

| 10. | Isometric view of an object is shown in the figure below. Draw the front view, top view and side view. All dimensions are given in millimeters. |  |  |  |



| | | 14M | CO5 | L2,L3 |
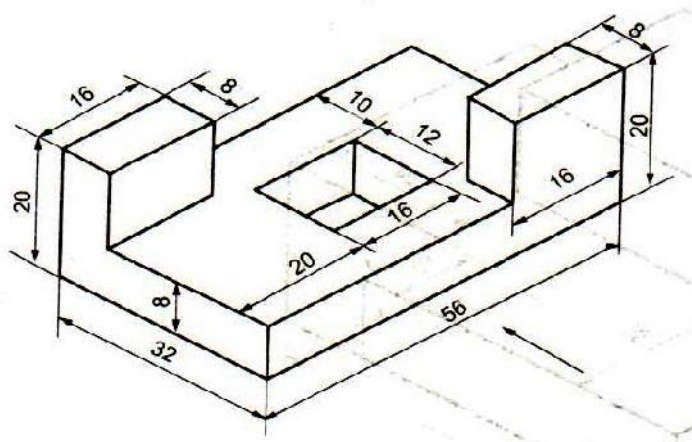
*** End ***

I B.Tech. I Semester Regular Examinations June 2021
## Problem Solving through C Programming
( Common to All Branches )

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

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
    2. In Part-A, each question carries **Two mark.**
    3. Answer **ALL** the questions in **Part-A** and **Part-B**

## PART-A
### (Compulsory question)

| | | | CO | Blooms Level |
|---|---|---|---|---|
| 1. | **Answer ALL the following short answer questions** | ( 5 X 2 = 10M ) | | |
| | a) Define high level language and low level language | | CO1 | L2 |
| | b) Define an array. How to store elements in an array? | | CO2 | L2 |
| | c) Write a program to check whether the string is palindrome or not | | CO3 | L1 |
| | d) Compare and contrast calloc() and malloc(). | | CO4 | L5 |
| | e) Give various modes of opening a file | | CO5 | L4 |

## PART-B
**Answer *five* questions by choosing one question from each unit ( 5 x 12 = 60 Marks )**

| | | Marks | CO | Blooms Level |
|---|---|---|---|---|
| | **UNIT–I** | | | |
| 2. | a) Briefly explain about the basic data types that C language supports. | 6M | CO1 | L5 |
| | b) What is flow chart? How it is useful in writing the programs? Explain about different symbols in flow chart. | 6M | CO1 | L1 |
| | **OR** | | | |
| 3. | a) Is there any difference between the pre-decrement and post decrement operators? Explain with suitable examples. | 6M | CO1 | L2 |
| | b) Write a pseudo code for swapping two numbers without using any temporary variable. | 6M | CO1 | L1 |
| | **UNIT–II** | | | |
| 4. | a) Compare the use of if-else construct with that of conditional operator. Explain with examples. | 6M | CO2 | L5 |
| | b) Give the control flow diagram of the for loop. How is the execution of 'for' loop proceeds? | 6M | CO2 | L4 |
| | **OR** | | | |
| 5. | a) Describe about two dimensional arrays, initializing the two dimensional arrays and accessing elements in such arrays. | 6M | CO2 | L2 |
| | b) Write a program to find an element present in a given array using Search techniques. | 6M | CO2 | L1 |

### UNIT–III

6. a) Write a C program with recursive function that counts the number of vowels in a string. — 6M — CO3 — L1

   b) Describe the concept of functions and the mechanism of a function call. Discuss the advantages of functions — 6M — CO3 — L2

**OR**

7. a) Explain about C Preprocessor with an example. — 6M — CO3 — L1

   b) Illustrate the storage classes extern, static and auto with an example — 6M — CO3 — L4

### UNIT–IV

8. a) Define a pointer. How to initialize and declare pointer variables? Explain the same with examples — 6M — CO4 — L2

   b) Write a recursive program for finding the n th Fibonacci value, using functions. — 6M — CO4 — L1

**OR**

9. a) Differentiate user defined and predefined function. Explain with one example. — 6M — CO4 — L2

   b) Explain how to pass one dimensional arrays to functions. — 6M — CO4 — L4

### UNIT–V

10. a) Differentiate between structures and unions, and write the syntax for nested structures. — 6M — CO5 — L2

    b) What is an enumerated data type? Explain with example. — 6M — CO5 — L1

**OR**

11. a) Write a program to count no of words and lines in a file — 6M — CO5 — L1

    b) Describe the process of handling errors during file operations. — 6M — CO5 — L2

*** End ***