

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
THIRD SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017

Course Code: EE207

Course Name: COMPUTER PROGRAMMING (EE)

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions, each carries 5 marks.

- | | | Marks |
|---|--|-------|
| 1 | Differentiate between machine language, assembly language and high level languages? What is the difference between compiler and assembler? | (5) |
| 2 | Write a C program to find the LCM and HCF of any two numbers entered by user. | (5) |
| 3 | Write a C program to reverse a string. | (5) |
| 4 | What are the 4 basic storage classes in C? | (5) |
| 5 | Differentiate between structure and union. | (5) |
| 6 | Write a C program to add two variables using pointers. | (5) |
| 7 | Explain how a new file is opened. What are the 3 modes while opening an existing file. | (5) |
| 8 | Write a Python program to reverse a given integer. | (5) |

PART B

Answer any two full questions, each carries 10 marks.

- | | | |
|----|--|-----|
| 9 | a) Explain any five kinds of operators in C. | (5) |
| | b) Draw a flowchart to find the sum of digits of an integer. | (5) |
| 10 | a) If more than one kind of operator is present in an expression, explain the order of precedence. | (5) |
| | b) Write a C program to print the prime numbers between 101 and 500. Those numbers whose sum of digits is 5 need not be printed. Use 'while' loop in the program | (5) |
| 11 | a) Explain 'switch' and 'go to' statements in C with the help of examples | (5) |
| | b) Write a C program to print the following pattern using 'for' loop | (5) |

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* * *
* * * *
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PART C

Answer any two full questions, each carries 10 marks.

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|----|--|-----|
| 12 | a) Explain how a 3 dimensional array is declared and initialised. How is a character array different from a string | (5) |
| | b) Write a C program to count the number of characters, words and lines in a text | (5) |
| 13 | a) Write a C program to find the product of two matrices | (5) |

- b) Explain the differences between pass by value and pass by reference with the help of examples. (5)
- 14 a) Explain recursive function with the help of an example program. (5)
- b) Write a program to print all prime numbers between any two numbers entered by user, using functions. (5)

PART D

Answer any two full questions, each carries 10 marks.

- 15 a) What is a pointer. How can you access a variable using chain of pointers? (5)
- b) Write a C program to sort an array using pointers. (5)
- 16 a) Write a C program to store the name and roll numbers of 10 students using structure. The name has to be then printed in the ascending order of roll numbers. (5)
- b) Explain the basic control statements in Python. (5)
- 17 a) Write a C program to copy the contents of one file to another. (5)
- b) How can a random part in a file be accessed? (5)

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
THIRD SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017

Course Code: EE205

Course Name: DC MACHINES AND TRANSFORMERS (EE)

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions, each carries 5 marks.

		Marks
1	What is the function of equalizer ring in a lap wound dc machine?	(5)
2	Derive the emf equation of a dc generator.	(5)
3	What is starter? What is the necessity of starter in dc motor?	(5)
4	Distinguish between core and shell type transformer?	(5)
5	What is an auto transformer? Derive an expression for the saving of copper in an autotransformer as compared to an equivalent two winding transformer?	(5)
6	Derive the condition for maximum efficiency of transformer.	(5)
7	What are the necessary conditions for parallel operation of three phase transformer?	(5)
8	What is the purpose of tertiary winding on transformer?	(5)

PART B

Answer any two full questions, each carries 10 marks.

9	With neat diagram explain the construction of dc generator.	(10)
10	a) A 250V short shunt compound generator is delivering 80A. Armature, series and shunt field resistances are 0.05Ω , 0.03Ω and 100Ω respectively. Calculate the induced emf.	(5)
	b) Define commutation. Explain the process of commutation with neat sketches.	(5)
11	What are the effects of armature reaction on the operation of dc machine? What are the remedial measures taken to counter effects of armature reaction?	(10)

PART C

Answer any two full questions, each carries 10 marks.

12	a) Explain with neat sketch how speed control of a dc motor is done.	(5)
	b) Draw the phasor diagram of a single phase transformer supplying to inductive load.	(5)
13	A 6 pole 250V series motor is wave connected. There are 240 slots and each slot has 4 conductors. The flux per pole is 0.175mWb when the motor is taking 80A. The field resistance is 0.05Ω , the armature resistance is 0.1Ω and the iron and frictional loss is 0.1kW . Calculate (a) speed (b) BHP (c) shaft torque (d) the pull in newtons at the rim of the pulley of diameter 25cm.	(10)
14	What are the different cooling methods used in transformer?	(10)

PART D

Answer any two full questions, each carries 10 marks.

15	a) The following test results were obtained on a 20kVA, 2200/220V, 50Hz single phase transformer	(5)
	OC Test(LV side) 220V 1.1A 125W	
	SC Test(HV side) 52.7V 8.4A 287W	

The transformer is loaded at unity power factor on secondary side with a voltage of 220V. Determine the maximum efficiency and load at which it occurs.

- b) Explain the working of Off-Load tap changing transformer with help of neat diagram. (5)
- 16 In detail explain scott connection in three phase transformer. (10)
- 17 a) A 220kVA single phase transformer is in circuit continuously. For 8 hours in a day, the load is 60kW at 0.8 pf. For 6 hours, the load is 80kW at unity pf and for the remaining period of 24 hours it runs on no load. Full load copper losses are 3.02kW and the iron losses are 1.6kW. Find all day efficiency. (6)
- b) What are the advantages and disadvantages of delta-delta connection? (4)

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
THIRD SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017

Course Code: EE203

Course Name: ANALOG ELECTRONICS CIRCUITS (EE)

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions, each carries 5 marks.

- | | | Marks |
|---|--|-------|
| 1 | With a neat circuit diagram explain the working of a negative voltage clamping circuit. Also sketch the output waveform for $\pm 5V$ square wave input. | (5) |
| 2 | Explain the construction and operation of Enhancement type metal oxide semiconductor FET with neat diagrams. | (5) |
| 3 | In an amplifier open loop gain changes by $\pm 50\%$ using a series voltage negative feedback. The amplifier is to be modified to get a gain of 100 with $\pm 0.1\%$ variation. Find the required open loop gain of the amplifier and the amount of negative feedback. | (5) |
| 4 | Explain Barkhausen criteria of sustained oscillation | (5) |
| 5 | Derive the expression for voltage gain of a non-inverting amplifier. | (5) |
| 6 | Design a three input summing amplifier using op-amp having gains of 2,3 and 5 respectively for each input. | (5) |
| 7 | Define slew rate and explain its effect on waveform generation. | (5) |
| 8 | Design a phase shift oscillator to have 1.5kHz output frequency using a 741 op-amp with $V_{CC} = \pm 12V$. | (5) |

PART B

Answer any two full questions, each carries 10 marks.

- | | | |
|----|--|------|
| 9 | Design a voltage divider bias circuit to operate from a 18V supply in which bias conditions are to be $V_{CE} = V_E = 6V$ and $I_C = 1.5mA$. $\beta = 90$. Also calculate the stability factor S | (10) |
| 10 | a) Draw a common source FET amplifier. Using small signal equivalent circuit derive the expression of the voltage gain. | (6) |
| | b) Explain the reasons for reduction of gain at high frequencies of a CE amplifier. | (4) |
| 11 | a) Explain the operation of a Zener voltage regulator with a neat circuit diagram. | (5) |
| | b) Define Miller's theorem. | (2) |
| | c) In a CE amplifier circuit, $h_{fe} = 50$, $h_{ie} = 1.3k\Omega$, $C_{bc} = 5pF$, $R_C = 3k\Omega$, $R_L = 2.2k\Omega$. Calculate the Miller capacitance. | (3) |

PART C

Answer any two full questions, each carries 10 marks.

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|----|---|-----|
| 12 | a) Draw the circuit diagrams of two stage RC coupled and Transformer coupled amplifiers. Discuss the important features and applications of both. | (6) |
|----|---|-----|

- b) A transformer coupled class A power amplifier draws a current of 250mA from a collector supply of 13 V. When no signal is applied to it determine i) Maximum output power ii) Power rating of the transistor iii) Maximum collector efficiency. (4)
- 13 a) With a neat diagram explain the working of a Hartley oscillator. (8)
- b) A Wien bridge oscillator has the following components $R_1 = R_2 = R_4 = 5.6 \text{ k}\Omega$, $R_3 = 12 \text{ k}\Omega$ and $C_1 = C_2 = 2000 \text{ pF}$. Calculate the oscillating frequency. (2)
- 14 a) Derive the expression for voltage gain of a dual input balanced output differential amplifier. (7)
- b) Why open loop op amp configurations are not used for linear applications? (3)

PART D

Answer any two full questions, each carries 10 marks.

- 15 a) Draw and explain the operation of a square waveform generator using opamp. (5)
- b) Explain inverting Schmitt trigger circuit with relevant waveforms. (5)
- 16 a) Draw and explain the circuit of IC 555 in Monostable mode with relevant waveforms. (7)
- b) What are the advantages of crystal oscillators. (3)
- 17 a) Explain the working of Instrumentation amplifier with a neat diagram. (6)
- b) In an astable multivibrator using 555, $R_B = 750 \Omega$. Determine the values of R_A and C to generate a 1.0 MHz clock that has a duty cycle of 25%. (4)

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
THIRD SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017

Course Code: EE201

Course Name: CIRCUITS AND NETWORKS (EE)

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions, each carries 5 marks.

- 1 Explain reciprocity theorem. Verify reciprocity theorem for the network shown in fig.(1) Marks (5)

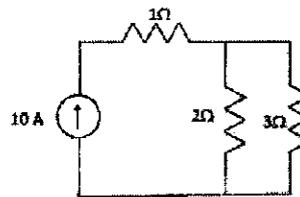


Fig.(1)

- 2 Express KVL equations for any circuit using the fundamental tie set matrix. (5)
- 3 The series RL circuit in fig. (2) is connected to 100V source at $t=0$. Determine the expression for the current $i(t)$ in the circuit. (5)

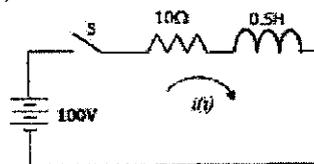


Fig.(2)

- 4 Explain how the conductively coupled equivalent circuit of a given magnetically coupled circuit can be derived. (5)
- 5 Find the equivalent network when two port networks are connected in parallel. (5)
- 6 What are T parameters? Express T parameters in terms of Y parameters. (5)
- 7 Write down the properties of the driving point impedance function of RL networks. (5)
- 8 What are positive real functions? What are the necessary conditions to be satisfied by a driving point function to be positive real? (5)

PART B

Answer any two full questions, each carries 10 marks.

- 9 a) Determine the value of Z_L in the circuit shown in fig.(3) so that the power delivered to the load (Z_L) is maximum. (5)

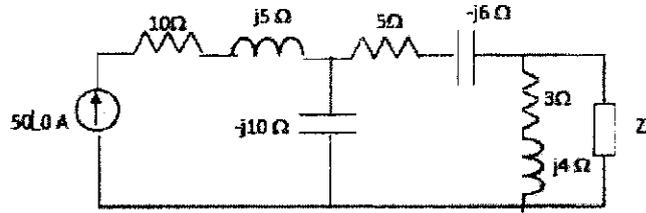
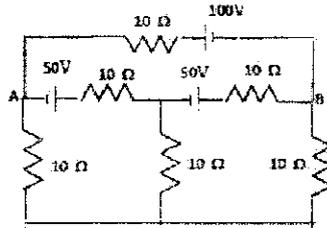


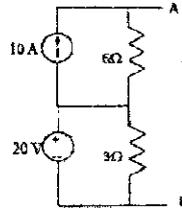
Fig.(3)

- b) Determine the current supplied by the 100V source shown in fig.(4) using Thevenin's theorem. (5)



Fig(4)

- 10 a) Find the Norton's equivalent network across terminals AB for the circuit shown in fig. (5) (5)



Fig(5)

- b) Explain node pair analysis as referred to topological analysis of electrical networks. (5)
- 11 Find the power delivered by the current sources in the given network shown in fig. (6) using node analysis by graphical method. (10)

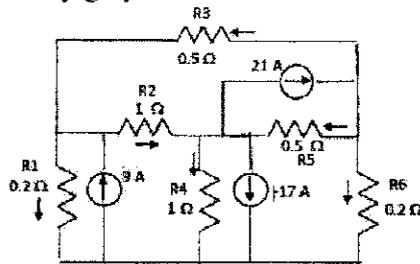


Fig.(6)

PART C

Answer any twofull questions, each carries10 marks.

- 12 A series RLC circuit consists of a resistance 20Ω , inductance $0.05H$ and capacitance $20\mu F$ in series with a $100 V$ constant voltage source when the switch is closed at $t=0$. Find the expression for the current in the circuit. Also find the current at $t=3ms$. (10)
- 13 In the given circuit shown in fig.(7), the switch is closed to position 1 at $t=0$ and after a time equal to one time constant it is moved to position 2. Find the expression for current after moving to position 2. Assume zero initial charge on the capacitor. (10)
- (Use Laplace transform technique)

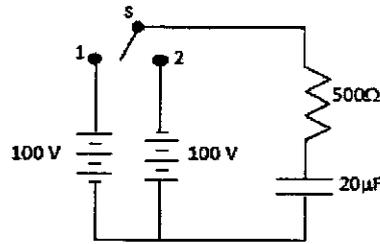


Fig.(7)

14

Find the voltage across the 5Ω resistor in the circuit shown in fig. (8).

(10)

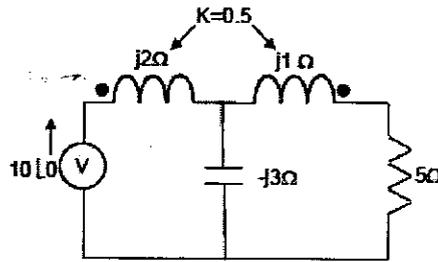


Fig.(8)

PART D*Answer any twofull questions, each carries 10 marks.*

- 15 a) The ABCD parameters of a two port network are $A=3$, $B=160$, $C=0.05$, $D=3$. (5)
Find the equivalent T and π network.
- b) Check whether the given polynomial $P(s) = s^3 + 3s^2 + 6s + 18$ is Hurwitz or not. (5)
- 16 The driving point impedance of a network is given by (10)

$$Z(s) = \frac{2(s^2 + 4s + 3)}{(s+2)(s+6)}$$

Obtain the first Foster form and second Cauer form of the network.

- 17 Obtain the Foster I and II forms of a network whose driving point function is (10)
given as

$$Z(s) = \frac{4s(s^2 + 4)}{(s^4 + 17s^2 + 16)}$$

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
THIRD SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017

Course Code: HS210

Course Name: LIFE SKILLS

Max. Marks: 50

Duration: 2 Hours

PART A

Answer all questions, each carries 6 marks.

- | | | Marks |
|---|---|-------|
| 1 | a) What are the different levels of communication? | (3) |
| | b) List and explain the different types of barriers in communication. | (3) |
| 2 | a) How does six thinking hat method help in decision making? | (3) |
| | b) Differentiate lateral thinking from vertical thinking. What are the four kinds of thinking tools used in lateral thinking? | (3) |
| 3 | a) "A group focuses on individual contribution, while a team must focus on synergy." Explain. | (3) |
| | b) Identify the type of group formed / constituted in each of the situations given below | (3) |
| | (i) An enquiry committee constituted to investigate a specific incident. | |
| | (ii) The Engineering Department of a company. | |
| | (iii) A group of members of a movie fans club. | |
| 4 | a) Compare and contrast Kohlberg theory and Gilligan's theory. | (4) |
| | b) What ethical responsibilities does an engineer have towards the environment? | (2) |
| 5 | Explain the six styles of leadership. | (6) |

PART B

Read carefully the following case and answer the questions given below, it carries 20 marks.

(Case study)

You are a trainee accountant in your second year of training within a small company. A more senior trainee has been on sick leave, and you are due to go on study leave. You have been told by your manager that, before you go on leave, you must complete some complicated reconciliation work. The deadline suggested appears unrealistic, given the complexity of the work. You feel that you are not sufficiently experienced to complete the work alone. You would need additional supervision to complete it to the required standard, and your manager appears unable to offer the necessary support. If you try to complete the work within the proposed timeframe but fail to meet the expected quality, you could face repercussions on your return from study leave. You feel slightly intimidated by your manager, and also feel pressure to do what you can for the practice in what are challenging times.

- | | | |
|---|---|-----|
| 6 | a) Who are the affected parties in the above passage? | (1) |
| | b) Identify relevant facts in the above situation. | (3) |
| | c) Who should be involved in coming up with a solution to this problem? | (4) |
| | d) Would it be right to attempt to complete work that is technically beyond your abilities, without proper supervision? | (4) |
| | e) Can you refuse to perform the work without damaging your reputation within the practice? | (4) |
| | f) What is the possible course of action that could be taken in this situation? | (4) |

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
THIRD SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017

Course Code: MA201

Course Name: LINEAR ALGEBRA AND COMPLEX ANALYSIS

Max. Marks: 100

Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks.

Marks

- 1 a) Find the points where Cauchy-Riemann equations are satisfied for the function $f(z) = xy^2 + i x^2 y$. Where does $f'(z)$ exist? Is the function $f(z)$ analytic at those points? (7)
- b) If $v = e^x(x \sin y + y \cos y)$, find an analytic function $f(z) = u + iv$. (8)
- 2 a) Show that $u = x^2 - y^2 - y$ is harmonic. Also find the corresponding conjugate harmonic function. (7)
- b) (i) Find a bilinear transformation which maps $(-i, 0, i)$ onto $(0, -1, \infty)$. (8)
- (ii) Test the continuity at $z = 0$, if $f(z) = \frac{Im z}{|z|}, z \neq 0$
 $= 0, z = 0$
- 3 a) Find the image of the lines $x=1, y=2$ and $x>0, y<0$ under the mapping $W = z^2$ (8)
- b) Find the image of the semi-infinite strip $x > 0, 0 < y < 2$ under the transformation $w = iz + 1$. Draw the regions. (7)

PART B

Answer any two full questions, each carries 15 marks.

- 4 a) Evaluate $\oint Re z^2 dz$ over the boundary C of the square with vertices $0, i, 1+i, 1$ clockwise (8)
- b) Evaluate $\int \frac{4-3z}{z(z-1)} dz$ over the circle $|z| = \frac{3}{2}$ (4)
- c) Evaluate $\int \frac{3z^2+7z+1}{z+1} dz$ over the circle $|z+i|=1$ (3)
- 5 a) Expand $\frac{z}{(z-1)(z-2)}$ in (1) $0 < |z-2| < 1$, (2) $|z-1| > 1$ (8)
- b) Evaluate $\int_0^{2\pi} \frac{1}{2+\cos \theta} d\theta$ (7)
- 6 a) Using Residue theorem evaluate $\int \frac{z^2}{(z-1)^2(z+2)} dz$ over the circle $|z|=3$ (7)
- b) Find the Taylor series of $\frac{\sin z}{z-\pi}$ about the point $z = \pi$ (4)

- c) Evaluate $\int \frac{\sin z}{z^6} dz$ over the circle $|z|=2$ using Cauchy's Residue theorem. (4)

PART C

Answer any two full questions, each carries 20 marks.

- 7 a) Solve by Gauss-Elimination method $x + y + z = 6$, $x + 2y - 3z = -4$, $-x - 4y + 9z = 18$. (7)
- b) Find the values of 'a' and 'b' for which the system of equations $x + y + 2z = 2$, $2x - y + 3z = 10$, $5x - y + az = b$ has: (7)
- (i) no solution (ii) unique solution (iii) infinite number of solutions.
- c) Verify whether the vectors $(1, 2, 1, 2)$, $(3, 1, -2, 1)$, $(4, -3, -1, 3)$ and $(2, 4, 2, 4)$ are linearly independent in \mathbb{R}^4 . (6)
- 8 a) Write down the matrix associated with the quadratic form $8x_1^2 + 7x_2^2 + 3x_3^2 - 12x_1x_2 - 8x_2x_3 + 4x_3x_1$. By finding eigen values, determine nature of the quadratic form. (7)
- b) Diagonalise the matrix $A = \begin{bmatrix} 1 & -2 & 0 \\ -2 & 0 & 2 \\ 0 & 2 & -1 \end{bmatrix}$ (7)
- c) If A is a symmetric matrix, verify whether AA^T and $A^T A$ are symmetric? (6)
- 9 a) Find the eigen vectors of $A = \begin{bmatrix} 3 & 0 & 0 \\ 5 & 4 & 0 \\ 3 & 6 & 1 \end{bmatrix}$ (8)
- b) Find the null space of $AX=0$ if $A = \begin{bmatrix} 1 & 1 & 0 & 2 \\ -2 & -2 & 1 & -5 \\ 1 & 1 & -1 & 3 \\ 4 & 4 & -1 & 9 \end{bmatrix}$ (6)
- c) Verify whether $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos \theta & -\sin \theta \\ 0 & \sin \theta & \cos \theta \end{bmatrix}$ is orthogonal. (6)

What can you say about determinant of an orthogonal matrix? Prove or disprove the result.
