

Total No. of Questions: 22

Total No. of Pages : 02

Roll No. _____

B.Tech IV sem (Main/Back) Exam April-May 2026

Electrical & Electronics Engg.

4EX2-01 Biology

Paper Code : 4E1319

EE, EX

Time: 3 Hours

Maximum Marks: 70

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1. _____

2. _____

Part A (Answer should be given up to 25 words only)

All questions are compulsory

- Q.1 What is objective of the Biology Course?
- Q.2 Explain the term molecular taxonomy?
- Q.3 Define Brownian Motion?
- Q.4 What is Enzyme?
- Q.5 What is spontaneity?
- Q.6 Mention the importance of gene?
- Q.7 What are monomeric units?
- Q.8 What is the difference between Mitosis and Meiosis?
- Q.9 Write the function of protein?
- Q.10 What is an allele?

10x2=20

Part B (Analytical/Problem solving questions)

Attempt any Five questions

- Q.1 Explain the salient features of genetic code?
- Q.2 Write short note on Amino acids?
- Q.3 Differentiate between Prokaryotic and Eukaryotic cell?
- Q.4 Explain how does an Enzyme catalyze a reaction?
- Q.5 Give two examples of single celled organisms?
- Q.6 Explain Growth Kinetics and Sterilization?
- Q.7 Define the role of protein receptors in the functionality of cellular actions?

5x4=20

Part C (Descriptive/Analytical/Problem Solving/Design question)**Attempt any three questions**

- Q.1 Compare DNA to RNA at molecular level?
- Q.2 Explain Mendel's Law of Independent Assortment and concept of segregation in details?
- Q.3 Write notes on Glycolysis and Photosynthesis?
- Q.4 Explain the mechanism of Enzyme action, Classification and Enzyme Kinetics?
- Q.5 What is Krebs's cycle, Explain in details various steps of Krebs's cycle with the help of a flowchart?

3 x 10 = 30

Part A (Answer should be given up to 15 words only)

All questions are compulsory

- Q.1 What is objective of the Biology Course?
- Q.2 Explain the term molecular taxonomy?
- Q.3 Define Brownian Motion?
- Q.4 What is Exocytosis?
- Q.5 What is spontaneous?
- Q.6 Mention the importance of genes?
- Q.7 What are membrane units?
- Q.8 What is the difference between Mitosis and Meiosis?
- Q.9 Write the function of protein?
- Q.10 What is an allele?

Part B (Analytical/Problem Solving questions)

Attempt any five questions

- Q.1 Explain the salient features of genetic code?
- Q.2 Write short note on Amino acids?
- Q.3 Differentiate between Prokaryotic and Eukaryotic cells?
- Q.4 Explain how does an Enzyme catalyse a reaction?
- Q.5 Give two examples of single celled organisms?
- Q.6 Explain Growth Kinetics and Regulation?
- Q.7 Define the role of protein receptors in the functioning of cellular actions?

Total No. of Questions : 22

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B.Tech IV sem (Main/Back) Exam April-May 2026

Aeronautical Engg.

4AN1-02 Technical Communication

Paper Code : 4E1303

All Branches

Time: 3 Hours

Maximum Marks: 70

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1. _____

2. _____

Part A (Answer should be given up to 25 words only)

All questions are compulsory

T-435

- Q. 1 What is Ideation in the process of Technical communication ?
- Q.2 What do you mean by Linguistic Competence ?
- Q.3 What is SQ3R Reading Technique ? Who developed this technique ?
- Q.4 Name any four graphic aids generally used in technical document ?
- Q.5 How will you ensure maximum engagement and share while preparing the online content ?
- Q.6 Define technical discourse.
- Q.7 What do you mean by the term Minutes of Meeting ?
- Q.8 What is Topicalising in the process of note making?
- Q.9 What does the term 'BCC' mean in the heading of an email ?
- Q.10 What is the main purpose of report writing?

10 x 2 = 20

Part B (Analytical/Problem solving questions)

Attempt any Five questions

- Q.1 What are the aspects of effective technical communication ?
- Q.2 How does active reading differ from passive reading ?
- Q.3 Reading is a complex communication process of receiving and interpreting the written word Elaborate.
- Q.4. What are the factors which affect the information and document design?
- Q.5 Correct the following sentences :
 - (i) Neither of the boys are selected for the final
 - (ii) The people of South India loves their tradition and follows them whole-heartedly.
 - (iii) Sartia is more better than Hari in playing chess.
 - (iv) What a terrible night it is ?

- Q.6 What are the main steps that are involved in summarizing technical texts ?
Q.7 What do you mean by the term Methodology in technical articles ?

5 x 4 = 20

Part C(Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

T-435

- Q.1 Write short notes on following :
- Literature survey and data collection.
 - Difference between report and a Proposal.
 - Strategies for reading technical text.
 - Internal and External Proposals.
- Q.2 Assume yourself as Shashwat Sharma, a B. Tech. student from MNIT Jaipur. Write an email message to Mr. Ayush Bhatia personnel manager of NTPC Power Management Institute at Noida, U.P. requesting him to allow you to do summer training there as a part of your academic assignments.
- Q.3 Suppose you want to avail a study loan from State Bank of India. Write a letter to the Chief Manager, SBI branch of your locality requesting him/her to send you all the information related to the loan.
- Q.4 What are the types of Technical Report ? Mention the structure of a format Report ?
- Q.5 What is the importance of Technical communication in engineering? How can clear, concise and accurate documentation contribute to the success of engineering projects?

3 x 10= 30

Total No. of Questions : 22

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B.Tech IV sem (Main/Back) Exam April-May 2026

Aeronautical Engg.

4AN1-03 Managerial Economics & Financial Accounting

Paper Code : 4E1302

All Branches

Time: 3 Hours

Maximum Marks: 70

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1. _____

2. _____

Part A (Answer should be given up to 25 words only)

All questions are compulsory

T-435

Q. 1 Define Managerial Economics.

Q.2 What is the meaning of demand ?

Q.3 Define monopoly?

Q.4 What is the meaning of Cash Flow analysis?

Q.5 What is the meaning of Oligopoly?

Q.6 Define Financial statement analysis ?

T-435

Q.7 Define opportunity cost ?

Q.8 What is the meaning of survey method ?

Q.9 What is payback Period ?

Q.10 Define Managerial Economics.

10 x 2 = 20 .

Part B (Analytical/Problem solving questions)

Attempt any Five questions

Q.1 Discuss the importance of Managerial Economics in decision making.

Q.2 Define 'Demand' and explain the factors that influence the demand of product.

- Q.3 Calculate the BEP in units and rupees using the following details :
- Selling price per unit Rs. 100 .
 - Variable cost per unit Rs. 60.
 - Fixed cost Rs. 20,000
 - Actual sales Rs. 2,00,000
- Q.4 Discuss the various concept of National income- Gross National products, Net National Product, Personal income and dispensable Income.
- Q.5 Define Balance Sheet ? Give two characteristics of Balance Sheet ?
- Q.6 Distinguish between Monopolistic competition and Perfect Competition ?
- Q.7 You are required to calculate.
- i) Margin of Safety
 - ii) Total sales
 - iii) Variable cost from the following figures
 - Fixed costs Rs. 12, 000
 - Profit Rs. 1,000
 - Break-Even Sales Rs. 60,000

5 x 4 = 20

Part C(Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

- Q.1 Define **Ratio Analysis**. Explain the importance of Liquidity and Profitability ratio for a firm.
- Q.2 How the price and output is determined under the perfect competition during the short period ?
- Q.3 Explain the concept of Market Equilibrium the context of Demand and Supply. Discuss how changes in demand and supply affect equilibrium price and quantity. Use diagrams to illustrate your answer.
- Q.4 Calculate the Net present value (NPV) of the two projects X and Y. Suggest which of the two projects should be accepted assuming a discount rate of 10%.

Item	Project -A	Project-B
Initial Investment	Rs. 80,000	Rs. 1,20,000
Life Period	5 years	5 years
Scrap Value	Rs. 4,000	Rs.8000
(Annual Cash Inflows)	(CFAT)	(CFAT)
Year : 1	Rs. 24,000	Rs. 70,000
, 2	Rs. 36,000	Rs. 50,000
, 3	Rs. 14,000	Rs. 24,000
, 4	Rs. 10,000	Rs.8,000
, 5	Rs. 8,000	Rs.8,000

- Q.5 Define **Managerial Economics** and discuss its nature, scope, and relationship with other disciplines like statistics and Mathematics.

3 x 10= 30

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B.Tech IV sem (Main/Back) Exam April-May 2026

Electrical & Electronics Engg.

4EX3-04 Electronic Measurement & Instrumentation

Paper Code : 4E1320

EE, EX

Time: 3 Hours

Maximum Marks: 70

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1. _____

2. _____

Part A (Answer should be given up to 25 words only)

All questions are compulsory

T-435

1. What are the applications of moving coil instruments?
2. What do you mean by phantom loading in energy meter?
3. Write the applications of Current transformers.
4. Define the term burden in instrument transformers.
5. What do you mean by standardization of potentiometers?
6. Differentiate the DC and AC potentiometers?
7. What are the various factors should be considered in measurement of earth resistances?
8. Draw the circuit diagram of Price's Guard wire method for measurement of resistances?
9. Draw the Phasor/vector diagram of Wien's bridges.
10. Draw the circuit diagram of Maxwell's Bridges.

10 x 2 = 20

Part B (Analytical/Problem solving questions)

Attempt any Five questions

1. Explain the construction and working of moving iron type instruments.
2. Derive the Expression of Blondel's Theorem for n-phase.
3. Explain the effect of variation of power factor of instrument transformers.
4. Draw and explain the diagram of slide wire potentiometers.
5. Draw and explain the circuit diagram of Kelvin's double bridge method for measurement of resistances.
6. What are the various difficulties are encountered in measurement of low resistances.

T-435

Explain their overcome techniques.

7. Explain the circuit diagram and Phasor/vector diagram of Anderson's Bridges.

T-435

5x 4 = 20

Part C (Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

1. Explain the construction and working of single phase energy meters with merits and demerits.
2. Discuss the ratio and phase angle errors and their minimization techniques of instrument transformers.
3. Explain the working and applications of crompton potentiometers with neat diagram with merits and demerits.
4. Draw and explain the circuit diagram of measurement of earth resistances with applications.
5. Explain the circuit diagram and Phasor/vector diagram of De Sauty's Bridges with merits, demerits and applications.

T-435

3 x 10 = 30

Total No. of Questions: 22

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B.Tech IV sem (Main/Back) Exam April-May 2026

Electrical & Electronics Engg.

4EX4-05 Electrical Machine - II

Paper Code : 4E1321

EE, EX

Time: 3 Hours

Maximum Marks: 70

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1. _____

2. _____

Part A (Answer should be given up to 25 words only)

All questions are compulsory T-435

- Q.1 What is meant by slip in an induction motor ?
- Q.2 The frequency of the emf in the stator of a 4 pole induction is 50Hz and the rotor is 1.5 Hz. What is the slip ?
- Q.3 What is cogging in 3- phase induction motor ?
- Q.4 Why single phase induction motor do not have a starting torque ?
- Q.5 What are the main disadvantage of a single phase induction motor when compared with three phase induction motor ?
- Q.6 Write important function of damper windings.
- Q.7 What is hunting of synchronous machine ?
- Q.8 Discuss full pitch coils.
- Q.9 What do you understand by distributed winding ?
- Q.10 What do you understand by revolving magnetic field ?

10x2=20

Part B (Analytical/Problem solving questions)

Attempt any Five questions T-435

- Q.1 Explain the principle of operation of a 3-phase induction motor.
- Q.2 The power input to a 3 phase induction motor is 60 kw. The stator loses total 1 kw. Find the total mechanical power developed and the rotor copper loss per phase if the motor is running with a slip of 3%
- Q.3 Describe the construction and working of capacitor start single phase induction motor.

- Q.4. What are V-curves and inverted V-curves of a 3-phase synchronous motor.
Q.5 Explain the principle of operation of 3-phase synchronous motor.
Q.6 Discuss Air-gap MMF distribution with fixed current through different windings.
Q.7 Discuss the pulsating magnetic field produced by spatially displaced windings.

T-435

5x4=20

Part C (Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

- Q.1 Explain the stator voltage control of 3- phase induction motors.
Q.2 Develop the equivalent circuit of 3- phase induction motor. Draw and explain the phasor diagram.
Q.3. Explain the construction and working of split phase induction motor with the help of neat sketches.
Q.4. A 1000 KVA, 11000V, 3- phase star connected synchronous motor has an armature resistance and reactance per phase of 3.5Ω and 40Ω respectively. Determine the induced emf and angular retardation of rotor when fully loaded at (a) unity power factor (b) 0.8 power factor lagging, (c) 0.8 power factor leading. T-435
Q.5 Discuss the physical arrangement of windings in stator and cylindrical rotor with neat sketches.

3x10=30

Total No. of Questions: 22

Total No. of Pages: 02

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B.Tech IV sem (Main/Back) Exam April-May 2026

Electrical & Electronics Engg.

4EX4-06 Power Electronics

Paper Code : 4E1322

EE, EX

Time: 3 Hours

Maximum Marks: 70

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1. _____

2. _____

Part A (Answer should be given up to 25 words only)

All questions are compulsory

- Q.1 Plot I-V characteristics of SCR and mark holding current, latching current, forward breakover voltage levels.
- Q.2 Name the methods to turn on the thyristor.
- Q.3 Name the performance indices for a converter.
- Q.4 Write the expression of output voltage in a single-phase full wave fully controlled converter.
- Q.5 Define the duty cycle in a chopper.
- Q.6 Write the expression of output voltage for the step-up and step-down chopper.
- Q.7 Draw the power circuit of a single-phase voltage source inverter.
- Q.8 What is modulation index?
- Q.9 What is the difference between bipolar and unipolar modulation?
- Q.10 Write three or more applications of three phase VSI.

10 x 2 = 20

Part B (Analytical/Problem solving questions)

Attempt any Five questions

- Q.1 Discuss the construction, characteristics, working, and applications of IGBT. Give a comparison between IGBT and MOSFET.
- Q.2 Discuss the R and RC triggering method for a thyristor.
- Q.3 A single-phase full bridge converter is connected to 'R' load. The source voltage is of 230 V, 50 Hz. The average load current is of 10A. For $R=20\ \Omega$ find the firing angle.

- Q.4. A DC-DC boost converter has input voltage 220 V and output voltage 660V. If the On time of the switch is $100 \mu\text{s}$, determine the switching period. 1-495
- Q.5. A DC-DC buck converter operates with input voltage $V_{in}=100 \text{ V}$ Duty ratio $D=0.4$, Switching frequency $f_s=20 \text{ kHz}$, Load resistance $R=10 \Omega$ and inductance $L=2\text{mH}$. Calculate the average output voltage, output current and the inductor current ripple.
- Q.6. Describe the principle of voltage control in a single-phase inverter using sinusoidal pulse width modulation (SPWM).
- Q.7. Discuss single-phase half bridge and full bridge inverter. **5 x 4 = 20**

Part C (Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

- Q.1 Discuss UJT relaxation oscillator and UJT relaxation triggering method for SCR.
- Q.2 a) Discuss the working principle of a single-phase full-wave fully controlled converter with RL load under continuous mode of conduction and discontinuous mode of conduction.
b) Sketch neat waveforms for source voltage, output voltage, load current and source current in each case.
- Q.3 Explain the construction and working principle of a buck converter and boost converter.
- Q.4 Explain the various methods of output voltage control in single-phase inverters.
- Q.5 a) Explain the 120 Degree conduction mode of operation of three phase voltage source inverters with necessary circuit diagram and waveform.
b) Three phase 120 Degree voltage source inverters deliver power to a resistive load from a 300V DC source. For a star connected load of 6Ω per phase, determine RMS value of load current and RMS value of thyristor current.
- 3 x 10 = 30**

Total No. of Questions: 22

Total No. of Pages: 02

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B.Tech IV sem (Main/Back) Exam April-May 2026

Electrical & Electronics Engg.

4EX4-07 Signals & Systems

Paper Code : 4E1323

EE, EX

Time: 3 Hours

Maximum Marks: 70

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1. _____

2. _____

Part A (Answer should be given up to 25 words only)

All questions are compulsory

T-495

- Q.1 State the objectives and outcomes of this course.
- Q.2 Differentiate between energy and power signals.
- Q.3 What is periodicity? Give condition for periodic signal.
- Q.4 Define stability of LTI system.
- Q.5 What is Parseval's theorem?
- Q.6 Define state-space representation.
- Q.7 What is Nyquist rate?
- Q.8 Define reason of convergence for Laplace transform.
- Q.9 Explain signal reconstruction.
- Q.10 Define zero-order hold.

10 x 2 = 20

Part B (Analytical/Problem solving questions)

Attempt any Five questions

- Q.1 A system engineer claims that "every real-world phenomenon can be modeled as a signal." Critically examine this claim with suitable examples and limitations. T-495
- Q.2 Can a system be linear but not time-invariant? Construct such a system and verify.
- Q.3 Explain the properties of Laplace transform.
- Q.4 A signal has maximum frequency 5kHz. Determine: Nyquist rate and minimum sampling frequency.

Q.5 Explain sampling and reconstruction process in detail.

Q.6 Compare DTFT and DFT. T-435

Q.7 Determine the convolution of the given signals:

$$x(t) = u(t-3) - u(t-5) \text{ and}$$

$$h(t) = e^{-3t} u(t) \text{ Where } u(t) \text{ is unit step function.}$$

5 x 4 = 20

Part C (Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

Q.1 Explain even and odd signals mathematically and graphically.

Q.2 A discrete-time signal is given by:

$$x(n) = 3u(n) - 2u(n-4)$$

- Sketch the signal for $n=-2$ to $n=10$.
- Determine whether it is periodic or aperiodic.
- Compute the energy of the signal.
- Test the signal for absolute integrability and comment on stability.

Q.3 A discrete-time signal is $x(n) = (1/2)^n u(n)$

- Compute the DTFT of the signal.
- Verify Parseval's theorem for the signal. T-435
- Find the Z-transform $X(z)$ and specify its ROC.
- Determine poles and zeros and sketch the pole-zero plot.

Q.4 A causal LTI system has impulse response $h(n)$, for which the z-transform is

$$H(z) = (1+z^{-1}) / (1-0.5z^{-1})(1+0.25z^{-1}). \text{ Is the system stable? Explain.}$$

Q.5 Write all the properties of DFT in detail and define the feedback control system.

3 x 10 = 30

Total No. of Questions: 22

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B.Tech IV sem (Main/Back) Exam April-May 2026

Electrical & Electronics Engg.

4EX4-08 Digital Electronics

Paper Code : 4E1324

EE, EX

Time: 3 Hours

Maximum Marks: 70

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1- NIL

2. NIL

Part A (Answer should be given up to 25 words only)

All questions are compulsory

- Q.1 In a number system with radix r , $\frac{312}{20} = 13.1$. Find the value of radix.
- Q.2 Find the range of signed decimal numbers that can be represented by 6-bit 2's complement representation.
- Q.3 Define current sourcing and current sinking in logic gates.
- Q.4 What are Conjunctive Normal Form (CNF) and Disjunctive Normal Form (DNF) of representing logic expression. Give example of each.
- Q.5 Describe the operation of a full subtractor, including its logic and functionality.
- Q.6 The number of comparator circuits required to build a three-bit simultaneous A/D converter is _____. (Show calculation)
- Q.7 What are the differences between a latch, a flip-flop, and a bistable circuit?
- Q.8 What input should be given to "S" and "R" when SR flip-flop is converted into a JK flip-flop?
- Q.9 Define the following :
- i) Memory Latency
 - ii) Memory Bandwidth
- Q.10 What are FPGA devices? Define the role of CLBs in FPGA.

10 x 2 = 20

Part B (Analytical/Problem solving questions)

Attempt any Five questions

- Q.1 Describe the operation of a 4-bit Ring counter utilizing positive edge triggered D flip-flops.
- Q.2 Reduce the expression :

$$F = \sum m(1, 3, 4, 11, 12, 13, 14) + d(2, 4)$$

- Q.3 Explain the operation of tri state TTL NAND gate with the help of a neat diagram.
- Q.4 Implement the following logic function using an 8×1 multiplexer.
- $$F(A, B, C, D) = \sum m(1, 3, 4, 11, 12, 13, 14, 15)$$
- Q.5 Give the Schematic, Characteristic Table, Characteristic Equation, Truth Table and Excitation Table of a JK flip-flop. ^{T-435}
- Q.6 What is a binary Decoder? Draw the schematic and circuit diagram of a 3 to 8 Decoder.
- Q.7 Design a 3-bit Modulo-7 synchronous counter using any suitable FF. Explain its working :

5x 4 = 20

Part C (Descriptive/Analytical/Problem Solving/Design question)

Attempt any three questions

- Q.1 Explain the carry look ahead adder with logic diagram with all the carry equations. Also explain how many time units are required to produce all sum bits.
- Q.2 Find the minimal expression of the given Boolean expression using Qn-McClusky method :
- $$F = AB + A\bar{B}\bar{C}\bar{D} + A\bar{B}\bar{C}D + \bar{A}BCD + \bar{A}\bar{B}\bar{C}\bar{D}$$
- Q.3 Design a modulo-5 synchronous counter having following states using JK FF.
- 001 $\longrightarrow$ 011 $\longrightarrow$ 101 $\longrightarrow$ 110 $\longrightarrow$ 111 $\longrightarrow$ 001
- Q.4 Draw the schematic of a Universal Shift Register. Explain its working. ^{T-435}
- Q.5 Differentiate between :
- RAM and SAM
 - Static and Dynamic Memory
 - PLA and PAL
 - SRAM and Flash Memory

3 x 10 = 30