I B.Tech. II Semester Regular Examinations May 2018
Basic Electrical and Electronics Engineering
(Computer Science and Engineering)

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 are the different types of network elements? Explain them briefly?   7M
    b) Define ohm's law? Briefly explain about it?   7M

OR

2. a) Derive the expression for an equivalent resistance if any two resistors R1, R2 are connected in parallel?   6M
    b) Two resistors of 4 , 6   are connected in parallel. if the total current is 30A,find the current through each resistor?   8M

UNIT–II

3. a) Classify and explain the different types of self excited DC generators?   7M
    b) Derive the EMF equation of a DC generator?   7M

OR

4. a) Derive the torque expression of a DC motor   4M
    b) Describe the various methods of speed control of DC shunt motor and discuss their relative merits and demerits.   10M

UNIT–III

5. a) What are the different types of losses occur in a transformer? Explain about OC test on a transformer?   8M
    b) A transformer supplies a load of 32 A at 415 Volts. If the primary voltage is 3320 volts, find the primary current, primary volt-ampere and secondary volt-ampere   6M

OR

6. a) Explain the working principle of an alternator?   7M
    b) Explain the working principle of three phase induction motor with a neat sketch?   7M

UNIT–IV

7. a) What is PN junction diode? Draw the symbol of it? Explain the V-I characteristics of it?   10M
    b) Mention the applications of PN junction diode?   4M

OR

8. a) Define PNP and NPN transistors along with symbols?   4M
    b) Describe about operation of NPN transistor in terms of CE configuration with necessary diagram.   10M

UNIT–V

9. a) Briefly explain about theory of induction heating?   10M
    b) Mention the industrial applications of induction heating?   4M

OR

10. a) Draw the block diagram of CRO? Explain the working principle of CRT in detail?   10M
    b) Mention the applications of CRO?   4M

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I B.Tech. II Semester Regular Examinations May 2018
Data Structures
(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 pointer and explain about pointer arithmetic.   7M
   b) List the four dynamic memory allocation functions in C and give their syntax with examples.   7M

OR

2. a) What are the features and uses of pointers?   7M
   b) Write a C program to add two numbers using command line arguments.   7M

UNIT–II

3. a) Differentiate between structure and union.   6M
   b) Give the tracing of quick sort algorithm for the data [1, 2, 3, 4, 5, 6, 7, 8] to be sorted in ascending order. Discuss its time complexity.   8M

OR

4. a) Write a program in C to copy the contents of one file to another.   7M
   b) Write an iterative algorithm for binary search and discuss its time complexity. 7M

UNIT–III

5. a) Convert the following infix expressions to postfix expressions.
      i) A + B * C + D   ii) (A + B) * (C + D)   iii) A + B + C + D   6M
   b) Write a program in C to implement operations on queue.(Use pointers)   8M

OR

6. a) Write an algorithm to evaluate a postfix expression.   8M
   b) Give the advantages and disadvantages of recursion.   6M

UNIT–IV

7. a) Write a C program for insertion operation in a singly linked list.   7M
   b) Write C functions for insertion and deletion operations in doubly linked list. 7M

OR

8. a) Write a recursive program to reverse the given singly linked list.   8M
   b) Give the applications of circular linked list.   6M

UNIT–V

9. a) Define binary search tree. Write a C function to insert a new node in a binary search tree.   8M
   b) Give the applications of graphs.   6M

OR

10. a) Write a C function to search a given key in a given binary search tree.   8M
    b) Define the following regarding graphs.
          i)   Undirected graph ii) In degree iii) Digraph   6M

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Code: 7GC24

I B.Tech. II Semester Regular Examinations May 2018
Engineering Mathematics-II
(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) Trace the curve $y^2(2a - x) = x^3$ 7M

   b) Evaluate $\iint r \sin_n \, dr \, d_n$ over the cardioid $r = a(1 - \cos_n)$ above the initial
      line.   7M

OR

2. a) Evaluate the double integral $\int_0^a \int_0^{\sqrt{a^2-y^2}} (x^2 + y^2) dx dy$ by changing into polar
      coordinates   7M

   b) Find the volume bounded by the cylinder $x^2 + y^2 = 4$ and the planes
      $y + z = 4 \ and \ z = 0$ 7M

UNIT–II

3. a) Find the Laplace transform of $e^{4t} \sin 2t \cos t$ 7M

   b) Evaluate $\int_0^\infty t \, e^{-3t} \sin t \, dt$ applying Laplace transform.   7M

OR

4. a) Find the Laplace transform of $\dfrac{\sin 3t \cos t}{t}$ 7M

   b) Evaluate $L(f(t))$ where $f(t)$ is a periodic function of period 2 given by
      $f(t) = \begin{cases} \sin t \ , \ 0 < t < f \\ 0 \ , \ f < t < 2f \end{cases}$ 7M

UNIT–III

5. a) Find the inverse Laplace transform of $\dfrac{s + 2}{s^2 - 2s + 5}$ 7M

   b) Applying Laplace transforms, solve the differential equation
      $\dfrac{d^3y}{dt^3} + 2\dfrac{d^2y}{dt^2} - \dfrac{dy}{dt} - 2y = 0$, $y(0) = 1$, $y'(0) = y''(0) = 2$ 7M

OR

6. a) Find the inverse Laplace transform of $\dfrac{e^{-2s}}{s^2 + 4s + 5}$ 7M

   b) Applying Laplace transforms, solve the differential equation
      $\dfrac{d^2x}{dt^2} + 2\dfrac{dx}{dt} + 5x = e^{-t} \sin t$, $x(0) = 0$, $x'(0) = 1$ 7M

UNIT–IV

7. a) Find the directional derivative of the function $f = x^2 - y^2 + 2z^2$ at the point $P = (1, 2, 3)$ in the direction of PQ where $Q = (5, 0, 4)$ 7M

   b) Show that $F = (e^x \cos y + yz)i + (xz - e^x \sin y)j + (xy + z)k$ is conservative over its natural domain and find potential function for it.   7M

OR

8. a) Establish the relation $\nabla^2[f(r)] = \dfrac{d^2 f}{dr^2} + \dfrac{2}{r}\dfrac{df}{dr}$ where $r = |\bar{r}|$ 7M

   b) Evaluate $\displaystyle\int_S \bar{F} \cdot \bar{n}\, dS$ where $\bar{F} = 18z\bar{i} - 12\bar{j} + 3y\bar{k}$ and S is the part of the surface of the plane $2x + 3y + 6z = 12$ located in the first octant.   7M

UNIT–V

9. a) Applying divergence theorem evaluate $\displaystyle\iint_S x\,dydz + y\,dzdx + z\,dxdy$ where S is the surface of the sphere $x^2 + y^2 + z^2 = a^2$ 7M

   b) Evaluate by Greens theorem $\displaystyle\oint_C (y - \sin x)dx + \cos x\, dy$ where C is the triangle enclosed by the lines $y = 0$, $x = \dfrac{f}{2}$ and $f\ y = 2x$ 7M

OR

10. Verify stokes theorem for the vector field $\bar{F} = (2x - y)\bar{i} - yz^2\bar{j} - y^2 z\bar{k}$ over the upper half of the surface $x^2 + y^2 + z^2 = 1$ bounded by its projection on the xy – plane.   14M

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Code: 7GC23

I B.Tech. II Semester Regular Examinations May 2018
Engineering Physics
(Common to CE, ME & CSE)

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 phenomenon of interference of light. Obtain conditions for maxima and minima due to interference of reflected light in Thin films.   10M

   b) In a Newton's Rings experiment diameter of 10th ring changes from 1.4cm to 1.27cm when a liquid is introduced between lens and the plate. Calculate R.I. of liquid.   4M

OR

2. a) Explain the following

   i) Population inversion   ii) Pumping mechanism   iii) Active system   6M

   b) Explain the working of semi conductor laser.   8M

UNIT–II

3. a) What do you understand by space lattice? Describe briefly the seven crystal systems and Bravais lattices.   10M

   b) Find the miller indices of a set of parallel planes which makes intercepts in the ratio 3a:4b on the X and Y axes and are parallel to Z axis, a, b, c, being primitive vectors of the lattice.   4M

OR

4. a) Define ultrasonics. Describe piezo-electric method of production of ultrasonics.   8M

   b) Give an account of the methods used in the detection of ultrasonics.   6M

UNIT–III

5. a) Derive Schrodinger's time independent wave equation.   8M

   b) Explain the significance of wave function.   6M

OR

6. a) Explain the concept of Kronig Penny model.   7M

   b) Obtain an expression for the electrical conductivity of metals on the basis of free electron theory.   7M

UNIT–IV

7. a) What are the diffusion and drift currents, and derive.   7M

   b) What is Hall effect? Obtain an expression for Hall coefficient for an extrinsic semiconductor.   7M

OR

8. a) Discuss general properties of super conductors.   8M

   b) Explain DC and AC Josephson effects.   6M

UNIT–V

9. a) Give the classification of Magnetic materials and explain their properties.   8M

   b) Explain magnetic flux density B, magnetic flux intensity H and magnetization M. How are they related to each other?   6M

OR

10. a) Explain the Basic principles responsible for unusual properties of Nano materials.   6M

    b) Explain Sol-gel method of synthesis of Nano materials.   8M

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I B.Tech. II Semester Regular Examinations May 2018
Environmental Science
(Computer Science and Engineering)

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 the term 'Environment'. What is Climate change?   7M
   b) Knowledge about the environment is not an end, but rather a beginning. Explain.   7M

OR

2. a) Name any five eminent environmentalists. Summarize their contribution.   7M
   b) Explain the scope of Environmental Science.   7M

UNIT–II

3. a) What are the ecological benefits of forests?   7M
   b) 'Dams' a boon or bane to human civilization. Discuss.   7M

OR

4. a) Explain the adverse environmental impacts of modern agriculture.   7M
   b) Describe the various types of land degradation with its causes and solutions.   7M

UNIT–III

5. a) With a neat sketch, explain how the element Carbon is recycled in nature?   7M
   b) Define Hotspot in Biodiversity. Enumerate the Hotspots identified in India.   7M

OR

6. a) What are food chains and food web? Explain significance with examples.   7M
   b) Identify and explain the present day threats to the biodiversity in India.   7M

UNIT–IV

7. a) Write a short note on Bhopal gas tragedy.   7M
   b) The Ganga Action Plan is to clean Ganga river waters. Discuss.   7M

OR

8. a) Mention the human activities contributing to large scale thermal pollution?   7M
   b) Define Noise. List the common sources and effects of noise on man.   7M

UNIT–V

9. a) Describe the salient features of Forest Conservation Act.   7M
   b) What are the objectives and elements of Value education?   7M

OR

10. a) List the major greenhouse gases. Explain effects of global warming.   7M
    b) Explain the environmental problems posed by population explosion.   7M

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