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SET-2

Code: 13BS1002

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech II Semester Supplementary Examinations, June-2017
ENGINEERING MATHEMATICS – II
(Common to EEE & ECE)

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

PART-A

Answer all Questions   **[10 x 1 = 10 M]**

1. a) What is meant by iteration process?
    b) Write the normal equations for a second degree curve.
    c) Lagrange's interpolation formula
    d) Simpson's 3/8 rule
    e) Write Taylor's series formula.
    f) Find Laplace transform of $\sin at$?

    g) Find $L^{-1}\left[\dfrac{s-a}{(s-a)^2+b^2}\right]$?

    h) Define non-linear partial differential equations of the first order.
    i) Solve p - q =1.
    j) Write one dimensional heat equation.

PART-B

Answer one question from each unit   **[5 x 12 = 60M]**
UNIT-I
2. a) By using the regula fasli method, find an approximate root of the equation $x\log_{10} x = 1.2$ correct to four decimal places.
    b) Find by the Newton's method, the real root of the equation $xe^x - 2 = 0$.   **[6M + 6M]**
    (OR)
3. a) Fit a second degree parabola to the following data:

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

    b) Derive the normal equations for the curve of the type $y = ab^x$ by the method of least squares.
    [6M + 6M]

UNIT-II

4. a) Find the polynomial f(x) by using Lagrage's formula and hence find f(3) for

x	0	1	2	5
y	2	3	12	147

    b) Evaluate (i) $\Delta \tan^{-1} x$ (ii) $\Delta^2(\cos 2x)$ **[6M + 6M]**

(OR)

5. a) The following data gives the velocity of a particle for 20 seconds at an interval of 5 seconds. Find the initial acceleration using the entire data:

Time t (sec)	0	5	10	15	20
Velocity v (m/sec)	0	3	14	69	228

   b) Use the Trapezoidal rule to estimate the integral $\int_0^6 \frac{1}{1+x^2} dx$.   [6M + 6M]

UNIT-III

6. a) Find the value of y for x = 0.1 by Picard's method, given that $\frac{dy}{dx} = \frac{y-x}{y+x}, y(0) = 1.$

   b) Using Euler's modified method, obtain a solution of the equation $\frac{dy}{dx} = x + \left|\sqrt{y}\right|$

   with initial conditions y=1 at x=0, for the range $0 \le x \le 0.6$ in steps of 0.2.   [6M + 6M]

(OR)

7. Using Runge-Kutta method of fourth order, solve for y at x=1.2, 1.4 from

   $\frac{dy}{dx} = \frac{2xy + e^x}{x^2 + xe^x}$ given $x_0 = 1, y_0 = 0.$

                                                                    [12M]

UNIT-IV

8. a) Find the Laplace transform of $te^{-t} \sin 3t$.

   b) Evaluate $L\left\{ \int_0^t \int_0^t \int_0^t (t \sin t) dt dt dt \right\}.$ [6M + 6M]

(OR)

9. a) Apply Convolution thermo to evaluate $L^{-1}\left[\frac{s^2}{(s^2 + a^2)(s^2 + b^2)} \right].$

   b) Solve by using Laplace transforms, the equation
   $(D^3 - 3D^2 + 3D - 1)y = t^2 e^t$ given $y(0) = 1, y'(0) = 0$ and $y''(0) = -2.$ [6M + 6M]

UNIT-V

10. a) Solve $q^2 = z^2 p^2 (1 - p^2).$

   b) Solve $\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial x \partial y} - 6\frac{\partial^2 z}{\partial y^2} = \cos(2x + y).$ [6M + 6M]

(OR)

11. a) Solve by the method of separation of variables $\frac{\partial u}{\partial x} = 2\frac{\partial u}{\partial t} + u$ where $u(x,0) = 6e^{-3x}$

   b) Solve the equation $\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}$ with boundary conditions $u(x,0) = 3\sin n\pi x,$

   $u(0,t) = 0$ and $u(1,t) = 0,$ where $0 < x < 1, t > 0.$ [6M + 6M]

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I B.Tech II Semester Supplementary Examinations, June-2017

BESIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Common to MECH & CIVIL Branches)

Time: 3 Hours   Max Marks: 70

PART-A

ANSWER ALL QUESTIONS   **[1 x 10 = 10 M]**

1. a) State Kirchoff's laws.
   b) Define Current?
   c) What is the function of brushes in D.C generator?
   d) Give the relationship between frequency, Speed and number of poles
   e) Write the expression for transformation ratio related to transformers?
   f) What are the various losses occurring in a transformer?
   g) What is the difference between MI and MC instruments?
   h) What are the different types of PMMI instruments?
   i) Write any 2 applications of SCR?
   j) Define percentage regulation with respect to a full wave rectifier.

PART-B

Answer one question from each unit   **[5x12=60M]**

UNIT-I

2. a) Derive an expression for finding the equivalent value of resistor and   6M
      capacitor when they are connected in parallel.
   b) Three resistors R_1, R_2, R_3 are connected in series with a constant   6M
      voltage source of 'V' volts.The Voltage across R_1 is 4V, power loss in
      R_2 is 16W and the value of R_3
      is 6 ohms. If the current flowing through the circuit is 2A, find the
      voltage V.

(OR)

3. For the circuit shown in Fig. 1, find the equivalent resistance between   12M
   (a) A and B and (b) A and N. All resistances values are in ohms.
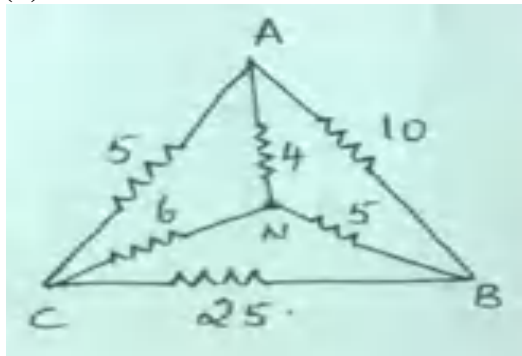

Fig. 1

UNIT-II

4. a) Derive the expression for torque in a D.C Motor.   6M
   b) A 250V, short shunt compound generator is delivering 80A. The armature, series and shunt field resistances are 0.05Ω, 0.03Ω and 100Ω respectively. Calculate the induced voltage allowing a brush drop of 2V.   6M

(OR)

5. a) With a neat circuit diagram, explain the construction of a D.C machine.   6M
   b) Derive an expression for finding the EMF equation of a DC generator.   6M

UNIT-III

6. a) Derive an expression for finding the EMF equation of a transformer.   6M
   b) A 100KVA,11KV/ 231V transformer has HV and LV winding resistances of 8.51Ω and 0.0038Ω respectively. The following test results were obtained:
   OC (LV side):   231V   15.2A   1.25KW
   SC (HV side): 440V   9A   not required
   Calculate the parameters of the circuit model of the transformer referred to HV side.   6M

(OR)

7. a) Derive an expression for finding the EMF equation of a alternator.   6M
   b) Briefly explain the torque – slip characteristics of an induction machine with a neat sketch.   6M

UNIT-IV

8. With a neat circuit diagram, explain the principle and working of a MI instrument.   12M

(OR)

9. With a neat circuit diagram, explain the principle and working of a MC instrument.   12M

UNIT-V

10. a) Explain PN junction diode operation and draw its V- I characteristics for both forward and reverse bias conditions.   6M
    b) Explain the construction and principle of operation of a P-N-P transistor.   6M

(OR)

11. a) With a neat sketch, explain the energy band diagram of a PN junction diode.   6M
    b) Explain the operation of a half wave rectifier with a neat sketch.   6M

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(AUTONOMOUS)
I B.Tech II Semester Supplementary Examinations, June-2017

DATA STRUCTURES
(Common to CSE and IT)

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

PART-A

ANSWER ALL QUESTIONS   [1 x 10 = 10 M]

1. a) Define algorithm.
    b) What is complexity of an algorithm?
    c) Define storage in a stack.
    d) What are types of recursion?
    e) What is time complexity of bubble sort?
    f) Define linear search.
    g) What is complete binary tree?
    h) How are trees dynamically implemented?
    i) What is difference between edge and node?
    j) Draw   an example of a graph.

PART-B

Answer one question from each unit   [5x12=60M]

UNIT-I

2. a) What is an algorithm? Write an algorithm to calculate the factorial of a given number.   6M
    b) Briefly describe different types of non linear data structures.   6M

(OR)

3. a) What is time complexity, explain with example.   6M
    b) How is recursion implemented, explain with an example.   6M

UNIT-II

4. a) Explain about Stack and its operations. Write the procedure for each operation   6M
    b) Write the pseudo code procedure and give a pictorial representation to delete the last   6M
        element of a single linked list.

(OR)

5. a) Explain about Queue and its operations. Write the procedure for each operation   6M
    b) What is the minimum number of queues needed to implement the priority queue? Explain.   6M

UNIT-III

6. a) For the ordered list L={B,D,F,G,H,I,K,L,M,N,O,P,Q,T,U,V,W,X,Y,Z} undertake   6M
        interpolation search for keys H and Y. Make use of the respective alphabetical sequence
        number for the keys, during the computation of the interpolation function
    b) What is sequential search? Write its advantages and disadvantages.   6M

(OR)

7. a) Write algorithm for Bubble Sort. Explain with an example   6M
    b) What is a Priority Queue? Explain insertion and deletion operations with an   example   6M

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UNIT-IV

8. a) What is a Binary search tree? Explain   6M
   b) Construct a Binary Search Tree with the following elements and Explain deletion of   6M
      element-13 from the obtained BST.
      25, 13, 45, 10, 15, 30, 65, 7, 12, 14, 18, 40

(OR)

9. a) Draw in-order and pre-order traversals for the BST with elements   6M
      10, 15 25, 5 45, 30, 22, 65
   b) Write a program to create a tree structure.   6M

UNIT-V

10. a) What are the various components of a graph? Explain with example.   6M
    b) What is Minimum Spanning Tree?   6M

(OR)

11. a) Explain Prim's algorithm with example.   6M
    b) What is adjacency matrix? Explain with example.   6M

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