**R16**

**II B. Tech I Semester Supplementary Examinations, May - 2018**
**SURVEYING**
(Civil Engineering)

Time: 3 hours                                                                 Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**
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## PART-A

1   a) List the accessories of plane table.

   b) Define latitude and departure.

   c) List the leveling instruments

   d) What are 'face left' and 'face right' observations? Why is it necessary to take

      both face observations?

   e) Write in detail about GPS.

   f) How do you determine the earth work for a borrow pit?

## PART-B

2   a) Compare the advantages and disadvantages of plane table surveying with those of
      chain surveying.
   b) State three-point problem plane tabling and describe its solution by trial method
      giving the rules which you will follow in estimating position of the point sought

3   a) The following bearings are taken on a closed compass traverse.

| Line | F.B | B.B |
|------|-----|-----|
| AB | S 37$^0$ 30' E | N 37$^0$ 30' W |
| BC | S 43$^0$ 15' W | N 44$^0$ 15' E |
| CD | N 73$^0$ 00' W | S 72$^0$ 15' E |
| DE | N 12$^0$ 45' E | S 13$^0$ 15' W |
| EA | N 60$^0$ 00' E | S 59$^0$ 00' W |

   Compute the interior angles and correct them for observational errors. Assuming the
   observed bearing of the line AB to be correct, adjust the bearing of the remaining
   sides.

4   a) What are the temporary adjustments of a leveling
   b) What are the indirect methods of locating a contour? Write about any one method.

5   a) Write  the temporary adjustments of a transit theodolite
   b) Write the permanent adjustments of a theodolite

6   Two straights of a proposed road deflect through an angle of 1200. Originally, they
   were to be connected by a curve of 520meters radius. However, due to the revision of
   the scheme, the deflection angle is to be increased to 1320. Calculate the suitable
   radius of the curve such that the original starting point of the curve (P.C.) does not
   change

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**R16**

Code No: R1621015

SET - 1

7   The following perpendicular offsets were taken at 10m intervals from a survey line to an irregular boundary line:
3.25, 5.60, 4.20, 6.65, 8.75, 6.20, 3.25, 4.20, 5.65
Calculate the area enclosed between the survey line, the irregular boundary line and the first and last offsets by Simpsons method.

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**II B. Tech I Semester Supplementary Examinations, May - 2018**
**SIGNALS & SYSTEMS**
(Com to ECE, EIE and ECC)

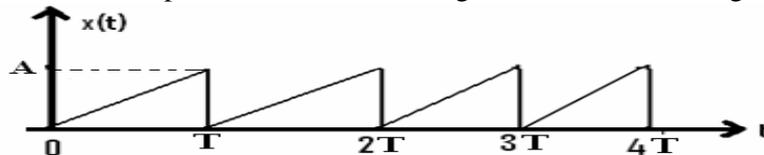Time: 3 hours                                                Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
        2. Answer **ALL** the question in **Part-A**
        3. Answer any **FOUR** Questions from **Part-B**
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## PART –A

1. a) Define Signal and System. What are the major classifications of the signal?    (2M)

    b) Write sampling property of impulse function    (3M)

    c) State differentiation and integration properties of Fourier Transform both in time and frequency domains.    (2M)

    d) List and state the properties of Autocorrelation function    (2M)

    e) State Initial and Final value Theorem of Laplace Transforms    (3M)

    f) Define one sided Z- transform and two sided Z-transform?    (2M)

## PART -B

2. a) Define the error function $f_e(t)$ while approximating signals and hence derive the expression for condition for orthogonality between two waveforms $f_1(t)$ &$f_2(t)$    (7M)

    b) Check whether the following systems are linear or not and stable or not    (7M)
       i)    $y(t) = x(t + 2)$    ii) $y(n) = n^2 x(2n)$

3. a) State the condition for the existence of Fourier transform    (7M)

    b) Using the properties of Fourier transform, find the Fourier transform of the following i) $u(-t)$    ii) $e^{j2t} u(t)$    (7M)

4. a) State and Explain the sampling theorem for band pass signals    (7M)

    b) Determine the Nyquist sampling rate and Nyquist sampling interval for the following i)$sinc^2(300\Pi t)$    ii)$sinc(100\Pi t) + 5sinc^2(200\Pi t)$    (7M)

5. a) State and explain Parseval's theorem.    (7M)

    b) Define auto-correlation and cross-correlation. Prove any two properties of correlation function.    (7M)

6. a) State the properties of ROC for Laplace Transform.    (7M)

    b) Find out the Laplace transform of the signal shown in below figure.    (7M)

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7. a) Distinguish between one-sided and two sided z-transforms and its region of convergence. (7M)

   b) Find the inverse Z-transform of $X(z) = \frac{z}{3z^2 - 4z + 1}$ (7M)

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Code No: R1621053     **R16**     SET - 1

<p style="text-align:center"><b>II B. Tech I Semester Supplementary Examinations, May - 2018</b><br><b>DIGITAL LOGIC DESIGN</b><br>(Com to CSE & IT)</p>

Time: 3 hours                     Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**
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## PART –A

1.  a) Convert the hexadecimal number E3FA to binary.    (2M)

    b) Perform subtraction operation between $(10010.11)_2$ , $(01100.10)_2$ .    (2M)

    c) State the absorption law of the Boolean algebra.    (2M)

    d) Implement the function F = ( AB+CD+E ),  using AND –OR logic.    (2M)

    e) Give the comparison between Combinational and Sequential logic circuits.    (3M)

    f) Explain about state diagram and state  table.    (3M)

## PART -B

2.  a) Subtract the following numbers in 9's complement form    (7M)
    (i)72532-03250             (ii) 03250 -72532

    b) Illustrate by an example how 1's complement and 2's complement of a binary number is obtained?.    (7M)

3.  a) Reduce the following function using K- map.    (8M)
    F(A,B,C,D) =$\sum$m(5,6,7,8,9,12,13,14)

    b) Implement the following Boolean function using AND, OR and inverter gates    (6M)
    $\overline{(AB + CD + E)}$

4.  a) Design a combinational circuit that accesses a 3-bit number and generates output number which is equal to the square of the input.    (7M)

    b) Design a 16×1 MUX  by using two 8×1MUX    (7M)

5.  a) Draw the diagram of master-slave JK flip-flop.    (7M)

    b) Convert the JK flip-flop into a T flip-flop.    (7M)

6.  a) List the applications of shift registers    (7M)

    b) Design a Mod-5 synchronous counter using JK flip-flop.    (7M)

7.  a) Write the difference between mealy machine to moore machine    (7M)

    b) What is meant by sates reduction? Explain the advantage of state reduction in sequential circuits.    (7M)

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Code No: R1621354　　　　　　　　　　$\boxed{\textbf{R16}}$　　　　　　　　　$\boxed{\text{SET - 1}}$

## II B. Tech I Semester Supplementary Examinations, May - 2018
## PROPERTIES AND STRENGTH OF MATERIALS
### (Agricultural Engineering)

Time: 3 hours　　　　　　　　　　　　　　　　　　　　　　　　　　Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
　　　　2. Answer **ALL** the question in **Part-A**
　　　　3. Answer any **FOUR** Questions from **Part-B**
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### PART –A

1　a) List out the characteristics of a good tile.

　　b) Prepare a list of various tests for concrete

　　c) Write the types of timber.

　　d) Define (i) Poisson's ratio and (ii) Volumetric strain

　　e) Write and explain about the limitations of Euler's Formula

　　f) What are the forces acting on a dam

### Part-B

2.　Give the sketches of various finishing surfaces of stones

3.　Give a brief description of the varieties and uses of paints

4.　Explain the characteristics and uses of copper

5.　Derive relation between three elastic moduli.

6.　A column of circular section has 160mm diameter and 4m length. Both ends of the column are fixed. The column carries a load of 150kN at an eccentricity of 15mm from the geometrical axis of the column. Find the maximum compressive stress on the column section

7.　A cantilever of length 6m carries a uniformly distributed load of 2kN/m length over the whole length. The free end of the cantilever is supported on a prop. If E = 2 x 105 N/ mm2 and I = 108 mm4, then (i) find the prop reaction (ii) deflection at the centre of cantilever

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Code No: RT21015    **R13**    SET - 1

**II B. Tech I Semester Supplementary Examinations, May - 2018**
**SURVEYING**
(Civil Engineering)

Time: 3 hours                                                 Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
         2. Answer **ALL** the question in **Part-A**
         3. Answer any **THREE** Questions from **Part-B**

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## PART –A

1. a) What are the errors in surveying
   b) What are the Errors in compass survey
   c) What are the different Temporary adjustments of a leveling instrument?
   d) Explain the principle of Electronic Theodolite.
   e) Explain the uses of Total Stations?
   f) What is the formula for computation the area along irregular boundaries?

## PART -B

2. The distance between two points measured with a Gunter's chain was found to be 7500links. The same distance was measured with an Engineers chain and was found to be 4930 feet. If the Gunter's chain was 0.25 Link too short, what was error in engineer's chain?

3. A 30m steel tape was standardized on the flat and was found to be exactly 3mm under no pull at 66° F. It was used in catenar to measure a base of 5 bays the temperature during the measurement was 92° F and the pull exerted during the measurement was 10kg. The area of the cross section of the tape was 0.08 sq.cm and the specific weights of steel is 7.86 g/cc. A = 0.0000063 per 1° F and e = 2.109 x 10$^6$ kg/sq.cm. Find the true length of the line

4. The following notes refer to reciprocal levels taken with one level

| Inst. at | Staff Reading on | | Remarks |
|---|---|---|---|
| | P | Q | |
| P | 1.820 | 2.740 | Dist PQ = 1010m |
| Q | 0.928 | 1.606 | RL of P = 126.380 |

Find (a) true RL of Q (b) Combination for curvature and refraction (c) Angular error in collimation adjustment of the inst.

5. a) Explain any one method of carrying out permanent adjustment of Transit Theodolite.
   b) What is Tacheometer? State the situations where it is used
   Explain methods of determination of Tacheometric constants.

6. Explain the principle used in total station. Classify different types of total stations based on range

7. Certain field has three straights sides PQ, QR, RS and an irregular side PS. Calculate the area of the field from the following data. PQ = 130m, QR =200m, PS = 150m, PR = 230m. Offset taken outwards from PS to the irregular boundary at chain ages 0,30,60,90,120 and 150 have values 0,3.2,1.6,6.8,4.0 and 0

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**R13**

**SET - 1**

## II B. Tech I Semester Supplementary Examinations, May - 2018
### ELECTRO MAGENETIC FIELDS
(Electrical and Electronics Engineering)

Time: 3 hours
Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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## PART –A

1.  a) What is meant by potential gradient (3M)
    b) Derive the expression for Electric field intensity due to an electric Dipole**.** (4M)
    c) States the Biot-Savart's law? (3M)
    d) Define magnetic dipole and dipole moment (4M)
    e) What is the significance of coefficient of coupling (4M)
    f) Write the Maxwell's equations for free space (4M)

## PART -B

2.  a) Explain the concept of electric field and write down expression for the electric field due to a point charge. (8M)
    b) Determine the field strength at a point situated 5cm away from two equal charge of $Q_1 = +10^9 C$ and $Q_2 = 10^9 C$, if the distance between them is 8m. (8M)

3.  a) Prove that the derivative of the energy stored in an electrostatic field with respect to volume is $\frac{1}{2}$ D.E, where D and E are electric flux density and electric field intensity respectively. (8M)
    b) Cylindrical coordinates, V = 50volts at ρ =5mm and V = 0 at ρ = 65mm. Find the voltage at ρ = 120mm, if the potential depends only on ρ. (8M)

4.  a) Using Biot-Savart's find an expression for the magnetic field intensity in the vicinity of a straight current carrying conductor of finite length? (8M)
    b) A circuit carrying a direct current of 25A forms a regular hexagon inscribed in a circle of radius 5m. Calculate the magnetic flux density at the centre of the hexagon. Assume the medium to be free space. (8M)

5.  a) Derive the expression for torque on a current loop placed in a magnetic field (8M)
    b) Determine the force between two linear parallel conductors carrying currents in opposite direction. (8M)

6.  a) Derive the expression for inductance of a solenoid? (8M)
    b) Show that the total energy in a magnetic static field is given by (8M)

$$W_m = \frac{1}{2}\int_v \left(\frac{B^2}{\mu}\right) dv$$

7.  a) State and explain the Faraday's laws of electromagnetic induction (8M)
    b) Derive the Maxwell's first equation from Ampere's law (8M)

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**II B. Tech I Semester Supplementary Examinations, May - 2018**
**MECHANICS OF SOLIDS**
(Com. to ME, AME, AE, MTE)

Time: 3 hours                                                                                       Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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## PART –A

1.  a) Write Hooke's law and draw the stress – strain diagram for mild steel?                (4M)
    b) Explain about the concept of shear force?                                               (3M)
    c) Mention the assumptions made in theory of simple bending.                              (4M)
    d) Explain about Macaulay's method?                                                        (4M)
    e) Explain about Thin spherical shells?                                                    (4M)
    f) Write the formulae for power by circular shafts?                                        (3M)

## PART -B

2.  a) An aluminium bar 60 mm diameter when subjected to an axial tensile load    (10M)
       100 kN elongates 0.20 mm in a gage length 300 mm and the diameter is
       decreased by 0.012 mm. Calculate the modulus of elasticity and the Poisson's
       ratio of the material.
    b) Obtain a relation for the stress induced in a body if a load P is applied with an   (6M)
       impact.

3.  A beam AB 5m long is simply supported at A and B. It is loaded with point   (16M)
    loads of 20kN, 30kN and 20kN at distances of 1m, 3m and 4m respectively from
    the support A, and a uniformly distributed load at the rate of 20kN/m over the
    length of 2m, from A. Draw the B.M and S.F. diagrams, indicating the principal
    values?

4.  The cross-section of a joist is a T-section $12.5 \times 12.5 \times 1.2$cm with 12.5 cm side   (16M)
    horizontal. Find the maximum intensity of shear stress and sketch the
    distribution of stress across the section if it has to resist a shear force of 90kN.

5.  a) A cantilever 3 m long is of rectangular section 120 mm wide 240mm deep. It   (9M)
       carries a uniformly distributed load of 2.5 kN per meter length for a length of 1.5
       meters from the fixed end and a point load of 1 kN at the free end. Find the
       deflection at the free end. Take E = 10 GN/ $m^2$.
    b) Determine the maximum deflection $\delta$ in a simply supported beam of length L   (7M)
       carrying a concentrated load of P at 1/4 of the span from left hand side.

6.  Design a cylinder of 800.0 mm inner diameter to sustain an internal pressure of   (16M)
    5.0 MPa. Assume E = 30.0 GPa and a safe stress of 15.0 MPa.

7.  A hollow circular column having the external and internal diameters of 300 mm   (16M)
    and 250 mm respectively carries a vertical load of 100kN at the outer edge of the
    column. Calculate the maximum and minimum intensities of stress across the
    section.

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**R13**

**II B. Tech I Semester Supplementary Examinations, May - 2018**
**SIGNALS AND SYSTEMS**
(Com. to ECE, EIE, ECC)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
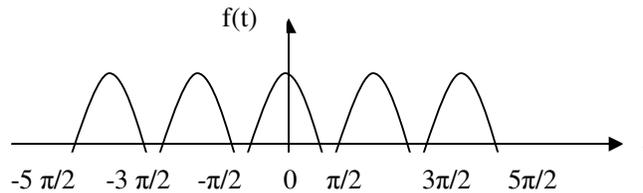3. Answer any **THREE** Questions from **Part-B**

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## PART –A

1. a) Find the fundamental period of the Signal (3M)

$$x[n] = \sin\left(\left(\frac{6\pi n}{7} + 1\right)\right)$$

b) State the modulation theorem of Fourier Transform. (4M)
c) What is the impulse response of two LTI systems connected in parallel? (4M)
d) State convolution properties in relation to Fourier transform. (4M)
e) Find the Laplace Transform of $e^{-at} u(t)$ (3M)
f) What is the relationship between Z transform and Fourier transform. (4M)

## PART -B

2. a) Evaluate the trigonometric Fourier series expansion of a full wave rectified cosine (8M)
function as shown. Derive Corresponding Exponential Fourier series.



b) Discuss the Orthogonal Signal Space and obtain the expression for mean signal (8M)
error.

3. a) State and prove Differentiation and integration properties of Fourier Transform. (8M)
b) Find the Fourier Transform of periodic signals. (8M)

4. a) A stable LTI system is characterized by the differential equation (8M)

$$\frac{d^2 y(t)}{dt^2} + 4\frac{dy(t)}{dt} + 3y(t) = \frac{dx(t)}{dt} + 2x(t)$$

Find the frequency response & Impulse response using Fourier transform.
b) Differentiate between signal bandwidth and system bandwidth. (8M)

5. a) Explain the detection of periodic signals in the presence of noise by correlation. (8M)
b) Prove that ACF and PSD forms Fourier Transform Pair. (8M)

6. a) Find the Laplace Transform for the following functions (8M)

i) $\dfrac{\sin wt}{t}$      ii) $S \ln\left(\dfrac{S+a}{S+b}\right)$

List the properties of ROC for laplace transform
b) Briefly explain the Constraints on ROC for various classes of signals. (8M)

7. a) Find the inverse z-transform of $x(z) = 1+3z^{-1} / 1+ 3z^{-1} + 2z^{-2}$ using residue method (8M)
b) Give the relationship between z-transform and Fourier transform. (8M)

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**II B. Tech I Semester Supplementary Examinations, May - 2018**
**DIGITAL LOGIC DESIGN**
(Com. to CSE, IT)

Time: 3 hours                                                      Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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## PART –A

1. a) Convert $(0.513)_{10}$ to octal.                                                    (3M)

   b) Implement the Boolean function $F = xy + x'y' + y'z$ with AND and inverter gates     (3M)

   c) Design a BCD-to-decimal decoder using the unused combinations of the BCD code        (4M)
      as don't care conditions.

   d) Show that the characteristic equation for the complement output of a $JK$ flip-flop is  (4M)
      $Q'(t + 1) = J'Q' + KQ$

   e) What is the difference between serial and parallel transfer? Explain how to convert    (4M)
      serial data to parallel and parallel data to serial. What type of register is needed?

   f) Write short notes on PLA.                                                              (4M)

## PART -B

2. a) Add and multiply the following numbers without converting them to decimal.             (8M)
      (i) Binary numbers 1011 and 101.
      (ii) Hexadecimal numbers 2E and 34.

   b) Explain the concept of radix complement with examples                                  (8M)

3. a) Simplify the following Boolean functions, using four-variable maps:                    (8M)
      (i) $F (w, x, y, z) = \sum(1, 4, 5, 6, 12, 14, 15)$
      (ii) $F (A, B, C, D) = \sum (2, 3, 6, 7, 12, 13, 14)$
      (iii) $F (w, x, y, z) = \sum (1, 3, 4, 5, 6, 7, 9, 11, 13, 15)$

   b) Simplify the following Boolean functions $T1$ and $T2$ to a minimum number of          (8M)
      literals:

| A | B | C | $T_1$ | $T_2$ |
|---|---|---|-------|-------|
| 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 1 | 1 | 0 |
| 0 | 1 | 0 | 1 | 0 |
| 0 | 1 | 1 | 0 | 1 |
| 1 | 0 | 0 | 0 | 1 |
| 1 | 0 | 1 | 0 | 1 |
| 1 | 1 | 0 | 0 | 1 |
| 1 | 1 | 1 | 0 | 1 |

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4.  a)  Design a code converter that converts a decimal digit from to 8, 4, –2, –1 code to Gray code.          (10M)
    b)  Design an excess-3-to-binary decoder using the unused combinations of the code as Don't-care conditions.          (6M)

5.  a)  Construct a *JK* flip-flop using a *D* flip-flop, a two-to-one-line multiplexer, and an inverter.          (6M)
    b)  Explain the differences among a truth table, a state table, a characteristic table, and an excitation table. Also, explain the difference among a Boolean equation, a state equation, a characteristic equation, and a flip-flop input equation.          (10M)

6.  a)  Derive the state tables for the 4 bit ring counter          (8M)
    b)  Explain the working of 3-bit bi-directional shift register with the help of diagram?          (8M)

7.  a)  Tabulate the PLA programming table for the four Boolean functions listed below. Minimize the numbers of product terms.          (8M)
        $A(x, y, z) = \sum(1, 3, 5, 6)$
        $B(x, y, z) = \sum(0, 1, 6, 7)$
        $C(x, y, z) = \sum(3, 5)$
        $D(x, y, z) = \sum(1, 2, 4, 5, 7)$
    b)  Derive the PLA programming table for the combinational circuit that squares a three-bit number. Minimize the number of product terms.          (8M)

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**II B. Tech I Semester Supplementary Examinations, May - 2018**
**DIGITAL LOGIC DESIGN**
(Com. to CSE, IT)

Time: 3 hours                                             Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Perform the following using 6's complement:
   - i. $(26)_7 - (42)_7$
   - ii. $(126)_7 - (42)_7$
   b) Explain in detail about non-weighted codes

2. a) Minimize below expression using EX-NOR function
   $$f = \bar{A}B\bar{C} + \bar{A}\bar{B}C + A\bar{C}D + AC\bar{D}$$
   b) Simplify the following function and implement it with NAND gates
   $F_1 = (B^1 + D^1)(A^1 + C^1 + D)(A + B^1 + C^1 + D)(A^1 + B + C^1 + D^1)$

3. a) Minimization of function f using K-map
   $f(A,B,C,D) = \sum(0,2,3,4,6,7,8,10,11,15)$
   b) What is standard POS form? Write the procedure Conversion of POS form to standard POS form with example

4. a) Design Full adders from half adder and write the applications of full adder
   b) Draw and explain about look-a-head adder circuit

5. a) Design full adder from 3 to 8 decoder
   b) Define Multiplexer and explain the procedure to implement 32 X 1 MUX by Using 4 X 1 Multiplexers

6. a) Implement f (A,B,C,D) = $\sum(0,1,3,5,6,8,9,11,12,13)$ using PROM and explain its procedure
   b) Design and implement Full adder with PLA

7. a) Write the differences between Latch and Flip-Flop
   b) Explain about Mater-slave J-K flip-flop

8. a) What is a shift register? Draw the block diagram and timing diagram of a shift register that shows the serial transfer of information from register A to register B.
   b) Explain about decade ripple counter

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