

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY:: PUTTUR
 B.Tech II Year I Semester Supplementary Examinations Aug- 2021

ELECTRICAL CIRCUITS -II
 (Electrical and Electronics Engineering)

Time: 3 Hours Max. Marks: 60
 Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

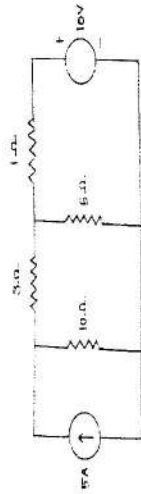
- 1 a) Derive the relationship between Phase and Line voltages, currents in star connected load. 6M
- b) An unbalanced 4 wire star connected load has a balanced voltage of 400V. The load are $Z_1=(4+j8) \Omega$, $Z_2=(5+j4) \Omega$, $Z_3=(15+j20) \Omega$. Calculate line currents, current in neutral wire, total power. 6M
- 2 a) Three impedances $Z_1=20\angle 30^\circ$, $Z_2=40\angle 60^\circ$, $Z_3=10\angle -90^\circ$ are delta connected to a $400V, 3\phi$ System. Determine i) phase currents ii) line currents iii) total power consumed by the load. 6M
- b) (i) Write the voltage and current relationship in star connected system?
 (ii) What are the different methods are used to solve the unbalanced systems?
 (iii) Draw the star connected load. 6M

UNIT-II

- 3 a) Derive the transient response of an RC circuit with AC excitation. 6M
- b) Derive the transient response of an RC circuit with DC excitation. 6M
- 4 a) A series RC circuit consists of resistor of 10Ω and capacitor of $0.1F$ has a constant voltage of $20V$ is applied to the circuit at $t=0$. Obtain the current equation. Determine the voltage across the resistor and the capacitor 6M
- b) (i) Find the Laplace transform of the function $f(t) = 4t^3 + t^2 - 6t + 7$
 (ii) Find $L\{ \cos^2 t \}$
 (iii) What is the transient response of RL series circuit with dc excitation? 6M

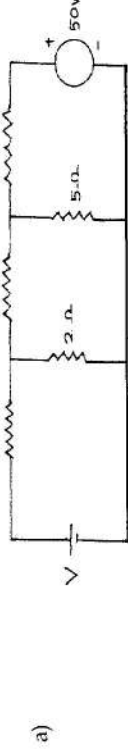
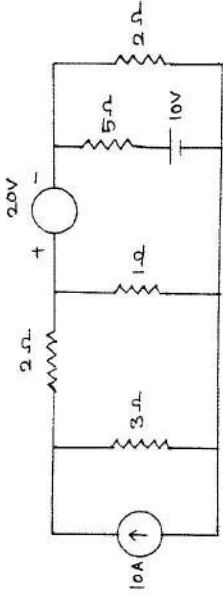
UNIT-III

- 5 a) Determine current in 10Ω resistor for the following network by using nodal analysis. 6M
- b) Determine current in 5Ω resistor for the circuit shown in figure. 6M



OR

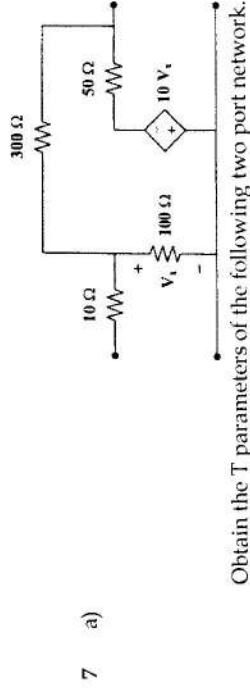
- 6 Find voltage V for the circuit shown in fig which makes the current in the 10Ω resistor is zero by using nodal analysis. 6M



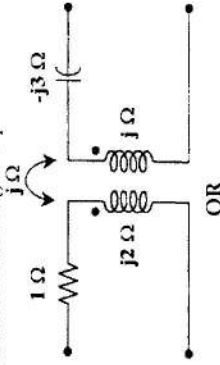
- a) 6M
- (i) Define duality.
 (ii) Define graph
 (iii) Define planar and non-planar graph. 6M

UNIT-IV

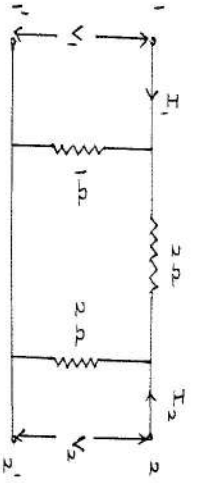
Obtain h and g parameters of following two port network.



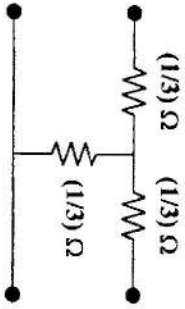
- 7 a) 6M
- b) Obtain the T parameters of the following two port network. 6M



- 8 a) Find the Z - parameters for the resistance network shown in figure. 6M



b) Determine Y parameters of the following network.



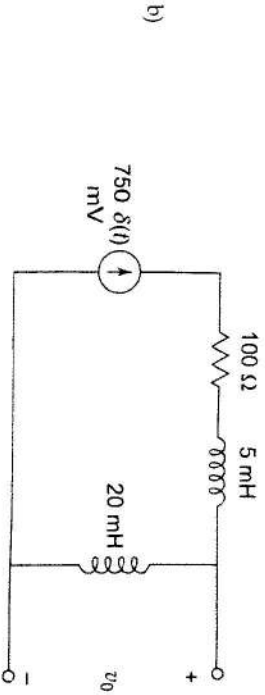
6M

- 9 a) Derive Laplace transform of all standard signals.
 A 500Ω resistor, a 16mH inductor, and a 25 nF capacitor are connected in parallel
 b) which is placed in series with a 2000Ω resistor. Express the impedance of this series combination as a rational function of s.

OR

- 10 a) Using the initial value theorem, find the initial value of the signal corresponding to the Laplace transform. $Y(S) = \frac{s+1}{s^2s+2^2}$
 There is no energy stored in the circuit shown in at the time the impulse voltage is applied. Find $v_o(t)$ for $t \geq 0$.

6M



6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY.: PUTTUR
 B.Tech II Year I Semester Supplementary Examinations Aug-2021
BASIC ELECTRICAL & MECHANICAL ENGINEERING
 (Civil Engineering)

Time: 3 Hours

Max. Marks: 60

Note: for Part-A, use first 16 pages...for Part-B, use 17 page onwards.

PART-A

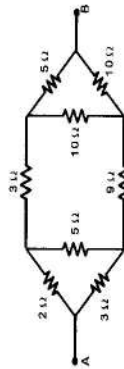
Answer one question from each unit (3 x 10 = 30 Marks)

UNIT-I

- Three resistances of values 20, 30 and 50 are connected in series across 20 V DC supply. Calculate.
 - Total current from the supply.
 - Voltage drop across each resistor.
 - Power dissipated in each resistor.

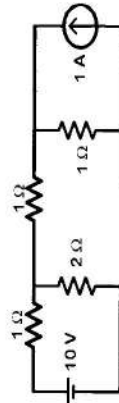
OR

- Find the voltage to be applied across AB in order to drive a current of 5A into the circuit.



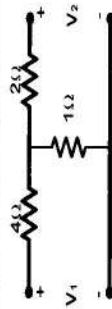
UNIT-II

- State Super position theorem
 - Calculate the current in 2Ω resistor in the given circuit using super position theorem.



OR

- Find the Open circuit parameters for the given circuit



UNIT-III

- Discuss about the principle of operation of DC motors
 - Calculate the value of torque established by the armature of a 4-pole DC motor having 774 conductors, 2 paths in parallel, 24mwb flux per pole when the total armature current is 50A.

OR

- Explain constructional details of transformer. 5M
 - A 20 kVA, 2000/200 V, 50 Hz transformer has 66 secondary turns. Calculate the number of primary turns and primary and secondary currents. Neglect losses. 5M

PART-B

Answer one question from each unit (3 x 10 = 30 Marks)

UNIT-IV

- What is manufacturing process? Classify the various manufacturing process. 5M
 - Explain the importance of manufacturing process towards technology and social-economic development? 5M

OR

- What is meant by welding? Explain the working of gas welding with neat sketch and mention the advantages, limitations and applications. 10M
- What is machine tool? Explain Working and Auxiliary motions in machine tools. 10M

OR

- Define indexing? Explain any two indexing methods with suitable example. 5M
 - What is the working principle and principle parts of a grinding machine? What are the grinding wheel parameters that influence the grinding performance? 5M

UNIT-V

- Explain below with neat sketches
 - front wheel drive
 - rear wheel drive

OR

- Define Psychometry and Explain their Properties. 10M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY:: PUTTUR
 B.Tech II Year I Semester Supplementary Examinations Aug-2021
PROBABILITY, NUMERICAL METHODS AND TRANSFORMS
 (EEE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Determine the probability of the following event :
 The sum 7 or 8 or 12 appears in a single toss of a pair of fair dice. 6M
 b) Companies B_1, B_2, B_3 produce 30%, 45% and 25% of the cars respectively. It is known that 2%, 3%, and 2% of the cars produced from B_1, B_2 and B_3 are defective. 6M
 (i) What the probability that a car purchased is defective?
 (ii) If a car purchased is found to be defective what the probability that this car is produced by company B_3 ?

OR

- 2 a) If A and B are two events, then prove that 6M
 $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
 b) Three balls are drawn successively from the box containing 6 red balls, 4 white balls and 5 blue balls. Find the probability that they are drawn in the order red, white and blue if each ball is (i) replaced, (ii) not replaced. 6M

UNIT-II

- 3 a) Using bisection method, compute the real root of the equation $x^3 - 6x + 2 = 0$. 6M
 b) Using Newton's forward formula, compute $f(1.6)$ from the following table: 6M

x	1	1.4	1.8	2.2
$f(x)$	3.46	4.82	5.96	6.5

OR

- 4 a) Find a real root of the equation $x \log_{10} x = 1.2$ by regula-falsi method correct to four decimal places. 6M
 b) Using Newton's backward formula compute $f(84)$ from the following table: 6M

x	40	50	60	70	80	90
$f(x)$	184	204	226	250	276	304

UNIT-III

- 5 a) Evaluate $\int_0^1 e^{-x} dx$, by using Trapezoidal rule and Simpson's $\frac{1}{3}$ rule taking $h = 0.25$. 6M
 b) Given that $\frac{dy}{dx} = 2 + \sqrt{xy}$, $y(1) = 1$. Find $y(2)$ in steps of 0.2 using the Euler's method. 6M

OR

- 6 a) Using Runge-Kutta method of fourth order, find $y(0.2)$ and $y(0.4)$ given that $\frac{dy}{dx} = y^2 - x^2$, $y(0) = 1$. Take $h = 0.2$ 6M
 b) Compute $y(0.1)$ and $y(0.2)$ by Taylor's series method if $\frac{dy}{dx} = x^2y - 1$, $y(0) = 1$.

UNIT-IV

- a) Find the Laplace transform of (i). $\left(\sqrt{t} - \frac{1}{\sqrt{t}}\right)^2$ 6M

(ii). $2^t + \frac{\cos 2t - \cos 3t}{t} + t \sin t$.

$$\frac{5s+3}{(s-1)(s^2+2s+5)}$$

- b) Find the inverse transforms of

OR

- 8 a) Evaluate (i) $\int_0^{\pi} t e^{-t} \sin t dt$ (ii) $L^{-1} \left\{ \frac{t e^t \sin t}{t} dt \right\}$ 6M

- b) Use Laplace transform, Solve $(D^2 + n^2)x = a \sin(nt + \alpha)$, $x = Dx = 0$ at $t = 0$. 6M

UNIT-V

- 9 (i) Find the Z-transform of $\cos n\theta$ and $\sin n\theta$. 6M
 (ii) Find the inverse Z-transform of $\frac{2z^2 + 3z}{(z+2)(z-4)}$.

- b) Solve the difference equation $y_{n+2} + 4y_{n+1} + 3y_n = 2^n$ with $y_0 = 0, y_1 = 1$ by using Z-transform. 6M

OR

- 10 a) Find (i) $Z\{\cos \theta + i \sin \theta\}^n$ (ii) $Z^{-1} \left\{ \frac{z^2}{(z-a)(z-b)} \right\}$, by use convolution theorem. 6M

- b) Solve the difference equation $y_{n+2} - 4y_n = 0$ given that $y_0 = 0, y_1 = 2$ by using Z-transform. 6M

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SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY:: PUTTUR

B.Tech II Year I Semester Supplementary Examinations Aug- 2021

BASIC ELECTRICAL & ELECTRONICS ENGINEERING

(Mechanical)

Time: 3 Hours

Max. Marks: 60

Note: For Part-A, use first 16 pages...for Part-B, use 17 page onwards

PART-A

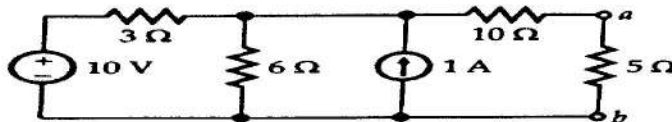
(Answer all Three units, 3 x 10 =30 Marks)

UNIT - I

1. Find the average, RMS values of sinusoidal waveform and also find form factor 10M
- OR**
2. (a) Derive and explain the relations of voltage, current and power with series and parallel resistive circuits. 5M
- (b) State and Explain Ohm's law and list out its limitations. 5M

UNIT - II

3. Find current flowing through 5Ω resistor using Norton's Theorem 10M



OR

4. Derive the expressions for Z-Parameters of a two port network. 10M
- UNIT - III**
5. Explain the principle operation of DC motor with neat sketch. 10M

OR

6. Derive the EMF equation of a single phase transformer. 10M

PART- B

(Answer all Three units, 3 x 10 =30 Marks)

UNIT - I

1. Explain the construction and V-I characteristics of Diode. 10M

OR

2. Explain in detail about Intrinsic & Extrinsic Semiconductors 10M

UNIT - II

3. Explain how BJT can acts as an amplifier with neat diagram 10M

OR

4. (a) Explain how a transistor can acts as a switch 5M
- (b) List out the applications of transistor. 5M

UNIT - III

5. Explain the construction and operation of a MOSFET with its V-I characteristics. 10M

OR

6. Explain how a JFET can acts as a switch and amplifier 10M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY.: PUTTUR
 B.Tech II Year I Semester Supplementary Examinations Aug- 2021
NUMERICAL METHODS & TRANSFORMS

(ECE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

- 1 a) Find a root of the equation $x^3 - 4x - 9 = 0$, using the bisection method correct to three decimal places. 6M
 b) Find a real root of $x^3 - 2x - 5 = 0$, using the method of false position. 6M

UNIT-I

- 2 State Newton's interpolation formula (forward & backward). Using them find the first and tenth terms of the series for the data given below: 12M

x:	3	4	5	6	7	8	9
y:	4.8	8.4	14.5	23.6	36.2	52.8	73.9

UNIT-II

- 3 Find by Taylor's series method, the values of y at $x=0.1$, $x=0.2$ and $x=0.2$ to five places of decimals from $y' = x^2y - 1, y(0) = 1$. 12M

OR

- 4 a) Describe the (i) Picard's method of successive approximations, and (ii) Runge-Kutta methods. 6M
 b) Compute the value of $\int_0^{1.4} (\sin x - \log x) dx$ using Simpson's $\frac{2}{3}$ th rule. 6M

UNIT-III

- 5 a) State and prove the first shifting theorem and hence find $e^{-3x}(2 \cos 5t - 4 \sin t)$. 6M
 b) Evaluate $\int_0^x e^{2t} \left(\frac{\cos at - \cos bt}{t} \right) dt$. 6M

OR

- 6 a) State convolution theorem and hence use it to find the inverse transform of the function $\frac{1}{(s^2 + 1)(s^2 + 9)}$. 6M
 b) Solve $\frac{d^2x}{dt^2} + 9x = \cos 2t, x(0) = 1, x(\pi/2) = -1$. 6M

UNIT-IV

- 7 a) Find the Fourier series expansion of $f(x) = \begin{cases} 0, & -\pi \leq x \leq 0 \\ \sin x, & 0 \leq x \leq \pi \end{cases}$ 8M
 Hence show that $\frac{1}{13} - \frac{1}{35} + \frac{1}{57} - \dots = \frac{\pi-2}{4}$.
 b) Express $f(x)=x$ as a half range sine series in $0 < x < 2$. 4M

OR

- 8 a) Discuss the Fourier series expansion of even and odd functions. 4M

- b) Obtain the half range cosine series for $f(x) = \begin{cases} kx, & 0 \leq x \leq \sqrt{2} \\ k(-x), & \sqrt{2} \leq x \leq l. \end{cases}$ 8M

Deduce the sum of the series $\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \dots$

UNIT-V

- 9 a) Find the Fourier transform of $e^{-a|x|}$, $a < 0$. Hence deduce that $e^{-x^2/2}$ is self reciprocal in respect of Fourier transform. 8M
 b) If the Fourier sine transform of $f(x)$ is $\frac{1 - \cos n\pi}{n^2 \pi^2}$, $0 \leq x \leq \pi$, find $f(x)$. 4M
- 10 a) State and prove change of scale property of Fourier transform. 6M
 b) Find the Fourier cosine transform of $f(x) = \begin{cases} x, & \text{for } 0 < x < 1 \\ 2-x, & \text{for } 1 < x < 2 \\ 0, & \text{for } x > 2. \end{cases}$ 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY:: PUTTUR
B.Tech II Year I Semester Supplementary Examinations Aug- 2021
MICROPROCESSORS & MICROCONTROLLERS
(CSE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Differentiate Microprocessor and Microcontroller. Mention applications 6M
b) Draw the functional block diagram of 8085 microprocessor 6M

OR

- 2 a) Explain the pin diagram of 8085 in detail. 6M
b) Explain the memory mapped i/o addressing scheme 6M

UNIT-II

- 3 a) Discuss about the flag register of 8085 microprocessor. 6M
b) With suitable examples explain 8085 addressing modes in detail. 6M

OR

- 4 a) Draw and explain the timing diagram of opcode fetch cycle. 6M
b) Explain any FOUR two-byte instructions used in 8085 processor 6M

UNIT-III

- 5 a) Explain how interrupts are prioritized. 6M
b) Explain the different serial communication modes in 8051 6M

OR

- 6 a) Explain the I/O port structure of 8051 6M
b) Name any four additional hardware features available in microcontrollers when compared to microprocessors. 6M

UNIT-IV

- 7 a) Discuss about the addressing modes of 8051 micro controller 6M
b) Explain mov, movc and movx instructions of 8051 with examples 6M

OR

- 8 a) Explain different data transfer instructions of 8051 microcontroller with suitable examples. 6M
b) Explain different arithmetic instructions of 8051 microcontroller with examples 6M

UNIT-V

- 9 a) With a neat schematic, explain the interfacing of A to D converters with 8051 microcontroller. 6M
b) Explain the interfacing of LEDs to 8051 microcontroller. 6M

OR

- 10 a) Elaborate the need of a dedicated keyboard display controller. 6M
Explain briefly about interface an 8-bit 7-segment LED display to 8051 through port 1 and port 3 and write a assembly language program to display message on the display 6M
b) port 1 and port 3 and write a assembly language program to display message on the display 6M

SIDDHARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR

B.Tech II Year I Semester Supplementary Examinations Aug- 2021

STRENGTH OF MATERIALS-II

(Civil Engineering)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

- UNIT-I**
- 1 a) Derive an expression for hoop and radial stresses across thickness of the thick cylinder
 - b) A compound cylinder is made by shrinking a cylinder of external diameter 300 mm and internal diameter of 250 mm over another cylinder of external diameter 250 mm and internal diameter 200 mm. The radial pressure at the junction after shrinking is 8 N/mm². Find the final stresses set up across the section, when the compound cylinder is subjected to an internal fluid pressure of 84.5 N/mm².

OR

- 2 a) A thin cylindrical shell with following dimensions is filled with a liquid — atmospheric pressure length = 1.2 m, external diameter = 20 cm, thickness of metal = 8 mm. Find the value of the pressure exerted by the liquid on the walls of the cylinder and the hoop stress induced if an additional volume of 25 cm³ of liquid is pumped into the cylinder. - Take $E = 2.1 \times 10^5 \text{ N/mm}^2$ and Poisson's ratio = 0.33.
- b) A steel cylinder of 300 mm external diameter is to be shrunk to another steel cylinder of 150 mm internal diameter. After shrinking, the diameter at the junction is 250 mm and radial pressure at the common junction is 28 N/mm². Find the original difference in radii at the junction. Take $E = 2 \times 10^5 \text{ N/mm}^2$.

UNIT-II

- 3 a) Explain maximum principal strain theory
- b) Determine the diameter of a bolt which is subjected to an axial pull of 9 kN together with a transverse shear force of 4.5 kN using : (i) Maximum principal stress theory. (ii) Maximum principal strain theory. Given the elastic limit in tension = 225 N/mm². factor of safety = 3 and Poisson's ratio = 0.3.

OR

- 4 a) Explain maximum strain energy theory
- b) A cylindrical shell made of mild steel plate and 1.2 m in diameter is to be subjected to an internal pressure of 1.5 MN/m². If the material yields at 200 MN/m², calculate the thickness of the plate on the basis of the following three theories, assuming a factor of safety 3 in each case : (i) Maximum principal stress theory, (ii) Maximum shear stress theory, (iii) Maximum shear strain energy theory

UNIT-III

- 5 a) State the difference between twisting moment and bending moment.
- b) Define Polar modulus, Torsional rigidity.

OR

- 6 a) In a torsion test, the specimen is a hollow shaft with 50 mm external and 30 mm internal diameter. An applied torque of 1.6 kN-m is found to produce an angular twist of 0.4° measured on a length of 0.2 m of the shaft. The Young's modulus of elasticity obtained from a tensile test has been found to be 200 GPa. Find the values of (i) Modulus of rigidity (ii) Poisson's ratio
- b) A hollow steel rod 200 mm long is to be used as torsional spring. The ratio of inside to outside diameter is 1 : 2. The required stiffness of this spring is 100N.m/degree. Determine the outside diameter of the rod. Value of G is 8 x 10⁴ N/mm².

Page 1 of 2

UNIT-IV

- 7 a) State advantages of fixed ends or fixed supports. 6M
 - b) A fixed beam AB of length 3 m is having moment of inertia $I = 3 \times 10^6 \text{ mm}^4$. The support B sinks down by 3 mm. If $E = 2 \times 10^8 \text{ N/mm}^2$, find the fixing moments. 6M
- OR
- 8 a) A fixed beam AB of length 3 m carries a point load of 45 kN at a distance of 2 m from A. If the flexural rigidity (i.e., EI) of the beam is $1 \times 10^4 \text{ kNm}^2$, determine : (i) Fixed end moments at A and B, (ii) Deflection under the load, (iii) Maximum deflection, and (iv) Position of maximum deflection. 6M
 - b) Derive Clapeyron's Equation of three Moments. 6M
- UNIT-V
- 9 a) Define curved beam and write a note on stresses generated in curved beams. 6M
 - b) Calculate the stresses in curved beams and state the assumptions made in the analysis of curved beams. 6M
- OR
- 10 a) Explain the importance of circular beam loaded uniformly and supported on 6M symmetrically placed columns.
 - b) Explain the importance of simply supported on three supports equally spaced. 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY: PUTTUR
B.Tech II Year I Semester Supplementary Examinations Aug- 2021
STRENGTH OF MATERIALS
(Mechanical)

Time: 3 Hours

Max. Marks: 60

Answer all question and all questions carry equal marks

5 x 12 = 60 M

UNIT-I

1. A wrought iron bar is 7.5m long and is 5 cm is diameter for 1.5m of its length, 4 cm in diameter for 2m of its length and 3cm in diameter for the remainder. The bar is in tension and the stress in the smallest section is 90 N/mm^2 , Find the total elongation of the bar if $E = 200 \text{ kN/mm}^2$.

OR

2. The principal stresses at a point in an elastic material are $1.5f$ (tensile), f (tensile) and $\frac{1}{2}f$ (compressive). If the elastic limit in simple tension is 210 N/mm^2 , determine the value of f at failure, according to the five different theories. Take $\mu=0.3$

UNIT-II

3. A cantilever 1.5 m long carries a gradually varying load over the whole span, from zero at free end and increment of load 25 kN/m towards the fixed end, Draw shear force and bending moment diagrams for the beam.

OR

4. A simply supported beam AB of span 8 m carrying point loads of 4 kN, 5 kN at distances 5m and 6m respectively from left hand support. Calculate the values of shear force and bending moment at salient points, and draw S.F. and B.M. diagrams.

UNIT-III

5. An I- section beam of flanges $20 \text{ cm} \times 2 \text{ cm}$ and web $30 \text{ cm} \times 1 \text{ cm}$ is acted on by a shearing force of 180 kN . Determine:
(i) The maximum and minimum shearing stress in the web.
(ii) The maximum shear stress in the flange.

OR

6. In a hollow circular shaft, the external diameter is 100 mm and internal diameter is 60 mm . The allowable shear stress in the shaft material is 65 N/mm^2 . Determine the angle of twist in a length of twenty times the external diameter of the shaft. Take $G = 8 \times 10^4 \text{ N/mm}^2$.

UNIT-IV

7. A simply supported beam of span 3 m and cross-sectional area $100 \text{ mm} \times 300 \text{ mm}$ carries a point load of 15 kN at a distance of 1 m from the left end. Find the slope at its two ends and deflection under the point load. Take $E = 2 \times 10^4 \text{ N/mm}^2$.

OR

8. The section of a column is a rectangle $20 \text{ cm} \times 10 \text{ cm}$. The column carries an axial compressive load of 25 kN . Factor of safety is 3 and $E = 2.1 \times 10^4 \text{ kN/cm}^2$. Determine the length of the column whose one end is fixed and the other end is free.

UNIT-V

9. The internal diameter of a cylindrical shell is 1 m and its length is 3 m , the plates being 1.5 cm thick. Determine the circumferential and longitudinal stresses set up and the changes in dimensions of the shell when a fluid is introduced in it at a pressure of 1.6 N/mm^2 . Take $E = 200 \text{ kN/mm}^2$ and $\frac{1}{m} = 0.3$.

OR

10. The external and internal radii of a thick cylindrical shell are respectively 300 mm and 150 mm . The cylinder is subjected to an internal fluid pressure of 15 N/mm^2 . Determine the maximum and minimum hoop stresses in the material of the shell.

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NETWORK THEORY
 (ECE)

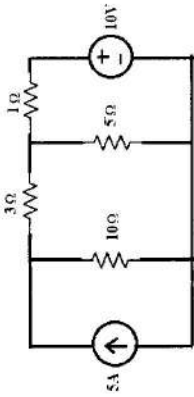
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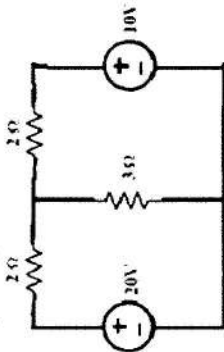
UNIT-I

- 1 a) Explain about Mesh analysis and write the steps for writing mesh analysis 6M
- b) Determine the current in 10Ω resistor for the following network by using nodal analysis. 6M



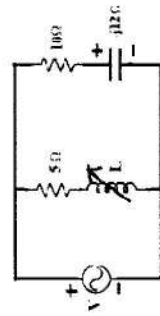
OR

- 2 a) State and prove Compensation theorem 6M
- b) Verify Tellegen's theorem for the circuit shown in below figure 6M



UNIT-II

- 3 a) Explain about Parallel resonance with phasor diagrams. 6M
- b) Find the value of 'L' at which the circuit resonates at a frequency of 1000 rad/sec in the circuit shown in figure 6M



OR

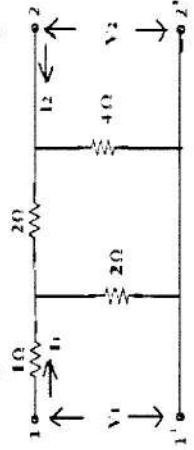
- 4 a) Explain about classification of filters 6M
- b) Explain about Propagation constant and Characteristic impedance in T-network filters 6M
- 5 a) Derive the Laplace Transform of Series RL Circuit. 6M

UNIT-III

- 6 a) Derive the Transient Response of Series RL circuit with Sinusoidal excitation 6M
- b) The Circuit Consists of Resistance=20 Ohm, Inductance = 0.05H, Capacitance = 20μF in Series With a 100V Constant at t=0. Find the Current Transient. 6M

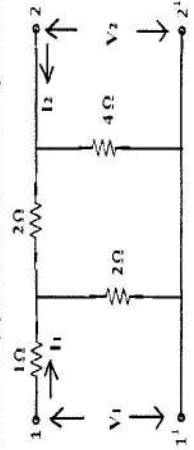
UNIT-IV

- 7 a) Explain about short-circuit parameters. 6M
- b) Find the h-parameters of the network shown in figure 6M



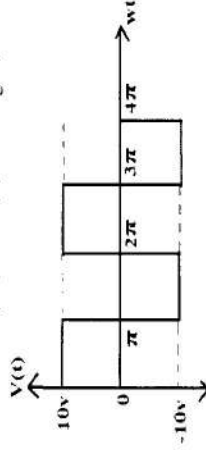
OR

- 8 a) Derive the expressions for Y-parameters in terms of ABCD parameters 6M
- b) Determine the y-parameters of the following network. 6M



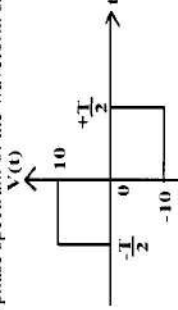
UNIT-V

- 9 a) Derive the Exponential form of Fourier series 6M
- b) Obtain the Fourier series for the following waveform shown in figure 6M



OR

- 10 a) Explain about Line spectrum and Phase spectrum. 6M
- b) Obtain the magnitude and phase spectrum of the waveform shown in figure 6M



SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY:: PUTTUR
B.Tech II Year I Semester Supplementary Examinations Aug- 2021
COMPUTER ORGANIZATION AND ARCHITECTURE
(CSE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Describe various steps of instruction cycle? 6M
b) List out the Computer Instructions and Explain about it 6M

OR

- 2 Illustrate any four addressing modes with neat sketch. 12M

UNIT-II

- 3 Show the steps of signed operand multiplication with example? 12M

OR

- 4 What are the steps of Division restoring and draw the flow chart with an example. 12M

UNIT-III

- 5 a) Narrate the three- state bus buffers with neat sketch. 6M
b) Write about binary increment with neat sketch 6M

OR

- 6 Explain in detail about Arithmetic Micro Operations? 12M

UNIT-IV

- 7 Describe the semiconductor RAM and its types in detail? 12M

OR

- 8 Give detailed notes on DMA controllers and transfers with neat sketch. 12M

UNIT-V

- 9 a) Describe the concept of Pipelining with clear example 6M
b) Explain about characteristics of Multiprocessor? 6M

OR

- 10 Illustrate three possible ways of implementing a multiprocessor system with neat sketch. 12M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY:: PUTTUR

B.Tech II Year 1 Semester Supplementary Examinations Aug-2021

SURVEYING & GEOMATICS

CIVIL ENGINEERING

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Briefly explain the various accessories in chain surveying. 6M
 b) What are the duties of a surveyor? 6M

OR

- 2 A steel tape was exactly 20 m long at 55°F when supported throughout its length under a pull of 10 kg. A line was measured with this tape under a pull of 16 kg and at a mean temperature of 80°F and found to be 780 m long. The cross-sectional area of the tape = 0.03 cm², and its total weight = 8kg. Coefficient of expansion of tape = 6.2×10^{-8} per °F and E for steel = 2.109×10^6 kg/cm².
 Compute the correction per tape length.

UNIT-II

- 3 a) In leveling between two points A and B on opposite sides of a river, the level was set up near A and the staff readings on A and B were 2.642m and 3.228m respectively. The level was then moved and set up near B, the respective staff readings on A and B were 1.086m and 1.664m. Find the true difference level of A and B. 6M

- b) Write short notes on difficulty in leveling. 6M

OR

- 4 a) Write short notes on errors in leveling 6M
 b) Discuss the effects of curvature and refraction in leveling. 6M

UNIT-III

- 5 a) Find the horizontal and vertical distances by tangential method when both angles are angles of elevation. 6M
 b) How would you, determine the constants K and C of a Tacheometer. 6M

OR

- 6 The vertical angles to vances fixed at 0.5m and 3.5m above the foot of the staff held vertically at a point were - 00° 30' and + 10° 12' respectively. Find the horizontal distance and the reduced level of the point, if the level of the instrument axis is 125.380meters above datum. 12M

UNIT-IV

- 7 a) Define and draw a typical compound curve. Under what circumstance compound curves are provided. 6M
 b) Derive the expression for the elements of a compound curve. 6M

OR

- 8 Two tangents intersect at chainage 1250 m. The angle of intersection is 150°. Calculate all data necessary for setting out a curve of radius 250 m by the deflection angle method. The peg intervals may be taken as 20 m. prepare a setting out table when the least count of the Vernier is 20". Calculate the data for field checking. 12M

UNIT-V

- 9 a) Explain in detail about the infrared type of EDM instrument. 6M
 b) Write short notes on total stations. 6M

OR

- 10 a) List out and explain the properties of EM waves. 6M
 b) State and brief about transit time. 6M

SIDDHARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY:: PUTTUR

B. Tech II Year I Semester Supplementary Examinations Aug-2021

FLUID MECHANICS & HYDRAULIC MACHINERY

(MECH)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

- 1 a) Explain the phenomenon of capillarity. 6M
 b) Obtain an expression for capillary fall of a liquid. A plate 0.025mm at a distance from a fixed plate moves at 60 cm/sec and requires a force of 2 N/m². Determine viscosity between the plates 6M

UNIT-II

OR

- 2 a) State Pascal's law. What do you understand the terms Absolute, Gauge & vacuum pressure? 6M
 b) A simple U-tube manometer containing mercury is connected to a pipe in which a fluid of specific gravity is 0.8 and having vacuum pressure is flowing. The other end of the manometer is open to atmosphere. Find the vacuum pressure in pipe, if the difference of mercury level in the two limbs is 40cm and the height of fluid in the left from the center of pipe is 15cm below. 6M

UNIT-III

- 3 a) Recall Local and convective accelerations. 6M
 b) Water is flowing through a pipe has diameter 300 mm and 200 mm at the bottom and upper end respectively. The intensity of pressure at the bottom end is 24.525 N/cm² and the pressure at the upper end is 9.81 N/cm². Determine the difference in datum head if the rate of flow through pipe is 40 lit/s. 6M

OR

- 4 a) Explain Energy gradient line and Hydraulic gradient line. 6M
 b) A 300 mm diameter pipe carries water under a head of 20 m with a velocity of 3.5 m/s. If the axis of the pipe turns through 45°, find the magnitude and direction of the resultant force at the bend. Explain Momentum correction factor, Energy correction factor 6M

UNIT-III

- 5 a) Explain about Venturimeter with neat sketches. Derive expression for rate of flow through Venturimeter. 6M
 b) An orifice meter with orifice diameter 15 cm is inserted in a pipe of 30cm diameter. The pressure difference measured by mercury oil in differential manometer on the two sides of the orifice meter gives a reading of 50 cm of mercury. Find the rate of flow of oil of specific gravity 0.9 when the coefficient of discharge of the orifice meter is 0.64. 6M

OR

- 6 a) Derive the expression for head loss in pipes due to friction by using Darcy-Weisbach equation. 6M
 b) A horizontal pipeline 40 m long is connected to a water tank at one end and discharges freely into the atmosphere at other end. For the first 25 m of its length from the tank, the pipe is 150 mm diameter and its diameter is suddenly enlarged

to 300 mm. the height of water level in the tank is 8 m above the centre of pipe. Considering all losses of head which occur, determine the rate of flow. Take $f = 0.01$ for both sections of the pipe.

UNIT-IV

- 7 a) Derive the expression for force and the efficiency by the jet when it strikes at the centre of moving curved plate? 6M
 b) A 7.5 cm diameter jet having a velocity of 30 m/s strikes a flat plate, the normal of which is inclined at 45° to the axis of the jet. Find the normal pressure on the plate when (i) the plate is stationary, and (ii) when the plate is moving with a velocity of 15 m/s and away from the jet. 6M

OR

- 8 a) Derive an expression for the hydraulic efficiency when a liquid jet strikes a single fixed curved vane 6M
 b) A jet of water moving at 12 m/s impinges on vane shaped to deflect the jet through 120° when stationary. If the vane is moving at 5 m/s, find the angle of the jet so that there is no shock at inlet. What is the absolute velocity of the jet at exit in magnitude and direction and the work done per second per unit weight of water striking per second? Assume that the vane is smooth. 6M

UNIT-V

- 9 a) Explain the working principle of a Pelton wheel with a neat sketch and also derive equation for hydraulic efficiency. 6M
 b) The following data is given for the Francis turbine. Net head $H = 60$ m, Speed $N = 700$ r.p.m., Shaft Power = 294.3 kW, $\eta_p = 84\%$, $\eta_h = 93\%$, flow ratio = 0.2, breadth ratio $n = 0.1$, outer diameter of the runner = 2 X inner diameter of the runner. The thickness of vane occupies 5% of circumferential area of the runner, velocity of flow is constant at inlet and outlet and discharge is radially at outlet. Determine: (i) Guide blade angle, (ii) Runner vane angles at inlet and outlet, (iii) Diameters of runner at inlet and outlet, and (iv) Width of wheel at inlet. 6M

OR

- 10 a) What is the principle behind a centrifugal pump and derive an expression for work done by the centrifugal pump 6M
 The internal and external diameters of the impeller of a centrifugal pump are 200 mm and 400 mm respectively. The pump is running at 1200 rpm. The vane angles of the impeller at inlet and outlet are 20° and 30° respectively. The water enters the impeller radially and velocity of flow is constant. Determine the work done by the impeller per unit weight of water. Derive the expression for specific speed. 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY:: PUTTUR
B. Tech II Year I Semester Supplementary Examinations Aug-2021
ELECTRONIC DEVICES AND CIRCUITS
(EEE & ECE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Explain the term diffusion capacitance C_D of a PN diode. 6M
b) What is a clamper. Explain the operation of a negative clamper. 6M

OR

- 2 a) Draw the energy band diagrams of PN junction and explain the working of a diode. 6M
b) Explain the term transition capacitance C_T of a PN diode. 6M

UNIT-II

- 3 a) Explain the working of capacitor filter and derive the expression for ripple factor. 6M
b) Explain the construction and V-I characteristics of UJT with suitable sketches. 6M

OR

- 4 a) Explain the working of a full wave bridge rectifier with circuit diagram and input output waveforms. 6M
b) Derive the relations for ripple factor and efficiency of a full wave bridge rectifier. 6M

UNIT-III

- 5 a) What are the significant differences between BJT and FET. 4M
b) Explain the input and output characteristics of a transistor in CE configuration. 8M

OR

- 6 a) Describe the construction and operation of an enhancement type MOSFET. 6M
b) Explain the operation of a transistor as an Amplifier. 6M

UNIT-IV

- 7 a) What is the Thermal Runway? How can it be avoided? 4M
b) Draw a Collector to Base bias circuit and derive an expression for the Stability factor. 8M

OR

- 8 a) Draw a voltage divider bias circuit and derive an expression for its Stability factor (S). 8M
b) Mention the different types of biasing methods. 4M

UNIT-V

- 9 a) Draw the small signal equivalent circuit of a common source FET amplifier. 4M
b) Derive the expressions for voltage gain, input impedance and output impedance of a common source FET amplifier. 8M

OR

- 10 a) Compare the three transistor amplifiers CB, CC, CE in terms of voltage gain, current gain, input impedance and output impedance. 4M
b) Analyze CE Amplifier using approximate h -model. 8M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY:: PUTTUR
B.Tech II Year I Semester Supplementary Examinations Aug- 2021
C AND DATA STRUCTURES

(CSE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Explain about while and for loops with suitable examples. 6M
b) Write a program to determine the Greatest Common Divisor (GCD) of two numbers. 6M

OR

- 2 a) Describe multi-way selection statements in C with examples. 6M
b) Write a C program to check whether a given number is Armstrong number or not 6M

UNIT-II

- 3 a) What is recursion? What are the advantages and disadvantages of recursion? 6M
b) Write a C program to find the factorial of a given number using recursion. 6M

OR

- 4 a) Distinguish between call by value and call by reference parameter passing techniques with examples. 6M
b) Discuss any five string handling functions with suitable example for each. 6M

UNIT-III

- 5 a) Define pointer. Explain how to pass a pointer to a function? 6M
b) Illustrate the use of typedef statement with suitable example. 6M

OR

- 6 a) Explain the concept of void pointers with examples. 6M
b) Explain pointers and arrays with some example programs. 6M

UNIT-IV

- 7 a) What is a stack? What are various operations that can be performed on them? Explain any 2 operations with an example. 6M
b) What do you mean by stack overflow and stack underflow? 6M

OR

- 8 a) State any two applications of stacks and queues? 6M
b) With an example, explain infix, postfix and prefix notations. 6M

UNIT-V

- 9 a) Sort the following numbers using merge sort : 6M
45,34,12,46,27,56,11,87,6,33,28.
b) Explain insertion sort with an example. 6M

OR

- 10 Explain with an example various operations of doubly linked list in detail 12M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY:: PUTTUR
B.Tech II Year I Semester Supplementary Examinations Aug-2021
BUILDING MATERIALS & CONSTRUCTION
(CIVIL ENGINEERING)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 List the classifications of rocks and explain the classification based on geological formation 12M

OR

- 2 Explain classification of bricks and ingredients of bricks. 12M

UNIT-II

- 3 a) What are properties of cement? 6M
b) Write about Timber, Glass and Steel 6M

OR

- 4 Write about mixing and vibration of concrete. 12M

UNIT-III

- 5 What are the mechanical properties of coarse aggregate? 12M

OR

- 6 Write about composition of paints and preparation of paint 12M

UNIT-IV

- 7 What is function of foundation and requirements of good foundation 12M

OR

- 8 Write differences between brick and stone masonry 12M

UNIT-V

- 9 Draw a neat diagram of lintels and name the parts and explain. 12M

OR

- 10 Discuss the defects in plastering and pointing briefly? 12M

SIDARTH INSTITUTE OF SCIENCE AND TECHNOLOGY:: PUJTUR
 B Tech II Year I Semester Supplementary Examinations Aug- 2021
KINEMATICS OF MACHINERY
 (MECH)

Time: 3 Hours

Max. Marks: 60

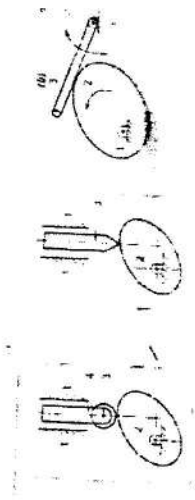
Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

1 Explain the classification of the kinematics pairs with neat sketch and all the aspect. 12M

OR

2 Define the term 'Degrees of Freedom'. And find the degrees of freedom for the following linkages. 12M



UNIT-II

3 a) Sketch and explain the working of Grasshopper straight line mechanism 6M
 b) Sketch and Describe the working of Peaucellier mechanism. 6M

OR

4 With neat sketch, explain the working of any two of exact straight line Mechanisms. 12M

UNIT-III

5 In a four bar chain ABCD, AD is fixed and is 150 mm long. The crank AB is 40 mm long and rotates at 120 r.p.m. clockwise, while the link CD = 80 mm oscillates about D. BC and AD are of equal length. Find the angular velocity of link CD when angle BAD = 60°. 12M

OR

6 What do you understand by the instantaneous centre of rotation in kinematic of machines? Answer briefly. 6M
 Explain the following terms: (a) Instantaneous center (b) Body center and space centrode (c) Axode. 6M

UNIT-IV

7 A cam is to give the following motion to a knife-edged follower : 12M
 1. Outstroke during 60° of cam rotation;
 2. Dwell for the next 30° of cam rotation;
 3. Return stroke during next 60° of cam rotation, and
 4. Dwell for the remaining 210° of cam rotation.

The stroke of the follower is 40 mm and the minimum radius of the cam is 50 mm. The follower moves with uniform velocity during both the outstroke and return strokes. Draw the profile of the cam when the axis of the follower is offset by 20 mm from the axis of the cam shaft.

OR

8 It is required to set out the profile of a cam to give the following motion to the reciprocating follower with a flat mushroom contact face: 12M

- (i) Follower to have a stroke of 20 mm during 120° of cam rotation
 - (ii) Follower to dwell for 30° of cam rotation;
 - (iii) Follower to return to its initial position during 120° of cam rotation; and
 - (iv) Follower to dwell for remaining 90° of cam rotation.
- The minimum radius of the cam is 25 mm. The out stroke of the follower is performed with simple harmonic motion and the return stroke with equal uniform acceleration and retardation.

UNIT-V

9 Explain the classification of gears with neat sketches 12M

OR

10 In a reverted epicyclic gear train, the arm A carries two gears B and C and a compound gear D - E. The gear B meshes with gear E and the gear C meshes with gear D. The number of teeth on gears B, C and D are 75, 30 and 90 respectively. Find the speed and direction of gear C when gear B is fixed and the arm A makes 100 r.p.m. clockwise. 12M

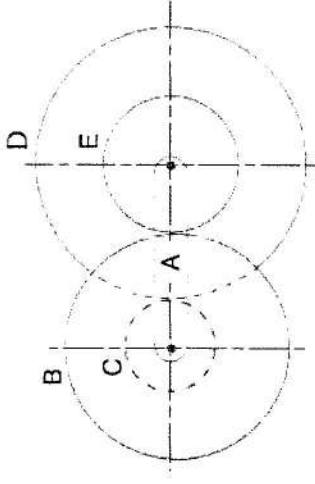


Fig.

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY:: PUTTUR
B.Tech II Year I Semester Supplementary Examinations Aug-2021
ELECTRICAL MACHINES-I
(EEE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

UNIT-I

- 1 a) Deduce an expression for e.m.f equation of DC Generator? 6M
b) An 8-pole lap connected armature has 960 conductors, a flux of 40 m Wb per pole and a speed of 400 r.p.m. Calculate the emf generated on open circuit. If the armature were wave connected, at what speed it must be driven to generate 400 V. 6M

OR

- 2 Explain the basic principle of operation of a DC Generator with a simple loop generator? 12M

UNIT-II

- 3 a) Distinguish between generator and motor action. Derive the equation for the back e.m.f of DC motor? 6M
b) Find the torque exerted by a 4-pole series motor whose armature has 1200 conductors Connected up in wave winding. The motor current is 10A and the flux per pole is 0.02Wb. 6M

OR

- 4 Explain the armature voltage and field flux control methods for the Speed control of a DC Motor. 12M

UNIT-III

- 5 Describe Retardation test in detail . What are its advantages and disadvantages ? 12M

OR

- 6 Explain in detail about the parallel operation of DC series generators 12M

UNIT-IV

- 7 a) Discuss the constructional features of transformers. Draw neat diagrams. 6M
A 10KVA, 2200/400V transformer has $R_1=5 \Omega$, $X_1=12 \Omega$, $R_2=0.2 \Omega$ and $X_2=0.48 \Omega$. 6M
b) Determine the equivalent impedance of the transformer referred to (i) primary side (ii) secondary side.

OR

- 8 a) Explain the effect of variations of frequency and supply voltage on iron losses 6M
b) Write a short notes on practical Transformer 6M

UNIT-V

- 9 a) Draw the equivalent circuit of an Auto transformer. 6M
b) In a 25-kVA, 2000/200V, single phase transformer, the iron and full-load copper losses are 350 and 400W respectively. Calculate the efficiency at unity p.f. on (i) full load (ii) half full-load. 6M

OR


- 10 a) Determine load shared by two transformers are each transformer when connected in parallel With equal voltage ratios 6M
b) Draw and explain the Connection diagram of Y- Δ & Δ -Y connected 3-phase transformer 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY:: PUTTUR
 B.Tech II Year I Semester Supplementary Examinations Aug-2021
SIGNALS, SYSTEMS & RANDOMPROCESS
 (ECE)

Time: 3 Hours

Max. Marks: 60

Answer one question from each unit (5 x 12 = 60 Marks)

- UNIT-I**
- 1 a) Derive from the basics, how any continuous time signal $x(t)$ can be represented as an integral of impulses. 6M
 - b) Explain the difference between the following systems with examples. 6M
 - i) Linear and Non-linear systems.
 - ii) Causal and Non-Causal systems.
- OR**
- 2 a) Test Whether the signal $x(n) = (\frac{1}{2})^n u(n)$ energy or power signal. 6M
 - b) Check whether the following system is linear, casual and time invariant or not.
$$d^3y(t)/dt^3 + 4d^2y(t)/dt^2 + 5dy(t)/dt + 2y^2(t) = x(t)$$
 6M
- UNIT-II**
- 3 a) Find the Exponential Fourier series for the rectified Sine wave as shown in figure. 6M
- 
- b) Determine the Fourier transform of a two sided exponential pulse $x(t) = e^{-|t|}$ 6M
- OR**
- 4 a) State and prove Parseval's Power theorem. 6M
 - b) Obtain the Fourier transform of the following functions. 6M
 - i) Impulse function $\delta(t)$
 - ii) Unit Step function
- 5 a) Write short notes on filter characteristics of a linear system. 6M
 - b) The system function of a LTI system be $1/j\omega + 2$ evaluate the output of the system for an input $(0.9)^t u(t)$. 6M
- OR**
- 6 a) Derive time domain condition for causality of LTI system 6M
 - b) Perform the convolution of the following signals, by graphical method. $x_1(t) = e^{-3t} u(t)$, $x_2(t) = t u(t)$. 6M
- UNIT-IV**
- 7 a) State the properties of the ROC of Laplace Transform and its existances. 6M
 - b) Define conditional probability distribution function and write the properties. 6M
- OR**
- 8 a) Compute the Laplace transform of $x(t) = e^{-b|t|}$ for the cases of $b < 0$ and $b > 0$ 6M
 - b) Define Random variable? Write the conditions for a function to be random variable 6M
- UNIT-V**
- 9 a) A random process is defined by $x(t) = At$ where A is a continuous random variable uniformly Distributed on (0,1) and t represents time. 6M
 - b) Find i) $E[x(t)]$ ii) $R_{xx}(t, t + \tau)$ iii) Is the process stationary? 6M
 - Find the PSD of a stationary random process for which auto correlation is 6M

$$R_{XX}(t) = 6e^{-\alpha|t|}$$

- OR**
- 10 a) State the conditions for wide sense stationary random process. 6M
 - b) A stationary random process $X(t)$ has auto correlation $R_{XX}(t) = 10 + 5\cos(2t) + 10e^{-2|t|}$. Find the dc and ac powers of $X(t)$. 6M

SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY:: PUTTUR
 B.Tech II Year I Semester Supplementary Examinations Aug-2021
DATABASE MANAGEMENT SYSTEMS
 (CSE)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

- 1 (a) Define Database? Discuss about applications of Database Systems? 6M
 (b) Write a short note on Database users and administrators? 6M

OR

- 2 Explain about ER model and Component of ER Diagram? 12M

UNIT-II

- 3 (a) Classify the Relational calculus in detail? 6M
 (b) Describe the SET operators with example. 6M

OR

- 4 (a) Distinguish different types of aggregate operators with examples in SQL? 6M
 (b) Create a sub query to establish the WHERE, ANY, AS and ALL sub queries with example. 6M

UNIT-III

- 5 Explain in detail about 1NF, 2NF, 3NF and BCNF with example 12M

OR

- 6 (a) Compare Trivial and Non - Trivial Functional Dependencies with example. 12M
 (b) Illustrate redundancy and the problems that it can cause.

UNIT-IV

- 7 Explain ACID properties and illustrate them through examples? 12M

OR

- 8 (a) Define Schedule? What is a serial schedule? 6M
 (b) Demonstrate Conflict Serializability? 6M

UNIT-V

- 9 (a) Discuss how do you recover from failure? 6M
 (b) Explain about the deadlock prevention schemes. 6M

OR

- 10 (a) Which level of RAID is best? Why? 6M
 (b) Explain about failure with loss of non-volatile storage. 6M

*** END ***