

R18

Code No: 152AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year II Semester Examinations, May - 2019

BASIC ELECTRICAL ENGINEERING

(Common to ECE, EIE)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

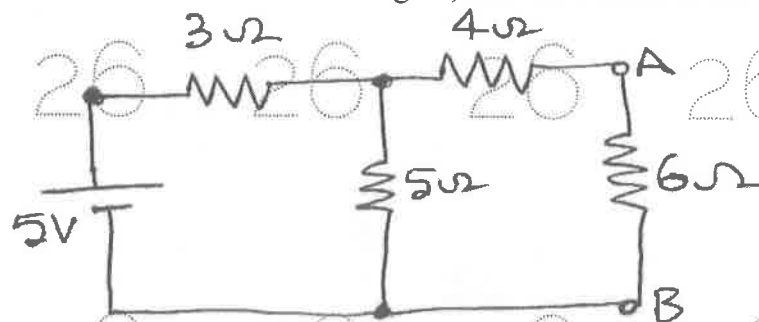
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A**(25 Marks)**

- 1.a) Write short notes on voltage source and current source. [2]
- b) Define average value of a sinusoidal quantity. [2]
- c) What is practical transformer? [2]
- d) Define slip. [2]
- e) List out the types of wires. [2]
- f) State Norton's theorem. [3]
- g) Show that power dissipated by a pure capacitor excited by a sinusoidal source is zero. [3]
- h) Write short notes on auto transformer. [3]
- i) Write short notes on salient pole rotor of a 3- ϕ synchronous generator. [3]
- j) What is the significance of earthing? [3]

PART-B**(50 Marks)**

- 2.a) Explain in detail the passive elements.
- b) By using Thevenin's theorem shown in figure, find the current in 6Ω resistor. [5+5]

**OR**

- 3.a) State and explain Superposition theorem by taking one example.
- b) Three resistors: $R_1=5\Omega$, $R_2=10\Omega$, $R_3=15\Omega$ are connected in parallel across a DC voltage source: 100V. Find the currents I_1 , I_2 , I_3 through R_1 , R_2 , R_3 and the total current supplied by 100V source. [5+5]

- 4.a) Show that the resonant frequency ω_0 of an RLC series circuit is the geometric mean of ω_1 and ω_2 , the lower and upper half power frequencies respectively.
- b) A circuit consisting of three branches, Z_2 is in parallel with Z_3 the combination is in series with Z_1 having the values $Z_1=10+j30$, $Z_2=5+j10$ and $Z_3=4-j16$ connected across single phase, 100 V, 50 Hz supply. Find i) I_1 , I_2 and I_3 ii) V_1 and V_2 [5+5]

OR

- 5.a) Derive the expression for RMS value of alternating current wave $I = I_m \sin \omega t$.
- b) A coil takes a current of 1 A at 0.6 lagging power factor from a 220 V, 60 Hz single phase source. If the coil is modeled by a series RL circuit find i) The complex power in the coil and ii) The values of R and L. [5+5]
- 6.a) Draw and derive the equivalent circuit parameters of single phase transformers.
- b) A single phase transformer working at unity power factor has an efficiency of 90% at both one half load and at the full load of 500 W. Determine the efficiency at 75% of full load. [5+5]

OR

- 7.a) Define and explain efficiency and regulation of a transformer.
- b) A 100 kVA, 1000/10000 V, 50 Hz, Single phase transformer has an iron loss of 1100 W. The copper loss with 5 A in the high voltage winding is 400 W. Calculate the efficiency at 25 %, 0.8 Power factor. The output terminal voltage being maintained at 10000 V. [5+5]

- 8.a) Explain the slip-torque characteristics of 3-phase induction motor.
- b) Explain the principle and operation of 1-phase induction motor. [5+5]

OR

- 9.a) Explain the working principles of Synchronous generator.
- b) A 6 pole, 3- ϕ induction motor runs at 1140 rpm on full load when supplied from a 60Hz supply. Determine the synchronous speed and slip at full load. [5+5]

10. Explain the components of LT switch gear in detail. [10]

OR

11. Explain the types of batteries and its important characteristics. [10]

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R18**Code No: 152AF****JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD****B.Tech I Year II Semester Examinations, May - 2019****PROGRAMMING FOR PROBLEM SOLVING****(Common to EEE, CSE, IT)****Time: 3 hours****Max. Marks: 75****Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A**(25 Marks)**

- 1.a) Name any two secondary storage devices and mention their characteristics. [2]
- b) Why is it necessary to give the size of an array in an array declaration? [2]
- c) Define the terms: Binary file and text file. [2]
- d) How does a recursive function differ from an iterative function? [2]
- e) Differentiate between selection sort and insertion sort. [2]
- f) What is an operating system? List out its goals and functions. [3]
- g) Mention the advantages and disadvantages of arrays. [3]
- h) What is the purpose of feof() function? [3]
- i) Write the syntax and purpose of malloc() function. [3]
- j) Write an algorithm to find the maximum number in a given set. [3]

PART-B**(50 Marks)**

- 2.a) What is precedence and associativity in an expression? What is their need?
 - b) Write down the significance of break statement inside a switch statement.
 - c) Discuss the concept of type conversion in C. [10]
- OR**
- 3.a) What are command-line arguments? Explain briefly.
 - b) List and explain various storage classes available in C and state the reason why register storage classes are less frequently used. [5+5]
- 4.a) What is a multidimensional array? Explain how a multidimensional array is defined in terms of a pointer to a collection of contiguous arrays of lower dimensionality.
 - b) Differentiate between structure and union in C.
 - c) Write down the applications of using arrays. [10]
- OR**
- 5.a) Write and explain the general format for declaring and accessing members of a structure.
 - b) How to use pointers as arguments in a function? Explain with a program. [5+5]

6. List and explain various file read/write functions available in C with examples illustrating their usage and implementation. [10]

OR

- 7.a) Write the syntax of fseek() function in C and explain the same. [5+5]
b) Explain the concept of streams and their significance in I/O operations.

- 8.a) Explain the call-by-value and call-by-reference parameter passing methods. [5+5]
b) Write a C program to generate Fibonacci series using recursive functions.

OR

- 9.a) State the need for user-defined functions. [5+5]
b) List and explain the functions used to allocate and free memory dynamically.

- 10.a) Devise an algorithm for linear search and explain with an illustration. [5+5]
b) Write a C program to determine whether a given number is prime or not.

OR

- 11.a) Devise an algorithm for selection sort and explain with an illustration. [10]
b) Give a brief note on asymptotic notations.
c) Mention the complexity of linear search and binary search algorithms.

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R16

Code No: 132AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech I Year II Semester Examinations, May - 2019

MATHEMATICS-III

(Common to CE, EEE, ME, ECE, CSE, EIE, IT, MCT, ETM, MMT, AE, MIE, PTM, CEE, MSNT)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A**(25 Marks)**

- 1.a) Let X denotes the number of heads in a single toss of 4 fair coins. Determine $P(1 < X \leq 3)$ [2]
- b) Define moment generating function of a random variable. [3]
- c) Define central limit theorem. [2]
- d) A random sample of size 100 has a standard deviation of 5. What can you say about maximum error with 95% confidence? [3]
- e) Define Type I and Type II errors. [2]
- f) Explain one way classification of ANOVA. [3]
- g) Establish an iterative formula for computing \sqrt{N} by Newton Raphson method. [2]
- h) Construct normal equations for fit a straight line by method of least squares. [3]
- i) Write Simpsons $1/3^{\text{rd}}$ and $3/8^{\text{th}}$ rule formulas. [2]
- j) Given $y' = xy$ with $y(0) = 1$. Find $y(0.2)$ with $h = 0.1$ by Euler's method. [3]

PART-B**(50 Marks)**

- 2.a) A sample of 4 items is selected at random from a box containing 12 items of which 5 are defective. Find the expected number of defective items.
- b) In a normal distribution, 7% of the items are under 35 and 89% are under 63. Determine the mean and variance of the distribution. [5+5]

OR

- 3.a) Let the continuous random variable X have the probability density function,

$$f(x) = \begin{cases} 2/x^3, & \text{if } 1 < x < \infty \\ 0, & \text{otherwise} \end{cases} \text{ Find } F(x).$$

- b) A discrete random variable X has the mean 6 and variance 2. If it is assumed that the distribution is Binomial find the probability that $5 \leq x \leq 7$. [5+5]
- 4.a) A random sample of size 100 is taken from an infinite population having mean $\mu=76$ and the variance $\sigma^2=256$. What is the probability that mean of the sample will be between 75 and 78?
- b) Assuming that $\sigma=20.0$, how large a random sample be taken to assert with probability 0.95 that the sample mean will not differ from the true mean by more than 3.0 points? [5+5]

OR

- 5.a) A normal population has a mean of 0.1 and standard deviation of 2.1. Find the probability that mean of a sample of size 900 will be negative.
- b) Find 95% confidence limits for the mean of a normality distributed population from which the following sample was taken 15, 17, 10, 18, 16, 9, 7, 11, 13, 14. [5+5]
- 6.a) In a random sample of 60 workers, the average time taken by them to get to work is 33.8 minutes with a standard deviation of 6.1 minutes. Can we reject the null hypothesis $\mu = 32.6$ minutes in favour of alternative null hypothesis $\mu > 32.6$ at $\alpha = 0.025$ level of significance.
- b) The mean life of a sample of 10 electric bulbs was found to be 1456 hours with S.D. of 423 hours. A second sample of 17 bulbs chosen from a different batch showed a mean life of 1280 hours with S.D. of 398 hours. Is there a significant difference between the means of two batches? [5+5]

OR

7. The following are the number of typing mistakes made in four successive weeks by four typists working for a publishing company.

Typist I	13	16	12	14
Typist II	14	16	11	19
Typist III	13	18	16	14
Typist IV	18	10	14	15

Using ANOVA, test at 0.05 level of significance whether the difference among the four sample means can be attributed to chance. [10]

- 8.a) Find a real root of $xe^x - \cos x = 0$ using Newton-Raphson method.
- b) Fit a least square parabola curve to the following data: [5+5]

x	0	1	2	3	4	5	6
y	1.4	2.8	2.4	2.9	3.6	4.0	4.1

OR

- 9.a) Find the root of the equation $2x - \log x = 7$ which lies between 3.5 and 4 by regula-falsi method.
- b) Solve the following system of equations by Gauss-Seidel method
 $8x_1 + x_2 - x_3 = 8$, $2x_1 + x_2 + 9x_3 = 12$, $x_1 - 7x_2 + 2x_3 = -4$ [5+5]
10. Find $y(0.1)$ and $y(0.2)$ using 4th order Runge - Kutta method given that $y' = xy + y^2$, $y(0) = 1$. [10]

OR

11. Solve the equation $y' = x + y^2$ subject to the condition $y(0) = 1$ by Picard's method. [10]

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