I B.Tech. I Semester Supplementary Examinations May / June 2019
Fundamentals of Electrical & Electronics Engineering
(Common to EEE & ECE)

Max. Marks: 70   Time: 4 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Write note on different types of capacitors and inductors. 8M

   b) Write note on voltage and current relationship for capacitor, inductor and resistor when DC is applied with neat diagram. 6M
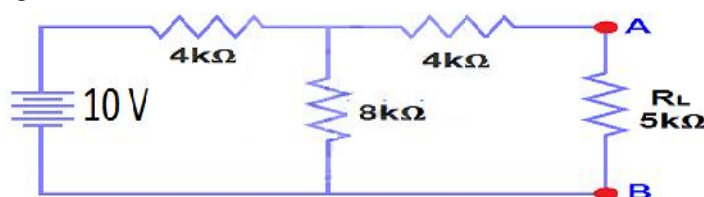
OR

2. a) Write note on different types of resistors. 6M

   b) Determine the color coding for the following resistors.

   i) 100   ii) 330   iii) 4.7K   iv) 100K 8M

UNIT–II

3. a) State and explain Kirchoff's laws. 8M

   b) State and explain Thevenin's Theorem. 6M

OR

4. a) Find V_{TH}, R_{TH} and the load current flowing through the load resistor R_L in the   figure shown   by using Thevenin's Theorem.

   10M

   b) State and explain Superposition Theorem. 4M

UNIT–III

5. a) Explain zener and avalanche break down. Which break down is dangerous? Why? 7M

   b) Construct zener diode voltage regulator which gives constant 3.6 Volts DC . 7M

OR

6. a) Explain V-I characteristics of P-N junction diode in forward and reverse bias conditions. 7M

   b) Explain energy band diagram of intrinsic and extrinsic semiconductors with neat diagram. 7M

UNIT–IV

7. a) Explain the working of center tapped full wave rectifier with neat diagram. Derive the expression for ripple factor and efficiency. 8M

   b) Compare capacitor, LC and   filters and write down their merits and demerits 6M

OR

8. a) Compare half wave, full wave and bridge rectifiers in terms of ripple factor and efficiency. 6M

   b) Explain working principle of filters in AC to DC converter circuits. Explain their necessity. 8M

UNIT–V

9. a) Explain construction on NPN transistor and write its current components. 7M

   b) Draw and explain input and output characteristics of transistor in CE configuration. 7M

OR

10. a) Write note on DSO 7M

    b) Draw and explain input and output characteristics of a transistor in CB configuration. 7M

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R-17

Code: 7GC14

I B.Tech. I Semester Supplementary Examinations May / June 2019

Engineering Mathematics-I

(Common to All Branches)

Max. Marks: 70   Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Reduce the matrix $A = \begin{bmatrix} 1 & -1 & 2 & -1 \\ 4 & 2 & -1 & 2 \\ 2 & 2 & -2 & 0 \end{bmatrix}$ into its Echelon form and hence find

   its rank.   7M

   b) Test for Consistency of the following equations and if possible find the

   solution $2x + 2y + 4z = 18$; $x + 3y + 2z = 13$; $3x + y + 3z = 14$.   7M

OR

2. a) Find the Eigen values and Eigen vectors of the matrix $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$.

                                                                      7M

   b) Verify Cayley-Hamilton theorem for the matrix $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$ and hence

   find its inverse.   7M

UNIT–II

3. a) Reduce the quadratic form $x_1^2 + 3x_2^2 + 3x_3^2 - 2x_2 x_3$ into canonical form and also

   write the nature of the quadratic form.   7M

   b) Show that $B = \begin{bmatrix} 3i & 2+i \\ -2+i & -i \end{bmatrix}$ is Skew-Hermitian. Find its Eigen values.

                                                                      7M

OR

4. a) Find a matrix P which diagonalizes the matrix $A = \begin{bmatrix} 4 & 1 \\ 2 & 3 \end{bmatrix}$.

   Verify that $P^{-1}AP = D$.   7M

   b) Prove that the Eigen values of Hermitian matrix A are real.   7M

UNIT–III

5. a) Solve $\sec^2 y \dfrac{dy}{dx} + x \tan y = x^3$.

                                                                      7M

   b) Find the orthogonal trajectory of the cardioids $r = a(1 - \cos_n)$.

                                                                      7M

OR

6. a) Solve $\dfrac{dy}{dx} + \dfrac{y\log y}{x - \log y} = 0$.

    7M

    b) Radium disintegrates at a rate proportional to its mass.When mass is 10 mgm, the rate of disintegration is 0.051 mgm per day. How long will it take for the mass to be reduced to 10 to 5 mgm?

    7M

UNIT–IV

7. a) Solve $\dfrac{d^2 y}{dx^2} - 2\dfrac{dy}{dx} + y = x\, e^x \sin x$.

    7M

    b) Solve the following ODE by the method of variation of parameters:

    $$\dfrac{d^2 y}{dx^2} + a^2 y = \sec ax.$$

    7M

OR

8. a) Solve $\dfrac{d^2 y}{dx^2} - 3\dfrac{dy}{dx} + 2y = xe^{3x} + \sin 2x$.

    7M

    b) The damped LCR circuit is governed by the equation $L\dfrac{d^2 q}{dt^2} + R\dfrac{dq}{dt} + \dfrac{q}{C} = 0$

    where L, R, C ate positive constants. Find the conditions under which the circuit is over damped, under damped and critically damped.

    7M

UNIT–V

9. a) Verify Lagrange's Mean value theorem for $f(x) = (x-1)(x-2)(x-3)$ in $[0,4]$

    .

    7M

    b) Find the minimum value of $x^2 + y^2 + z^2$, given that $xyz = a^3$.

    7M

OR

10. a) Determine whether the following functions are functionally dependent or not. If functionally dependent, find the functional relation between them:

    $u = \sin^{-1} x + \sin^{-1} y, \quad v = x\sqrt{1 - y^2} + y\sqrt{1 - x^2}$.

    7M

    b) Find the maximum and minimum values of $f(x,y) = x^3 + y^3 - 3axy$.

    7M

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Code: 7G111

I B.Tech. I Semester Supplementary Examinations May / June 2019
Problem Solving Techniques and C Programming
(Common to All Branches)

Max. Marks: 70   Time: 3 Hours
Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. a) Explain the various problem solving strategies with example.   7M
   b) Write an algorithm to find the greatest number among 3 numbers   7M

OR

2. a) Differentiate between high level and low level language with example   7M
   b) What do you mean by error in a program? Explain the strategies to handle the error.   7M

UNIT–II

3. a) Classify the operators in "C" with example.   7M
   b) Explain the structure of a C program with an example.   7M

OR

4. a) Explain the primitive data types of C with example.   8M
   b) Explain type conversion in c   6M

UNIT–III

5. a) Write a C program to illustrate the working of jump statements break and continue   8M
   b) Explain the "nested if "concept of C by an example.   6M

OR

6. a) Write a C Program to Display Fibonacci Sequence of 8 numbers   7M
   b) Write the concept of "do while" and "while". When to use do while in a
      program explain with an appropriate example.   7M

UNIT–IV

7. a) Write a C Program to Find the Frequency of Characters in a String   7M
   b) Explain the applications of String with suitable example.   7M

OR

8. a) Write a program to find the smallest number of an integer array. A={34, 45,6,
      7,89}   7M
   b) Write a C Program to Copy String Without Using strcpy()   7M

UNIT–V

9. a) Explain various type of qualifiers in C language. Write the importance of
      "Static" key word.   7M
   b) Write a program using function to design an arithmetical calculator.   7M

OR

10. a) Explain the concept of pre-processor commands.   7M
    b) Write a C Program to Find GCD Using Recursion.   7M
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I B.Tech. I Semester Supplementary Examinations May / June 2019
Technical English & Professional Communication
(Common to All Branches)

Max. Marks: 70   Time: 4 Hours
Answer all five units by choosing one question from each unit (5 x 14 = 70 Marks)
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UNIT–I

1. a) Why does E.F.Schumacherstate that modern technology does not enrich man but empties him?

    b) Fill in the blanks in the following sentences using the hints given in brackets.
        i. He was not happy with her decision. He may _____ with her. (a word with the prefix dis_)
        ii. He enjoys_____ his friends. (to meet/ meeting)
        iii. Good sleep is _____to health. (beneficial/benificial)
        iv. Rita _____ from the shock of her uncle's death. (Phrasal verb with 'get')
        v. Anything written in a letter after it is signed is known as _____. (postscript/postdiction)

OR

2. Discuss the different elements of human communication?

UNIT–II

3. a) What are the main ways in which human development has affected climate patterns on the earth?

    b) Write a letter of application in response to an advertisement for the post of Project Manager in a reputed software company.

OR

4. Discuss the different levels of communication.

UNIT–III

5. a) What are the two kinds of technologies currently used to generate solar power on a large scale?

    b) Complete the following sentences with appropriate words chosen from those in brackets:
        i.   How many _____ are there in each character in MS Word? (bytes/bites)
        ii. Students are given an essay about the human _____ in the exam. (soul/sole)
        iii. We saw a_____ and a tiger when we visited the local zoo.(boar/bore)
        iv. Our _____took us through the Alps and then on to Italy. (route / root)
        v.   When it's low _____ you have to walk a long way before you can swim. (tide/tied)

OR

6. Explain the different types of Non-verbal communication in brief?

UNIT–IV

7. a) What are the measures to be taken to prevent soil erosion?

    b) Correct the following sentences
        i. The second innings are going on now
        ii. Either Ramu or Somu might offer their services.
        iii. My friend sits besides me in the class
        iv. Each of the candidates were awarded a certificate.
        v. One must love his parents.

OR

8. Discuss the different types of listening.

UNIT–V

9. How the idea of 'samskara' is explained in the essay "The Secret of Work"?

OR

10. Write about Linear, Interactive and Transactional communications.

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Code: 7GC13

I B.Tech. I Semester Supplementary Examinations May / June 2019

Engineering Physics

(Common to EEE and ECE)

Max. Marks: 70   Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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	UNIT–I

1. a) What is meant by acceptance angle for an optical fiber? Obtain mathematical expression for acceptance angle and numerical aperture.   8M

    b) Write some differences between step index fiber and graded index fiber.   6M

OR

2. a) Explain construction and working of He-Ne laser.   10M

    b) Write some differences between Spontaneous emission and Stimulated emission of radiation.   4M

	UNIT–II

3. a) Describe with suitable diagram, the powder method for determination of crystal structure.   10M

    b) A beam of X-rays is incident on a NaCl crystal with lattice spacing 0.282nm. Calculate the maximum order of diffraction possible if wavelength of X-rays used is 0.841^0A.   4M

OR

4. a) Discuss various non-destructive testing systems which are commonly adopted in industries using ultrasonics.   7M

    b) Explain the ultrasonic flaw detector.   7M

	UNIT–III

5. a) Apply Schrodinger's wave equation to the case of particle confined in a box and show that the energies of particle are quantized.   10M

    b) The minimum energy for a particle entrapped in a one dimensional box is $3.2×10^{-18}$ J. What are the next three energies in electron volts the particle can have..   4M

OR

6. a) Describe the salient features of Kronig-Penny model.   8M

    b) Explain Fermi- Dirac distribution function of electron.   6M

	UNIT–IV

7. a) Write a note on direct band gap and indirect band gap semiconductors.   8M

    b) Distinguish between intrinsic semiconductor and extrinsic semiconductor.   6M

OR

8. a) What are Cooper pairs? Explain   8M

    b) Write a note on the applications of superconductors.   6M

	UNIT–V

9. a) Explain hysteresis loop observed in ferromagnetic materials.   10M

    b) A magnetic material has a magnetization of 3300 A/m and flux density of 0.0044 W/m². Calculate the magnetizing field strength.   4M

OR

10. a) Explain in detail various properties of nanomaterials.   8M

    b) Write some optical applications of nanomaterials.   6M

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