H.T No: | | | | | | | | | | | **R18** **Course Code: A30224**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech III Semester Supplementary Examinations July-2025

Course Name: Electrical Engineering

(Electronics & Communication Engineering)

Date: 03.07.2025 FN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

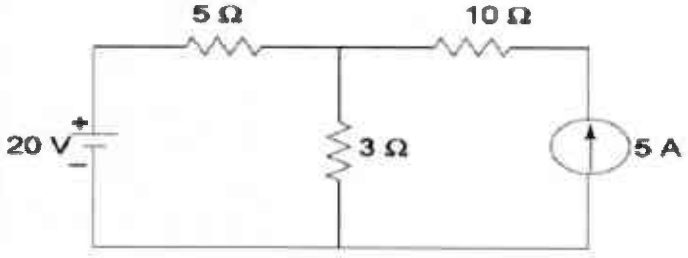
Each question carries TWO marks. **10x2=20M**

1. State Kirchoff's Current law, Kirchoff's Voltage law. 2 M
2. Sate superposition theorem. 2 M
3. Define i) active power ii) reactive power iii) apparent power 2 M
4. Draw the Phasor diagram for series R-L circuit. 2 M
5. Mention types of two port networks. 2 M
6. In an RL series circuit, R = 5Ω, L = 2.5mH and i(0-) = 2A. If a source of 50 V is applied at t = 0, find i(t) for t>0, using Laplace transformation. 2 M
7. Explain the Principle operation of single-phase transformer. 2 M
8. Why rating of Transformer in KVA? 2 M
9. What is the principle of operation of dc generator? 2 M
10. Classify dc motors and write their applications. 2 M

PART-B

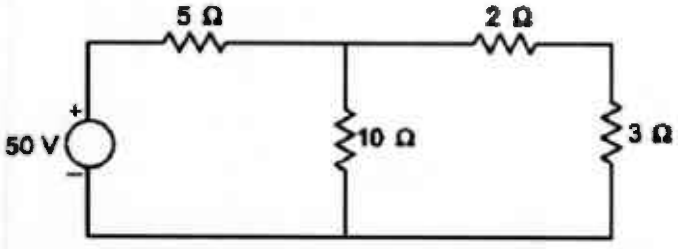
Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Find the current passing through the 3ohms resistor in the circuit using superposition theorem. 10M



OR

11. B). State Thevenin's Theorem. Use Thevenin's Theorem to find the current in 3-ohm resistor. 10M



12. A). (i) Explain the following: a) Impedance, b) Reactance, c) Phase angle difference. 5M

(ii) An inductive circuit has a resistance of 5OHM of 0.03 H. Calculate the current and power factor when connected across 230 V, 50 HZ supply. 5M

(P.T.O..)

OR

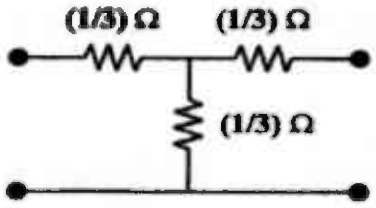
12. B). Determine the RMS value, average value and form factor for the sinusoidal waveform. 10M

13. A). (i) Derive the expression for i(t) and the voltage across capacitor Vc(t) for series RC circuit with DC voltage applied to it at t = 0. 5M

(ii) Determine the DC response of RC circuit and sketch the voltage transients. 5M

OR

13. B). Find the Y-parameters of the two-port circuit given below. 10M



14. A). Draw the circuit diagrams for conducting OC and SC tests on a single-phase transformer. Also explain how the efficiency and voltage regulation can be estimated by these tests. 10M

OR

14. B). (i) Drive the emf equation of a Transformer. 5M

(ii) A single-phase transformer working at unity power factor has an efficiency of 90% at both 3/4th load and full load of 750 W. Determine the efficiency at 50% of full load. 5M

15. A). Explain the principle of operation of DC generators. 10M

OR

15. B). Explain the differences between the slip ring and squirrel cage poly phase induction motors. Sketch a typical characteristic for each. 10M

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H.T No: | | | | | | | | | | | **R18** **Course Code: A30402**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech III Semester Supplementary Examinations July-2025

Course Name: Probability & Stochastics Processes

(Electronics & Communication Engineering)

Date: 05.07.2025 FN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1. Define probability. 2 M
2. Define a sample space. 2 M
3. Define probability density function. 2 M
4. Write any two properties of density function. 2 M
5. Define probability distribution function for two random variables. 2 M
6. Give properties of probability distribution function. 2 M
7. Define strict sense stationary random process. 2 M
8. Define correlation ergodic process. 2 M
9. State any two properties of cross-power density spectrum. 2 M
10. Define Spectral density. 2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). i) Explain conditional distribution and density function and state its properties. 6M

ii) In a bolt factory machine A,B,C Manufacture 30%,30%,40% of the total output respectively. From their outputs,4%,5%,3% are defective bolt. A bolt is drawn at random and found to be defective. What are the probabilities that is was manufactured by machines A, B, C? 4M

OR

11. B). i) State and prove total probability theorem? 7M

ii) A man wins in a gambling game if he gets two heads in in five flips of a biased coin. The probability of getting a head with the coin is 0.7. 3M

a). Find the probability the man will win. Should he play this game?

b). What is the probability of winning if he wins by getting at least four heads in five flips? Should he play this new game?

12. A). i) If the joint PDF of two dimensional random variable (x, y) is given by: 5M

$f_{X,Y}(x,y) = 2$; for $0<X<1$, $0<Y<x= 0$; otherwise

Find the marginal density function of X and Y.

ii) Explain Chebychev's Inequality. 5M

OR

12. B). i) A random process is defined as $X(t) = A \cos(\pi t)$ Where A is a Gaussian random variable with zero mean and variance σ_A^2. 5M

(a) Find the density functions X(0) and X(1).

(b) Is X(t) stationary in any sense?

ii) What are the axioms of probability? Give engineering examples. 5M

(P.T.O..)

13. A). i) Explain when random variables are called jointly Gaussian random variables, and also list important properties of Gaussian random process? 5M

ii) A random variable X has = −3, $\bar{X}^2$ =11, σ_X^2 = 2. x X X andσ For a new random variable Y= 2X-3, find: (i) $\bar{Y}$ (ii) $\bar{Y}^2$ (iii) σ_Y^2 5M

OR

13. B). i) State and explain probability density function for two random variables. 5M

ii) The joint PDF of X and Y is $f_{(X,Y)}(x, y) = 5y/4 \; -1 \leq x \leq 1, \; x^2 \leq y \leq 1$, 0 otherwise. Find the marginal PDFs fX (x) and fY (y). 5M

14. A). i) State and prove the properties of Autocorrelation function. 5M

ii) The power Spectral density of X(t) is given by $S_{xx}(w)=1/1+w^2$ for w>0. Find the autocorrelation function. 5M

OR

14. B). i) Explain wide sense stationary random process. 5M

ii) Show that the process X(t)= A Cos($w_0t+\theta$) is wide sense stationery if it is assumed that A and w0 are constants and θ is uniformly distributed random variable over the interval (0,2π). 5M

15. A). i) Prove wiener khinchinen relation. 4M

ii) Let the auto correlation function of a certain random process X (t) be given by $R_n(\tau) = (A^2/2)(\cos(\omega\tau))$ Obtain an expression for its power spectral density $S_n(\omega)$. 6M

OR

15. B). i) Derive the relation between PSDs of input and output random process of an LTI system. 6M

ii) Derive relation between power spectrum and auto correlation. 4M

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H.T No: | | | | | | | | | | | **R18** **Course Code: A30403**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech III Semester Supplementary Examinations July-2025

Course Name: Switching Theory & Logic Desgin

(Electronics & Communication Engineering)

Date: 08.07.2025 FN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1. Convert $(76)_{16}$ into Gray code number. 2 M
2. Give any two properties of EX-OR gate. 2 M
3. Define a Combinational circuit. 2 M
4. Draw the truth table for half- subtractor. 2 M
5. Differentiate between a Latch and a Flip-Flop. 2 M
6. What is race around condition? 2 M
7. What is a state diagram in sequential circuit design? 2 M
8. List the steps involved in designing a synchronous sequential finite state machine. 2 M
9. Write the differences between Moore and Mealy machines. 2 M
10. What are features of ASM chart? 2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Construct a hamming code using odd parity for the information "011010". 10M

OR

11. B). i) Implement the given expression using NOR gate F=(A+B)(A'+B)(A+B') 5M
ii) Convert the following Boolean expression into canonical sop f(A,B,C)=A(B +C) +BC. 5M

12. A). Simplify the function F(A,B,C,D)=$\sum$m(0,1,2,8,10,11,14,15) using tabular method. 10M

OR

12. B). Implement the following functions using PAL and write PAL programming table. 10M
F1 (A, B, C, D) =$\sum$m (0, 1, 2, 3, 6, 9, 11)
F2 (A, B, C, D) =$\sum$m (0, 1, 6, 8, 9)

13. A). Explain about JK flip-flop in detail with neat diagrams. 10M

OR

13. B). i) Differentiate synchronous and asynchronous sequential circuit. 5M
ii) Convert JK flip-flop to T flip-flop. 5M

14. A). The input equation of a D Flip-flop is given by DA = A $\oplus$ x $\oplus$ y. DA means a D Flip-flop with output A. Analyse the circuit diagram with D – Flip-flop. 10M

OR

14. B). Explain the working of Ring counters with neat diagram. 10M

(P.T.O..)

15. A). For the machine given in table, find the equivalence partition & a reduced machine in standard form. 10M

PS	NS,Z	
	X=0	X=1
1	1,0	1,0
2	1,1	6,1
3	4,0	5,0
4	1,1	7,0
5	2,0	3,0
6	4,0	5,0
7	2,0	3,0

OR

15. B). Describe the ASM chart for weighing machine. 10M

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H.T No: | | | | | | | | | | | **R18** Course Code: A30401

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech III Semester Supplementary Examinations July-2025

Course Name: Electronic Devices & Circuits

(Common for EEE & ECE)

Date: 10.07.2025 FN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions

Each question carries TWO marks. **10x2=20M**

1. What is transition capacitance? 2 M
2. Recall the principle of operation of Tunnel diode. 2 M
3. Define rectifier operation. 2 M
4. List any two disadvantages of center tapped full wave rectifier. 2 M
5. What is Early effect or base width modulation. 2 M
6. Define h-parameters of CC configuration. 2 M
7. What is the need for biasing? 2 M
8. What is thermal runaway? 2 M
9. When pinch-off voltage is occur? 2 M
10. Compare CS, CD and CG amplifiers. 2 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Derive an expression for semiconductor PN junction diode current. 10M

OR

11. B). Explain the V-I characteristics of SCR. 10M

12. A). Interpret the construction and operation of a bridge rectifier and find PIV, RMS current, Rectifier efficiency & Ripple factor. 10M

OR

12. B). Explain construction and operation of full wave rectifier with Inductor filter. 10M

13. A). Illustrate the current components in transistor with appropriate diagrams 10M

OR

13. B). Explain the construction and working principle of transistor in Common Emitter configuration along with its characteristics. 10M

14. A). Determine stability factor and operating point for CE germanium transistor amplifier which uses self-bias technique where V_{CC}=16V, R_C = 3 KΩ, R_E=2 KΩ, R_1=56KΩ, R_2= 20 KΩ and α= 0.985. 10M

OR

14. B). Analyze the h-parameters equivalent circuit for a common emitter amplifier and derive the expression for current gain, input impedance, voltage gain, output impedance. 10M

15. A). Explain drain and transfer characteristics of depletion type MOSFET with suitable diagram. 10M

OR

15. B). Draw the small signal equivalent circuit of Common Source FET amplifier and derive expressions for Input impedance, output impedance and voltage gain. 10M

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