Hall Ticket Number :

Code: 7G311

R-17

I B.Tech. I Semester Supplementary Examinations May 2018
Fundamentals of Electrical & Electronics Engineering
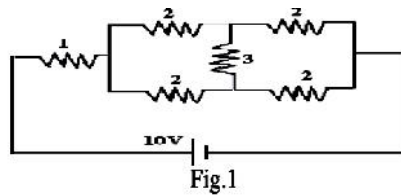(Common to EEE & ECE)

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) State ohm's law and give its applicability to electrical network and explain convention current direction and voltage across an element.   7M

    b) Find the total power dissipated in the circuit shown in the Fig.1 (All resistances are in ohms).


Fig.1   7M

OR

2. a) What color rings on the body of the resistor, the value of resistance mentioned below (ignoring the value of tolerance)?

    i). 33   ii). 200 k   iii). 750   iv). 43 k   8M

    b) i). In the given circuit, calculate current **i**, the conductance **G** and the power P.
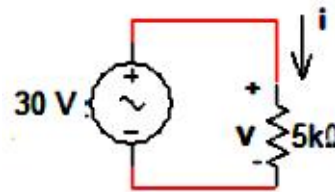
    ii). Differentiate ideal, practical voltage and current sources.   6M

UNIT–II
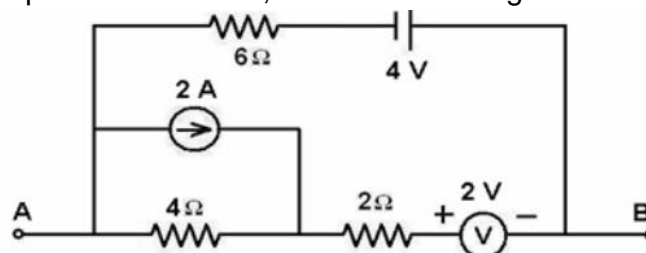
3. a) What is super node and super mesh concept explain with example.   7M

    b) Using Kirchoff's current law, find the values of the currents i_1 and i_2 in the circuit shown in figure.
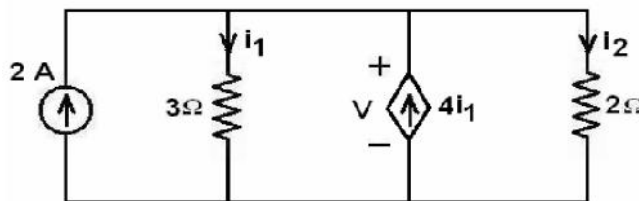
                    7M

OR

4. a) State and Explain Maximum power transfer Theorem.   7M

    b) Using Superposition Theorem, find V_{AB} for the figure shown below.

                    7M

Page **1** of **2**

UNIT–III

5. a) Derive an expression for depletion capacitance and diffusion capacitance in a PN Junction diode. 7M

   b) Explain how the Zener diode acts as a Voltage Regulator with neat diagram and expressions. 7M

OR

6. a) Explain
      (i) Avalanche breakdown and
      (ii) Zener breakdown with reference to Zener diodes and differentiate them. Give any three applications of Zener diodes. 8M

   b) Draw V-I characteristics of PN junction diode and explain each term in a Diode current equation. 6M

UNIT–IV

7. a) With circuit and necessary waveforms, explain the operation of Bridge Rectifier. 7M

   b) Design a filter for FWR circuit with LC filter to provide an output voltage of 10 Volts with a load current of 200mA and the ripple is limited to 2%. 7M

OR

8. a) Derive the expressions the ripple factor and efficiency for a Half Wave rectifier. 7M

   b) Draw the circuit diagram of a Full wave rectifier. Explain the operation of the circuit with relevant waveforms. Mention any three applications of it. 7M

UNIT–V

9. a) What is early effect? How does it modify the V-I characteristics of a BJT? 6M

   b) Define   and   of a transistor. Derive the relation between them. 4M

   c) Give reason for cutoff conditions for **Si** and **Ge** Transistors are different. 4M

OR

10. a) Calculate the maximum velocity of the beam of electrons in a CRT having a cathode anode voltage of 800 V. Assume that the electrons to leave the cathode with zero velocity. 7M

    b) Describe an overview of applications of CRO. 7M

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Code: 7GC14

I B.Tech. I Semester Supplementary Examinations May 2017
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) Define rank of a matrix. Find the rank of the matrix $A = \begin{bmatrix} 0 & 1 & 2 & -2 \\ 4 & 0 & 2 & 6 \\ 2 & 1 & 3 & 1 \end{bmatrix}$.

   b) Find the values of k for which the following system of equations has a non-trivial solution

   $(3k-8)x + 3y + 3z = 0;\ 3x + (3k-8)y + 3z = 0;\ 3x + 3y + (3k-8)z = 0.$

OR

2. a) Find the eigen values and eigenvectors for the matrix $A = \begin{bmatrix} 4 & 6 & 6 \\ 1 & 3 & 2 \\ -1 & -4 & -3 \end{bmatrix}$

   b) Apply cayley –Hamilton theorem to find the inverse of the matrix

   $A = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$.

UNIT–II

3.   Reduce the quadratic form $8x^2 + 7y^2 + 3z^2 - 12xy - 8yz + 4zx$ to canonical form and specify the matrix of transformation. Also find the rank, index, signature and nature of the quadratic form.

OR

4. a) Show that $A = \begin{bmatrix} \dfrac{1}{2}(1+i) & \dfrac{1}{2}(-1+i) \\ \dfrac{1}{2}(1+i) & \dfrac{1}{2}(1-i) \end{bmatrix}$ is unitary and find A^{-1}.

   b) Prove that the eigen values of a Hermitian matrix are real.

UNIT–III

5. a) Solve: $(1 + e^{x/y})dx + e^{x/y}(1 - x/y)dy = 0.$

   b) If 30% of a radioactive substance disappears in 10 days then how long will it take for 90% of it to disappear?

OR

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

   b) Find the orthogonal trajectories of the family of Coaxial circles

   $x^2 + y^2 + 2gx + c = 2;\ g$ being the parameter.

UNIT–IV

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

   b) Using the method of variation of parameters , solve: $\dfrac{d^2y}{dx^2} - 2\dfrac{dy}{dx} + y = e^x \log x.$

OR

8. a) Solve: $\dfrac{d^2y}{dx^2} + a^2 y = \tan ax.$

   b) The differential equation for a circuit in which self-inductance neutralize each other is $L\dfrac{d^2i}{dt^2} + \dfrac{i}{c} = 0.$ Find the current i is a function of t, given that I is the maximum current and $i = 0$ when $t = 0.$

UNIT–V

9. a) If $u = 3x + 2y - z,$ $v = x - 2y + z,$ and w=x(x+2y-z) then show that they are functionally related, and find the relation.

   b) Using mean value theorems, prove that (if0<a<b<1), $\dfrac{b-a}{1+b^2} < \tan^{-1} b - \tan^{-1} a < \dfrac{b-a}{1+a^2}.$

OR

10. a) The sum of three numbers is constant. Prove that their product is maximum when they are equal.

    b) Discuss the maxima and minima of $f(x, y) = x^3 y^2 (1 - x - y).$

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R-17

Code: 7GC13

I B.Tech. I Semester Supplementary Examinations May 2018

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) Differentiate between Interference and Diffraction. Discuss Fraunhoffer diffraction due to a single slit and hence obtain the condition for maxima and minima.   10M

   b) A single slit of width 1mm illuminated by light of wavelength 589nm. Find the angular spread of the central maxima of diffraction pattern observed.   4M

OR

2. a) What do you understand by solid state laser? Describe the principle, construction and working of a Ruby laser.   10M

   b) What is meant by population inversion and how is it achieved in practice   4M

UNIT–II

3. a) Discuss the seven crystal system with diagram.   7M

   b) Define the terms (i) Basis (ii) space lattice (iii) unit cell (iv) Coordination number (v) atomic radius (vi) Latice parameters (vii) Packing fraction   7M

OR

4. a) Explain the powder method of crystal structure analysis.   10M

   b) X-Rays of wavelength 1.5418 ^{0}A are diffracted by (111) planes in a crystal at an angle 30^0 in first order. Calculate the interatomic spacing.   4M

UNIT–III

5. a) Derive one dimensional time independent Schrodinger's wave equation for a free particle.   10M

   b) Summarize physical interpretation of wave function.   4M

OR

6. a) Outline the fermi-Dirac distribution function of electrons. Discuss the effect of temperature on the distribution   7M

   b) On the basis of band theory how the crystalline solids are classified into metals, semiconductors and insulators.   7M

UNIT–IV

7. a) Explain with a suitable diagram working of Hall effect and its uses.   10M

   b) The Hall coefficient of certain silicon specimen was found to be -7.35x10-5 m^3/C from 100 to 400K. If the conductivity was found to be 200m^{-1}/ohm, calculate density and mobility of the charge carrier   4M

OR

8. a) Describe with an appropriate diagram working of a P-N junction diode.   7M

   b) Elaborate Josephson effects and their applications.   7M

UNIT–V

9. a) What is Bohr Magneton? Give an account of domain theory of ferromagnetism.   7M

b) What are the different types of CNT? Outline their properties? 7M

OR

10. a) Write short notes on soft and hard magnetic materials. 7M

    b) What are carbon Nanotubes? Discuss one of the method of preparation of CNT. 7M

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I B.Tech. I Semester Supplementary Examinations May 2018
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 briefly about different computer languages.   7M
    b) Explain the software development method in detail.   7M

OR

2. a) What is algorithm? What are the main steps followed in the development of an algorithm?   8M
    b) Draw flowchart and write algorithm to find sum of the digits in a given number.   6M

UNIT–II

3. a) Explain about the basic data types in C language with examples   8M
    b) Write a C program to swap (exchange) the values of two variables without using temporary variable.   6M

OR

4. a) What is meant by type conversion? Why is it necessary? Explain about implicit and explicit type conversion with examples.   9M
    b) Write a program to enter two numbers and find the largest of them. Use conditional operator.   5M

UNIT–III

5. a) Explain various selection statements available in C language with examples.   8M
    b) Write a program to print whether a given number is prime or not.   6M

OR

6. a) Explain various iterative statements available in C language with examples.   8M
    b) Write a program to find out whether the given number is Armstrong or not?   6M

UNIT–IV

7. a) What is Array? Discuss about the initialization and accessing of array elements in one dimensional and two dimensional arrays.   8M
    b) Write a program to find the maximum element of an array.   6M

OR

8. a) Explain the following string handling functions with examples:
       (i) strcpy( ) (ii) strcat( ) (iii) strrev( ) (iv) strlen( )   8M
    b) Write C program to concatenate two strings without using strcat( ) function   6M

UNIT–V

9. a) Explain about call by value and call by reference mechanisms with examples   8M
    b) What are the standard header files used in 'C'? Explain their functions.   6M

OR

10. Explain about different storage classes with examples   14M

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Hall Ticket Number :

R-17

Code: 7GC11

I B.Tech. I Semester Supplementary Examinations May 2018

Technical English & Professional Communication

(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) How does E.F.Schumacher substantiate his view that technology causes more problems than it offers solutions?

   b) Fill in the blanks in the following sentences using the hints given in brackets.

      i. Though my handwriting is not beautiful, it is not ___. (a word with the prefix il-)

      ii. Just because I forgot to write one sub-heading, the teacher asked me to _____ the whole assignment. (a word with the prefix re-)

      iii. It was really a _____ that the child was not killed in a ghastly accident. (surprise / miracle)

      iv. _____ a minute. I am almost ready. (phrasal verb with hang)

      v. You will _____ a lot of fun in New York. (have / make)

OR

2. Explain in brief the major elements of human communication.

UNIT–II

3. a) What do human beings often tend to forget when engaging in large- scale developmental activities?

   b) Write a letter of application for your dream job in your dream company. Enclose your resume.

OR

4. What are the five Communication Flows in an organization? Explain them in brief.

UNIT–III

5. a) Which is the country that figure among the top countries in the world as well as Europe in using solar power and why?

   b) i. The conditions in Andhra Pradesh are _____ to establish new industries. (congenial / congenital)

      ii. He is a specialist in _____ Mathematics. (discreet/ discrete)

      iii. She lost the case in the court because her _____ misled her. (council/ counsel)

      iv. He was liked by all his friends for his _____ innocence.   (childish / childlike)

      v. Of the few books you gave me, I liked the _____. (later/ latter)

OR

6. How does Body Language help during Presentation Skills?

UNIT–IV

7. a) How does water help in the formation of fertile land?

   b) Assuming that you are the Regional Representative of the Central Institute of Environmental Studies, New Delhi, write a formal report to the Director of the Institute on the problem of air pollution in an urban area of your region. Make specific recommendations to minimize air pollution.

OR

8. What are the different methods used to remove Barriers of Communication?

UNIT–V

9. Discuss the two ways in which one can work without expecting anything in return.

OR

10. Write in brief the different kinds of models of communication.

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