USN | | | | | | | | | |

10AL51

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Management and Entrepreneurship

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Define Management. List and explain the functions of Management. **(10 Marks)**
b. Explain the scope of management. Explain the characteristics and levels of management. **(10 Marks)**

2 a. Explain Hierarchy of plans. **(05 Marks)**
b. Briefly explain types of planning. **(05 Marks)**
c. State the different types of decisions and explain the steps in decision - making. **(10 Marks)**

3 a. Explain with sketch the line and staff organisation. **(05 Marks)**
b. What are the advantages of Management By Objectives (MBO) and Advantages of Management by Exception (MBE)? **(10 Marks)**
c. What are the advantages of Matrix Organisation? **(05 Marks)**

4 a. Write about Maslow's theory of Motivation. **(05 Marks)**
b. Explain Mc Gregor's theory X and theory Y. **(05 Marks)**
c. Differentiate between Co-ordination and Co-operation. **(05 Marks)**
d. What are barriers of successful communication? **(05 Marks)**

PART – B

5 a. Briefly compare Intrapreneurs, Entrepreneurs and managers. **(06 Marks)**
b. Explain in detail the stages in Entrepreneurial process. **(10 Marks)**
c. Explain the characteristics of Entrepreneurship. **(04 Marks)**

6 a. Define briefly about Ancillary Industry and Tiny Industry. **(06 Marks)**
b. Write a short note on GATT and also mention the challenges faced since its inception. **(10 Marks)**
c. List four prominent functions of WTO. **(04 Marks)**

7 a. Name any five state or Central Government Institutions and state their objectives and functions. **(10 Marks)**
b. Explain the roles of IDBI. **(05 Marks)**
c. Write a note on Single window DIC agency. **(05 Marks)**

8 a. Write short notes on : i) Quantifiable and non – quantifiable projects ii) Sectoral projects. **(05 Marks)**
b. Classify Techno – Economic projects and briefly describe the same. **(06 Marks)**
c. Write short notes on :
i) Project Identification ii) Project Selection iii) Project Report. **(09 Marks)**

*****

USN | | | | | | | | | | |

10EC52

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Digital Signal Processing

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Describe the process of frequency domain sampling and reconstruction of discrete time signals. **(10 Marks)**

b. Derive the relationship of DFT with z-transform. **(06 Marks)**

c. Compute the N-point DFT of the sequence $x(n) = 1,\ 0 \le n \le N-1$. **(04 Marks)**

2 a. Show that the multiplication of two DFTs leads to circular convolution of the corresponding sequences in time domain. **(07 Marks)**

b. Let x(n) be a finite length sequence with x(k) = (1, j4, 0, – j4). Find the DFT's of,

(i) $x_1(n) = e^{j\frac{\pi}{2}n} x(n)$ (ii) $x_2(n) = \cos\left(\frac{\pi}{2}n\right) x(n)$ (iii) $x_3(n) = x((n-1))_4$. **(07 Marks)**

c. Let $x(n) = (1, 2, -1, -2, 3, 4, -3, 4)$ with a 8-point DFT x(k). Evaluate (i) $\sum_{K=0}^{7} X(k)$

(ii) $\sum_{K=0}^{7} |X(k)|^2$ without explicitly computing DFT. **(06 Marks)**

3 a. Explain the filtering of long data sequence using overlap-add method. **(06 Marks)**

b. For sequences $x_1(n) = (2, -1, 2, 1)$, $x_2(n) = (1, 1, -1, -1)$:

(i) Compute circular convolution.

(ii) Compute linear convolution using circular convolution.

Compare the result. **(07 Marks)**

c. Compute the output of a filter with an impulse response $h(n) = (3, 2, 1)$ for input $x(n) = (2, 1, -1, -2, -3, 5, 6, -1, 2, 0)$ using overlap save method. Use 8-point circular convolution. **(07 Marks)**

4 a. Find the number of complex multiplications and additions required to compute 128 point DFT using (i) Direct method (ii) FFT algorithm (radix – 2). What is the speed improvement factor? **(05 Marks)**

b. Develop DIF-FFT algorithm and obtain the signal flow diagram for N = 8. **(07 Marks)**

c. Using DIT-FFT algorithm, compute the DFT of a sequence $x(n) = (1, 1, 1, 1, 0, 0, 0, 0)$. **(08 Marks)**

PART – B

5 a. Explain the Butterworth filter characteristics. Obtain the second order Butterworth polynomial. **(06 Marks)**

b. Determine the order and cutoff frequency of Butterworth analog highpass filter with
Pass band attenuation, frequency : 2 dB, 200 rad/sec.
and Stop band attenuation, frequency : 20 dB, 100 rad/sec. **(06 Marks)**

c. Let $H(s) = \frac{1}{(s+1)(s^2+s+1)}$ represent a LPF with passband of 1 rad/sec. Find H(s) for
   (i) LPF with passband 2 rad/sec.
   (ii) HPF with cutoff frequency 2 rad/sec.
   (iii) BPF with passband 10 rad/sec and center frequency of 100 rad/sec.
   (iv) BSF with stopband of 2 rad/sec and center frequency of 10 rad/sec. **(08 Marks)**

6 a. Realize the system function $H(z) = \frac{1+2z^{-1}}{(1+3z^{-1})(1+2z^{-1}+z^{-2})}$ in
   (i) Direct form I
   (ii) Direct form II
   (iii) Cascade form.
   (iv) Parallel form. **(12 Marks)**

b. Consider three stage FIR lattice structure having coefficients $K_1 = 0.2$, $K_2 = 0.4$ and $K_3 = 0.6$. Draw the lattice structure. Find the system function H(z) and realize it in direct form. **(08 Marks)**

7 a. Compare FIR and IIR filters. **(04 Marks)**

b. The desired frequency response of a LPF,

$$H_d(\omega) = \begin{cases} e^{-j2\omega}, & |\omega| < \frac{\pi}{4} \\ 0, & \text{Otherwise} \end{cases}$$

Find the impulse response h(n) using Hamming window. Determine the frequency response of FIR filter. **(08 Marks)**

c. A low pass filter has the desired frequency response,

$$H_d(\omega) = \begin{cases} e^{-j3\omega}, & 0 < \omega < \frac{\pi}{2} \\ 0, & \text{Otherwise} \end{cases}$$

Determine the filter coefficients based on frequency sampling technique. **(08 Marks)**

8 a. Obtain the mapping rule for bilinear transformation. What is the effect on digital frequency in this transformation? **(08 Marks)**

b. Design a digital Butterworth low pass filter to meet the following specifications:
Pass band attenuation, frequency : 2 dB at 0.2 π rad
Stop band attenuation, frequency : 13 dB at 0.6 π rad
Use backward difference method with T = 1 sec. **(08 Marks)**

c. Determine the order of a digital Chebyshev 1 filter that satisfies the following constraints:

$$0.8 \le |H(\omega)| \le 1, \quad 0 \le \omega \le 0.2\pi$$
$$|H(\omega)| \le 0.2, \quad 0.6\pi \le \omega \le \pi$$

(04 Marks)

* * * * *

USN | | | | | | | | | | |

10EC53

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Analog Communication

Time: 3 hrs. Max. Marks:100

Note: 1. *Answer any FIVE full questions, selecting atleast TWO questions from each part.*
2. Standard notations are used.
3. Draw neat diagram, wherever necessary.
4. Missing data be suitably assumed.

PART – A

1 a. Define Random variables and differentiate between discrete and continuous random variables. List the properties of PDF. **(07 Marks)**

b. Discuss the properties of Gaussian process. **(07 Marks)**

c. State and prove Central Limit theorem. **(06 Marks)**

2 a. Describe the generation of AM wave using square law modulator with mathematical analysis. **(08 Marks)**

b. An AM wave has the form :
$S(t) = 20[1 + 1.5 \cos 2000 \pi t + 1.5 \cos 4000 \pi t] \times \cos 40000 \pi t$.
i) Find the carrier power and side band power ii) Find the S(f) and sketch its spectrum
iii) Find the modulation index. **(07 Marks)**

c. Explain the single tone modulation of DSBSC wave with frequency spectrum. **(05 Marks)**

3 a. Explain the operation of quadrature carrier multiplexing scheme with transmitter and receiver diagrams. **(07 Marks)**

b. Define Hilbert transform. Explain the properties of Hilbert transform. **(07 Marks)**

c. Consider the message signal m(t) containing the frequency components 100Hz, 200Hz and 400Hz. This message signal is applied to a SSB modulator together with a carrier at 100KHz with only USB retained. The coherent detector employed at the receiver uses a local oscillator that gives a sine wave of frequency 100.02KHz. Determine the frequency components of the detector O/P. **(06 Marks)**

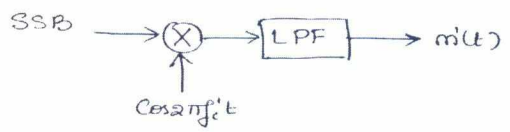

Fig.Q3(c)

4 a. Show that a VSB modulated S(t) containing a vestige of the lower side band is defined by
$S(t) = \frac{Ac}{2} m(t) \cos 2\pi fct - \frac{Ac}{2} M_Q(t) \sin 2\pi fct$ with relevant spectrum. **(08 Marks)**

b. Explain how downward frequency translation is achieved with the help of a block diagram and waveforms. **(08 Marks)**

c. Compare amplitude modulation techniques. **(04 Marks)**

PART – B

5 a. Show that the spectrum of FM contains infinite number of sidebands. **(08 Marks)**

b. A 93.2MHz carrier is frequency modulated by a 5KHz sine wave. The resultant FM signal has a frequency deviation of 40 KHz.

i) Find the carrier swing of the FM signal.

ii) What are the highest and lowest frequencies attained by the frequency modulated signal?

iii) Calculate the modulation index for the wave. **(07 Marks)**

c. Give the relationship between frequency modulation and phase modulation, with scheme for generating an FM wave by using a phase modulator. **(05 Marks)**

6 a. Explain FM detection using PLL. **(07 Marks)**

b. Draw the block diagram of balance frequency discriminator and explain it for demodulation of FM signal. **(08 Marks)**

c. Explain non – linearity and its effect in FM system. **(05 Marks)**

7 a. Explain the following :

i) Thermal Noise ii) Shot Noise

iii) Noise figure iv) Equivalent Noise temperature. **(12 Marks)**

b. In a TV receiver a long lossy cable is used to connect the antenna to the receiver. To overcome the effect of lossy cable, a pre – amplifier is mounted on the antenna as shown as fig. Q7(b). Find the overall noise figure with and without pre amplifier. **(08 Marks)**

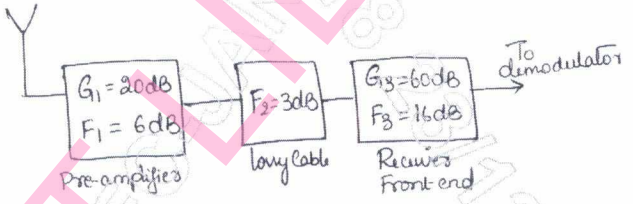

Fig.Q7(b)

8 a. Write short notes on :

i) Pre - emphasis and de-emphasis in FM ii) FM Stereo Multiplexing. **(10 Marks)**

b. Considering the model of DSBSC receiver using Coherent detection, explain the noise in DSBSC receiver and derive the Expression for figure of Merit. **(10 Marks)**

*****

USN | | | | | | | | | | |

10EC54

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Microwaves and Radar

Time: 3 hrs. Max. Marks:100

Note: 1. ***Answer FIVE full questions, selecting at least TWO questions from each part.***
2. ***Use of Smith chart is permitted***
3. ***Any missing data can be assumed.***

PART – A

1 a. What are standing waves? Explain. **(05 Marks)**

b. Define and derive expressions for reflection coefficient, transmission coefficient and voltage standing wave ratio. **(10 Marks)**

c. An open wire transmission line has R = 5Ω/m L = 5.2×10^{-8}= H/m, G = 6.2×10^{-3} ℧/m and C = 2.13×10^{-10} F/m. Signal frequency is 4GHz. Find characteristic impendence and propagation constant. **(05 Marks)**

2 a. What is stub matching? Derive the expression for the length and location of the short circuited stub used in single stub matching. **(12 Marks)**

b. A single stub tuner is to match a lossless line of 400Ω to a load 800 – j300Ω. The frequency of operation is 3GHz.
i) Find the distance in meters from the load to the tuning stub
ii) Determine the length in meters of the short circuited stub
Note: Use Smith chart. Give the procedure in steps. **(08 Marks)**

3 a. Starting from wave equation, derive the field component expressions for TM_{mn} mode of propagation in a rectangular waveguide. **(10 Marks)**

b. Explain a two-hole directional coupler listing out its characteristics. **(06 Marks)**

c. A matched isolator has insertion loss of 1db and isolation of 30db. Find the scattering coefficients. **(04 Marks)**

4 a. Briefly explain the different modes of operation in a Gunn diode. **(08 Marks)**

b. List out the properties of S – parameters. **(06 Marks)**

c. Prove that it is impossible to construct a perfectly matched lossless reciprocal 3-part junction. **(06 Marks)**

PART – B

5 a. Explain with a neat sketch precision type variable attenuator. **(08 Marks)**

b. What are applications of Magic Tee? Briefly explain any one of them. **(06 Marks)**

c. In a H-plane Tee junction, compute power delivered to the loads 40Ω and 60 Ω connected to collinear arms 1 and 2 when 10mW power is delivered to arm 3. Assume $Z_0 = 50\Omega$. **(06 Marks)**

6 a. With relevant equation explain various losses in a microstripline. **(12 Marks)**

b. A lossless parallel strip line has its conducting strip of with W. The dielectric material of the strip line has a thickness of 4mm and its permittivity is 4. Compute :

i) Value of W so that $z_o = 75\Omega$

ii) Strip-line capacitance

iii) Strip line inductance

iv) Phase velocity of the wave propagating through the line. **(08 Marks)**

7 a. Derive the simple Radar Range equation, Discuss the factors influencing the Radar Range. **(10 Marks)**

b. Give some important application of Radar. **(04 Marks)**

Compute the range of a radar system operating at a wavelength of 3cm, peak pulse power of 400kW, effective antenna aperture of $5m^2$, radar cross sectional area of $20m^2$ and minimum detectable signal of 10^{-13}W. What will be the transmitter power needed to double the range. **(06 Marks)**

8 a. With a block diagram, explain the working of a MTI radar. **(08 Marks)**

b. Write short note on :

i) Blind speed

ii) Delay line cancellers. **(08 Marks)**

c. A MTI Radar has a PRF of 1000Hz at 4GHz. Compute lowest, second lowest and third lowest blind speeds expressed in Kmph. **(04 Marks)**

* * * * *

USN | | | | | | | | | | |

10EC55

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Information Theory and Coding

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. A source emits one of the four probable messages m_1, m_2, m_3 and m_4 with probabilities 3/11, 2/11, 2/11 and 4/11 respectively. Find the entropy of the source and show that for the second order extension of the source $H(S^2) = 2\ H(S)$ by listing the symbols of second extended source along with their probabilities. **(10 Marks)**

b. A certain data source has 8 symbols that are produced in blocks of four at a rate of 500 blocks/sec. The first symbol in each block is always the same for synchronization. The remaining three symbols are filled by any of the 8 symbols with equal probability. Find entropy rate of this source. **(06 Marks)**

c. Explain the block diagram of an information system. **(04 Marks)**

2 a. Explain the steps in the Shannon's encoding algorithm for generating binary code. **(04 Marks)**

b. Show that $H(X, Y) = H(Y) + H(X/Y)$. **(04 Marks)**

c. The state diagram of the mark off source is as shown in the Fig.Q2(c).
   i) Find the stationary distribution
   ii) Find the entropy of each state and hence the entropy of the source
   iii) Find the entropy of the adjoint source and verify that $H(S) < H(\bar{S})$. **(12 Marks)**

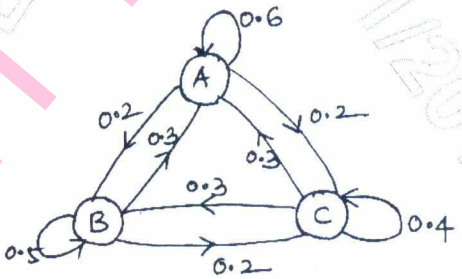

Fig.Q2(c)

3 a. A discrete memoryless source has an alphabet of seven symbols with probabilities for its output as $S = \{S_1, S_2, S_3, S_4, S_5, S_6, S_7\}$; $P = \{0.25, 0.25, 0.125, 0.125, 0.125, 0.0625, 0.0625\}$; $x = \{0, 1\}$, compute the Huffman code for this source, moving the composite symbol as high as possible. Explain why the computed source code has an efficiency of 100%. **(12 Marks)**

b. Prove that the mutual information of the channel is symmetric. **(04 Marks)**

c. Define priori entropy, posteriori entropy, equivocation and mutual information. **(04 Marks)**

4 a. Two noisy channels are cascaded whose channel matrices are given by :

$$P(Y/X) = \begin{bmatrix} 1/5 & 1/5 & 3/5 \\ 1/2 & 1/3 & 1/6 \end{bmatrix} \quad P(Z/Y) = \begin{bmatrix} 0 & 3/5 & 2/5 \\ 1/3 & 2/3 & 0 \end{bmatrix}$$

With $P(x_1) = P(x_2) = 1/2$. Find the overall mutual information I(X,Z) and show that I(X, Y) > I(X, Z). **(12 Marks)**

b. Alphanumeric data are entered into a computer from a remote terminal through a voice - grade telephone channel. The channel has a bandwidth of 3.2KHz and output signal to noise ratio of 20dB. The terminal has a total of 256 symbols. Assume that the symbols are equiprobable and the successive transmissions are statistically independent.

i) Calculate channel capacity
ii) Find the average information content per character
iii) Calculate the maximum symbol rate for which error free transmission over the channel is possible. **(08 Marks)**

PART – B

5 a. Design a systematic (4, 2) linear block code :

i) Find the generator matrix [G] and parity check matrix [H]
ii) Find all possible code vectors
iii) Write the standard array
iv) What are the error detecting and correcting capabilities of the code?
v) Draw the encoding circuit
vi) Draw the syndrome calculating circuit. **(14 Marks)**

b. Draw the general encoding circuit for (n, k) linear block code and explain its operation. **(06 Marks)**

6 a. Consider (15, 5) cyclic code generated by polynomial $g(x) = 1 + x + x^2 + x^4 + x^5 + x^8 + x^{10}$.

i) Draw the block diagram of an encoder and syndrome calculator for this code
ii) Find the code polynomial for the message polynomial $D(x) = 1 + x^2 + x^4$ in systematic form.
iii) Is $V(x) = 1 + x^4 + x^6 + x^8 + x^{14}$ a code polynomial? **(12 Marks)**

b. Draw the general block diagram of syndrome calculation circuit for cyclic codes and explain its operation. **(08 Marks)**

7 a. Write short notes on : i) RS codes ii) Golay codes iii) Shortened cyclic codes iv) Burst error correcting codes. **(15 Marks)**

b. Define cyclic code. Explain how cyclic codes are generated from the generating polynomials. **(05 Marks)**

8 a. Consider the convolution encoder is as shown in the Fig. Q8(a).

i) Draw the state diagram
ii) Draw the code tree
iii) Find the encoder output produced by the message sequence 10111
iv) Verify the output using time – domain approach (matrix method). **(14 Marks)**

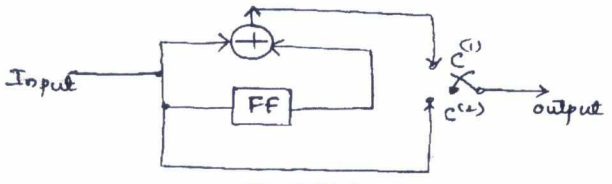

Fig.Q8(a)

b. Explain encoding of convolution codes using time domain approach with an example. **(06 Marks)**

* * * * *

USN | | | | | | | | | | |

10EC56

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Fundamentals of CMOS VLSI

Time: 3 hrs. Max. Marks:100

Note: 1. ***Answer any FIVE full questions, selecting at least TWO questions from each part.***
2. ***Draw Neat diagram.***

PART – A

1 a. Describe with neat diagrams, the P-well fabrication process. **(08 Marks)**

b. Explain the DC transfer characteristics of CMOS inverter and mark all the regions of operation with necessary expressions for V_{out} in each region. **(08 Marks)**

c. Compare CMOS and Bipolar Technology. **(04 Marks)**

2 a. Explain Transmission gate and Tristate inverter operations with neat diagram. **(06 Marks)**

b. Give the λ-based design rules for different layers, p and n MOSFETS and contact cuts. **(08 Marks)**

c. Obtain the stick diagram and layout of two way selector with enable. **(06 Marks)**

3 a. What are the features of CMOS Domino logic? Explain with neat diagram. **(06 Marks)**

b. In the following circuit find V_1, V_2, V_3 and V_4. **(06 Marks)**

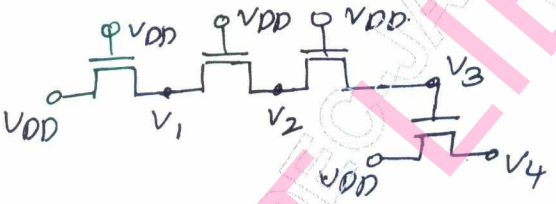

Fig Q3(b) 1

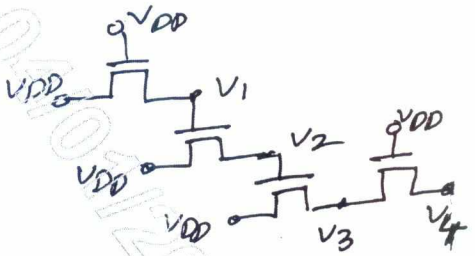

Fig Q3(b) 2

c. Explain following logic structure with their salient features with neat diagram
i) Pseudo nMOS logic
ii) C^2MOS logic **(08 Marks)**

4 a. Define sheet Resistance and standard unit of capacitance □Cg. **(06 Marks)**

b. Explain cascaded inverter to drive large capacitance loads? Obtain an equation to find the number of stages. **(08 Marks)**

c. Calculate the total capacitance in terms of □Cg for the following Fig.Q4(c) **(06 Marks)**

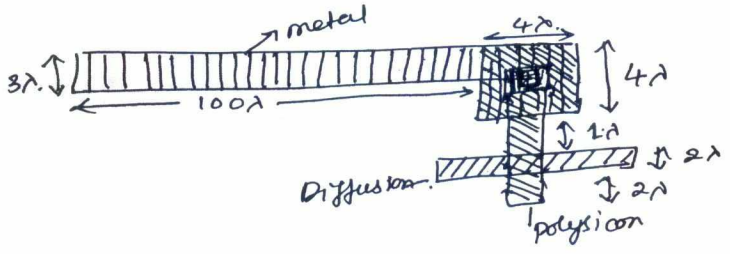

Fig Q4(c)

PART – B

5 a. What are the properties of nMOS and PMOS switches? How TG is useful. **(06 Marks)**

b. Explain the structure design of a parity generation with necessary diagrams and also write stick diagrams. **(08 Marks)**

c. Obtain the logic implementation of 4-way multiplexer (Selector) using nMOS switches with necessary diagrams. **(06 Marks)**

6 a. Explain nMOS and CMOS non-inverting dynamic storage cell and draw the 4-bit shift register using nMOS. **(07 Marks)**

b. How to implement arithmetic and logic operation with a standard adder? Explain with the help of logic expression. **(06 Marks)**

c. Explain 4×4 Barrel shifter with neat diagram. **(07 Marks)**

7 a. What are system timing consideration? **(05 Marks)**

b. Explain Read/write operation of one T dynamic memory cell (one transistor). **(05 Marks)**

c. Discuss Baugh Worley method used for Two's complement multiplication with neat diagrams. **(10 Marks)**

8 a. Write a note on Testability and Testing. **(06 Marks)**

b. What are different types of I/O pads? **(06 Marks)**

c. Write short notes on :

i) Built in self Test (BIST)

ii) Scan design Technic. **(08 Marks)**

* * * * *