Electronics & Tele. Dept.

Bachelor Of Engineering

Question Papers Nov-Dec 2019

Sem–III to VIII

SE CET) Cchoice Based) 14/11/19

(3 hours) **Total Marks-80**

N.B. 1) Question No.1 is compulsory.

2) Attempt any THREE questions from Q.No.2 to Q.No.6

3) Figures to the right indicate full marks

Q1 a) Find $L[\frac{\cos 2t \sin t}{e^t}]$ [5]

b) Determine the constants a,b,c,d if $f(z) = x^2 + 2axy + by^2 + i(cx^2 + 2dxy + y^2)$ is analytic. [5]

c) Find Half range cosine series for $f(x) = x(\pi - x), 0 < x < \pi$ [5]

d) Find the directional derivative of $f(x, y, z) = xy^2 + yz^3$ at the point(2,-1,1) in the direction of the vector $i + 2j + 2k$ [5]

Q2) a) Show that the function $u = 3x^2y + 2x^2 - y^3 - 2y^2$is harmonic. Find its harmonic conjugate and corresponding analytic function. [6]

b) Find the Fourier series for $f(x) = 1 - x^2$ in (-1,1). [6]

c) Find *i)* $L^{-1}[\frac{e^{-\pi s}}{s^2-2s+2}]$ [8]

ii) $L^{-1}[tan^{-1}\left(\frac{s+a}{b}\right)]$

Q3) a) Find the angle between the surfaces $xlogz + 1 - y^2 = 0$, $x^2y + z = 2$ at (1,1,1) [6]

b) Prove that $J'_2(x) = \left(1 - \frac{4}{x^2}\right)J_1(x) + \frac{2}{x}J_0(x)$ [6]

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c) Obtain Fourier series for [8]

$$f(x) = \begin{cases} x + \frac{\pi}{2} & , -\pi < x < 0 \\ \frac{\pi}{2} - x & , \quad 0 < x < \pi \end{cases}$$

Hence deduce that $\frac{\pi^4}{96} = \frac{1}{1^4} + \frac{1}{3^4} + \cdots \ldots$

Q4) a) Using Gauss's Divergence theorem, prove that [6]

$\iint_S (y^2z^2i + z^2x^2j + z^2y^2\,k).\bar{N}ds = \frac{\pi}{12}$ where S is the part of the sphere $x^2 + y^2 + z^2 = 1$ above the xy- plane.

b) Prove that $J_{-\frac{1}{2}}(x) = \sqrt{\frac{2}{\pi x}}.cosx$ [6]

c) Solve using Laplace Transform $(D^2 + 2D + 5)y = e^{-t}sint$, when $y(0) = 0, y'(0) = 1$ [8]

Q5) a) Find inverse Laplace Transform using convolution theorem for [6]

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

b) Prove that $J_3(x) + 3J_0(x) + 4J_0'''(x) = 0$ [6]

c) Obtain the complex form of Fourier Series for $f(x) = e^{ax}$ in $(-l, l)$ [8]

Q6) a) Using Green's Theorem in the plane evaluate $\oint(x^2 - y)dx + (2y^2 + x)dy$ around the boundary of the region defined by $y = x^2, y = 4$ [6]

b) Show that the map of real axis of the Z-plane is a circle under the transformation $w = \frac{2}{z+i}$. Find its centre and the radius. [6]

c) Find Fourier Integral Representation for [8]

$$f(x) = \begin{cases} 1 - x^2 & for\ |x| \le 1 \\ 0 & for\ |x| > 1 \end{cases}$$

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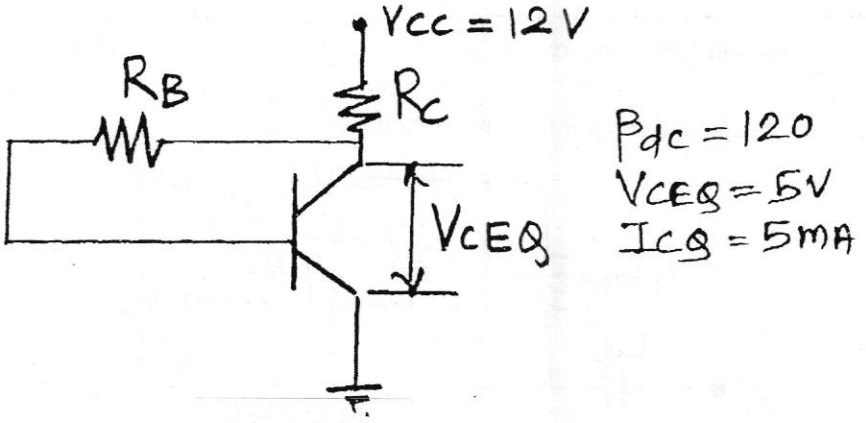
SE(III) CET) (choice based) 18/11/19

(3 Hours) (Total Marks : 80)

Please check whether you have got the right question paper.

N.B.: 1) **Question No. 1** is **compulsory**.
2) Solve **any three** questions from the remaining **five** questions.
3) **Figures** to the **right** indicate **full marks**.
4) Assume suitable **data** if **necessary** and **mention the same** in **answer sheet**.

1. Attempt **any Four** questions : **(20)**
   a) Explain Various types of Resistors.
   b) Give the equation for the current in semiconductor diode. With the help of this equation explain in detail the V-I characteristics of a semiconductor diode.
   c) Explain Zener as a Voltage regulator.
   d) Find Values for R_B and R_C :



   e) Compare BJT CE Amplifier and JFET CS Amplifier.
   f) Draw and explain high frequency model of BJT for CE configuration.

2. Design a single stage CE amplifier suitable for low frequencies up to 10Hz to give voltage gain Av 70 and the output voltage of 4.5 Volts; employing transistor type BC147A.Calculate the expected Av and maximum output voltage with negligible distortion that can be obtained from the designed circuit. Also, calculate the input resistance of the amplifier. Specify clearly the supply voltage Vcc for the designed circuit. **(20)**

3. a) A dc voltage of 350 Volts with peak ripple voltage not exceeding 5 Volts is required to supply a 500 Ω load. Determine following if inductor filter and full wave rectifier is used **(10)**
      1) Inductance required
      2) Input voltage required.
   b) Explain and derive the expression for ripple factor for capacitor filter with full wave rectifier. **(10)**

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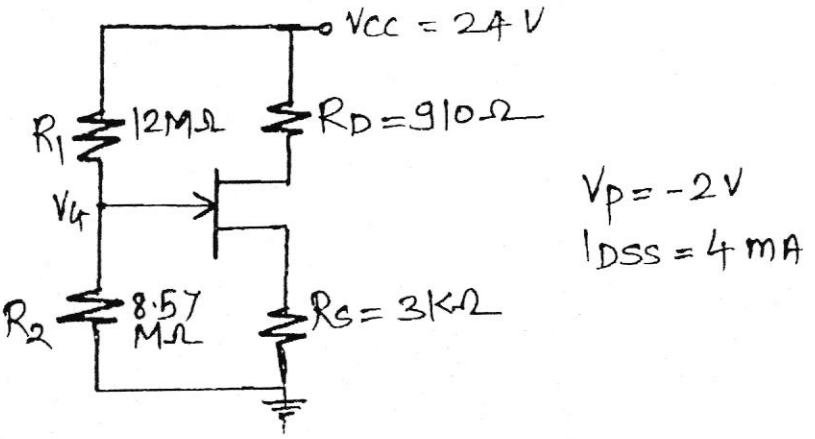
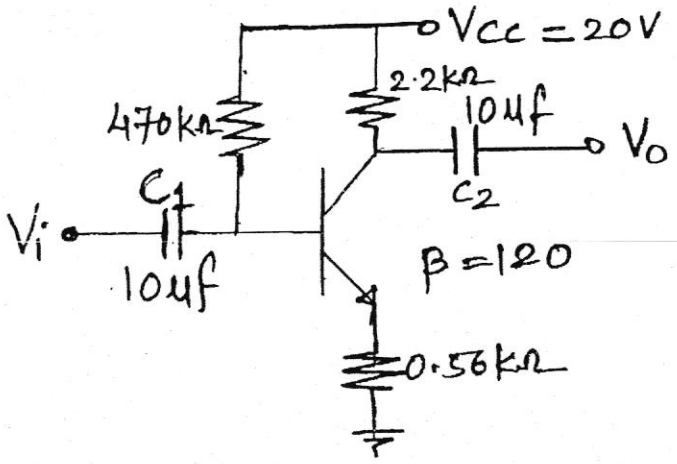
4. a) For the circuit shown below determine I_{DQ} and verify if the FET will operate in pinch off region : **(10)**



b) State and explain Miller theorem. **(10)**

5. a) Determine Zi ,Zo and A v for the circuit shown below : **(10)**



b) Draw small Signal hybrid parameter equivalent circuit for CE amplifier and define the same .What are the advantages of h-parameters? **(10)**

6 Write short note on : **(20)**

a) Hybrid Parameter
b) Regions of operation of FET
c) Stability factor of biasing circuits
d) DC load line concept in BJT. Why Q point should be at the middle of load line and fixed?

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Transistor type	Pdmax @ 25°C Watts	Icmax @ 25°C Amps	$V_{CE}^{(sat)}$ volts d.c.	V_{CBO} volts d.c.	V_{CEO} (Sus) volts d.c.	V_{CER} (Sus) volts d.c.	V_{CEX} volts d.c.	V_{EBO} volts d.c.	T_j max °C	D.C. current gain min	typ.	max.	Small · Signal h_{fe} min	typ.	max.	V_{BE} max.	θ_{jc} °C/W	Derate above 25°C W/°C
2N 3055	115·5	15·0	1·1	100	60	70	90	7	200	20	50	70	15	50	120	1·8	1·5	0·7
ECN 055	50·0	5·0	1·0	60	50	55	60	5	200	25	50	100	25	75	125	1·5	3·5	0·4
ECN 149	30·0	4·0	1·0	50	40	—	—	8	150	30	50	110	33	60	115	1·2	4·0	0·3
ECN 100	5·0	0·7	0·6	70	60	65	—	6	200	50	90	280	50	90	280	0·9	35	0·05
BC147A	0·25	0·1	0·25	50	45	50	—	6	125	115	180	220	125	220	260	0·9	—	—
2N 525(PNP)	0·225	0·5	0·25	85	30	—	—	—	100	35	—	65	—	45	—	—	—	—
BC147B	0·25	0·1	0·25	50	45	50	—	6	125	200	290	450	240	330	500	0·9	—	—

Transistor type	hie	hoe	hre	θja
BC 147A	2·7 K Ω	18μ ℧	1·5 × 10⁻⁴	0·4°C/mw
2N 525 (PNP)	1·4 K Ω	25μ ℧	1·2 × 10⁻⁴	—
BC 147B	4·5 K Ω	30μ ℧	2 × 10⁻⁴	0·4°C/mw
ECN 100	500 Ω	—	—	—
ECN 149	250 Ω	—	—	—
ECN 055	100 Ω	—	—	—
2N 3055	25 Ω	—	—	—

BFW 11—JFET MUTUAL CHARACTERISTICS

$-V_{GS}$ volts	0·0	0·2	0·4	0·6	0·8	1·0	1·2	1·6	2·0	2·4	2·5	3·0	3·5	4·0
I_{DS} max. mA	10	9·0	8·3	7·6	6·8	6·1	5·4	4·2	3·1	2·2	2·0	1·1	0·5	0·0
I_{DS} typ. mA	7·0	6·8	5·4	4·6	4·0	3·3	2·7	1·7	0·8	0·2	0·0	0·0	0·0	0·0
I_{DS} min. mA	4·0	3·0	2·2	1·6	1·0	0·5	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0

N-Channel JFET

Type	V_{DS} max. Volts	V_{DG} max. Volts	V_{GS} max. Volts	P_d max. @25°C	T_j max.	I_{DSS}	g_{mo} (typical)	$-V_p$ Volts	r_d	Derate above 25°C	θ_{jc}
2N3822	50	50	50	300 mW	175°C	2 mA	3000 μ℧	6	50 KΩ	2 mW/°C	0·59°C/mW
BFW 11 (typical)	30	30	30	300 mW	200°C	7 mA	5600 μ℧	2·5	50 KΩ	—	0·59° C/mW

20/11/19.

B.E (II Sem) - EXTC - CBCS

Time: 3 Hours **Max Marks: 80**

N:B: 1. Question No. 1 is compulsory.
2. Out of remaining questions, attempt any three questions.
3. Assume suitable additional data if required.
4. Figures in brackets on the right hand side indicate full marks.

Q.1 (A) The Gray code for decimal number 6 is equivalent to **(01)**
i) 0100 ii) 0001
iii) 0101 iv) 0110
Prove it. **(04)**

(B) Which of the following is correct statement: **(01)**
i) PLA contains a fixed AND array and a programmable OR array.
ii) PLA contains a programmable AND array and a programmable OR array.
iii) PAL contains a fixed AND array and a programmable OR array.
iv) PAL contains a programmable AND array and a programmable OR array.
Draw the structure of correct statement. **(04)**

(C) Which of the following expression is equivalent to $Z = A\,\overline{B} + C$ where A represents MSB and C represents LSB of the binary numbers? **(01)**
i) $Z = \sum m(0, 2, 6)$. ii) $Z = \Pi M(1, 3, 4, 5, 7)$.
iii) $Z = \sum m(1, 3, 4, 5, 7) + d(6)$. iv) $Z = \Pi M(0, 2, 6)$.
Prove it. **(04)**

(D) A single 4-bit magnitude comparator IC 7485 can compare maximum **(01)**
i) two 4-bit numbers ii) two 5-bit numbers
iii) two 8-bit numbers iv) two 10-bit numbers
Draw its corresponding diagram **(04)**

Q.2 (A) Implement the following Boolean equation using single 4:1 MUX and few logic gates: $F(A, B, C, D) = \sum m(0, 2, 5, 6, 7, 9, 12, 15)$. **(10)**

(B) Write the VHDL code for Fibonacci Series Generator sequential circuit. **(10)**

Q.3 (A) Design synchronous counter using D type flip flops for getting the following sequence: $0 \rightarrow 2 \rightarrow 4 \rightarrow 6 \rightarrow 0$. **(10)**
Take care of lockout condition.

(B) Compare SRAM with DRAM. **(05)**

(C) What are the Universal Gates? Why are they so called? Design any one Basic Logic Gate using only Universal Gates. **(05)**

Q.4 (A) Draw a neat circuit of BCD adder using IC 7483 and explain. **(10)**

(B) Using Quine Mc'Clusky method, minimize the following: **(10)**
$F(A, B, C, D) = \sum m(0, 3, 5, 7, 8, 11, 13, 15)$.

Q.5 (A) With neat diagram, explain the working of Universal Shift Registers. Give its applications. **(10)**

(B) Analyze the circuit given in Figure 5(B). Assume initial state as A=0, B=0. Complete a state table that shows the behavior of this state machine. Is this a Moore or Mealy machine? (Explain with a sentence) **(10)**

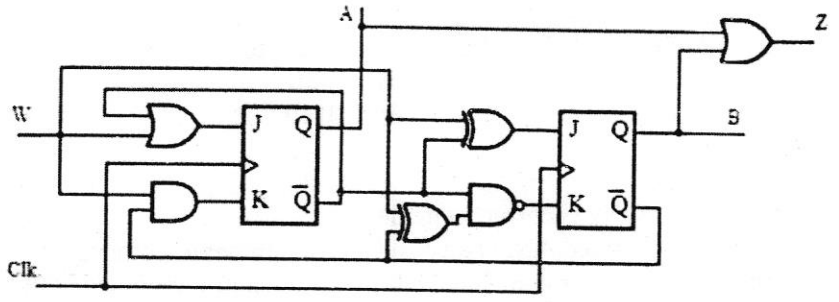

Fig. 5(B)

6. (A) Convert T type flip flop into D type flip flop. **(05)**

(B) Compare Moore with Mealy circuits. **(05)**

(C) Compare PAL with PLA. **(05)**

(D) Compare FPGA with CPLD. **(05)**

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B.E / SEM II / EXTC / Choice Base 22/11/19

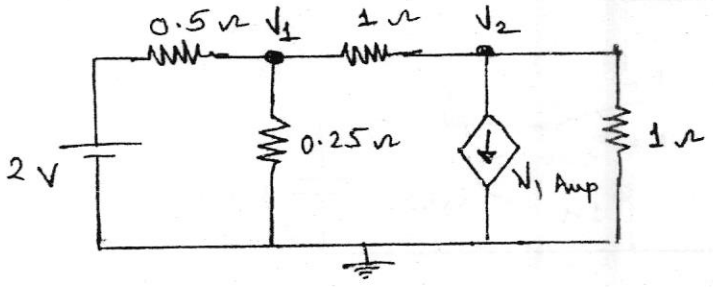
Paper / Subject Code: 51204 / Circuit Theory and Networks

[Time: 3 Hours] **[Total Marks: 80]**

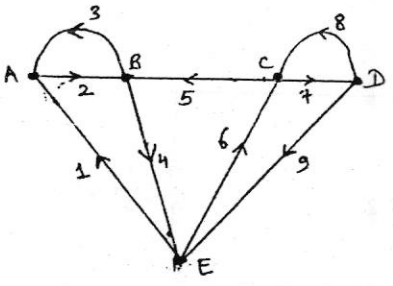
N.B.: 1. Question no.1 is compulsory.

2. Attempt any three from remaining 5 questions.

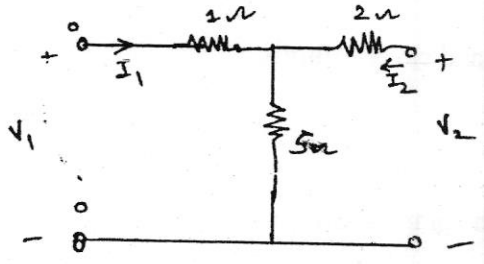
Q1 **a)** Determine the node voltages V1 and V2 by Nodal Analysis. **5**



b) Find incidence Matrix (A) for the graph shown in figure. **5**



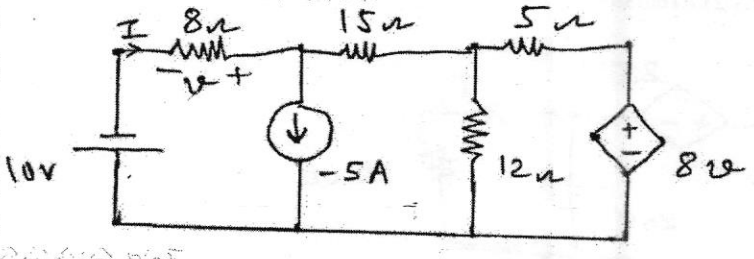
c) Find the transmission parameters [A, B, C, D] for the network shown in the fig. **5**



d) Test whether F(s) is a positive real function **5**

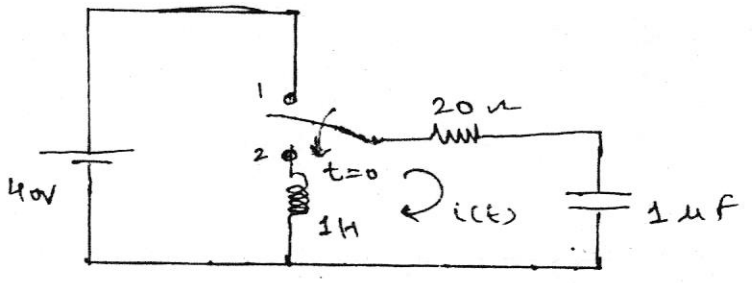
$$F(s) = \frac{s^3+6s^2+7s+3}{s^2+2s+1}$$

Q2 **a)** Find the current 'I' in 8Ω resistor by superposition theorem. **10**

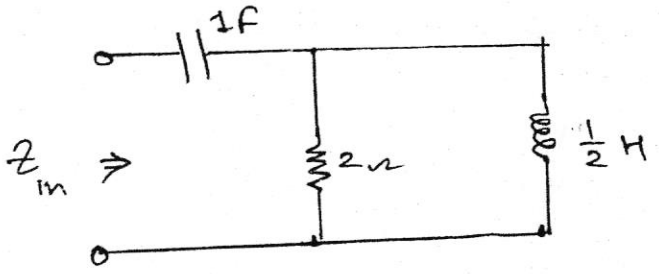


b) The switch in the circuit shown is charged from position '1' to position '2' at t=0. Steady state conditions having reached before switching. Find the values of 5

$$i, \frac{di}{dt} \text{ and } \frac{d^2i}{dt^2} \text{ at } t = 0^+$$



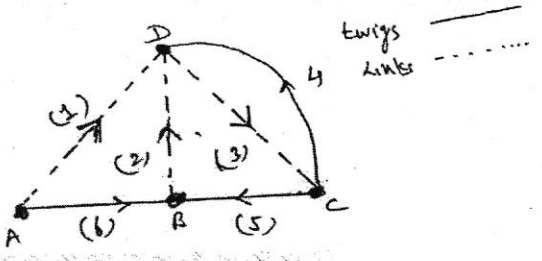
c) Determine the driving point impedance function $z_{in}(s)$ for the Network shown in fig. and also draw pole-zero plot. 5



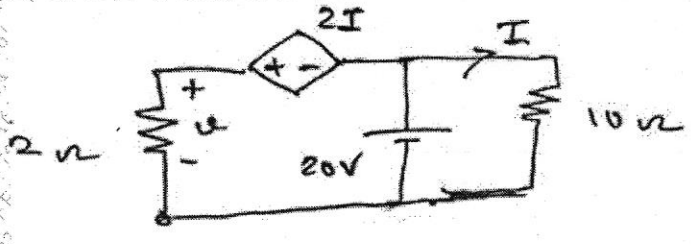
Q3 a) Synthesize z(s) into Foster -1 and cauer-1 forms. 10

$$z(s) = \frac{s^2 + 12s^2 + 32s}{s^2 + 7s + 6}$$

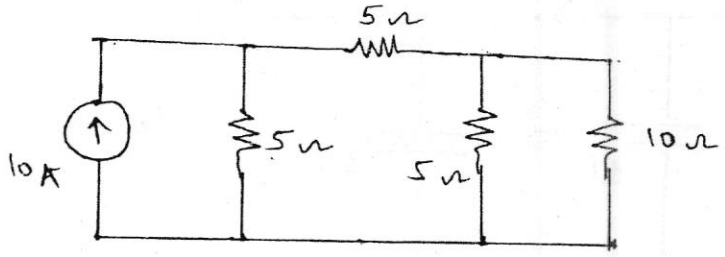
b) Determine f-loop matrix for the graph shown in fig. 5



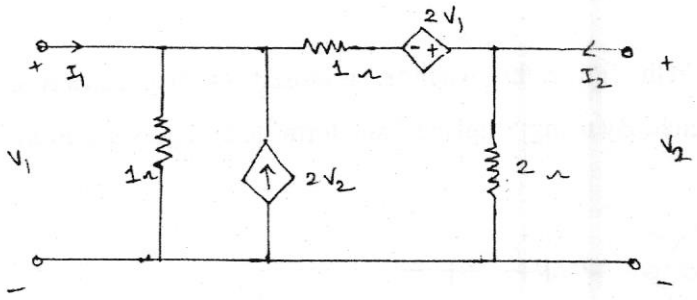
c) Find voltage across 2Ω resistor. 5



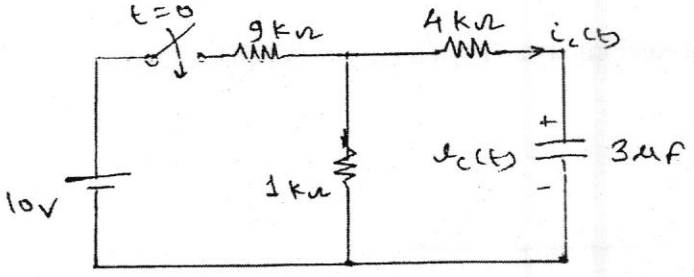
Q4 a) Write f-cut set matrix for the circuit shown and hence obtain matrix Node equation using Graph Theory. **10**



b) For the Network shown in the figure determine z and y parameters. **10**



Q5 a) In the figure shown the switch is closed at t=0 with no initial charge on the capacitor. Determine $v_c(t)$ and $i_c(t)$ for $t \geq 0$ **10**

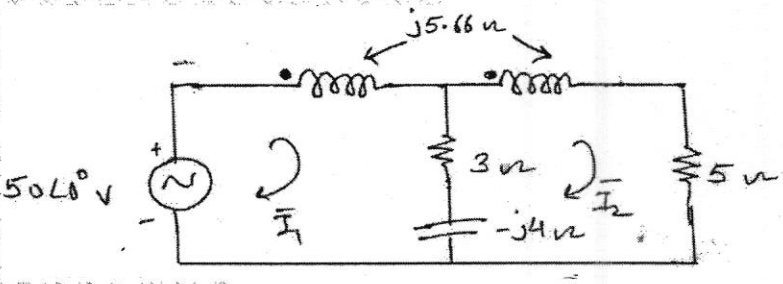


b) Test the following for Hurwitz polynomial **5**

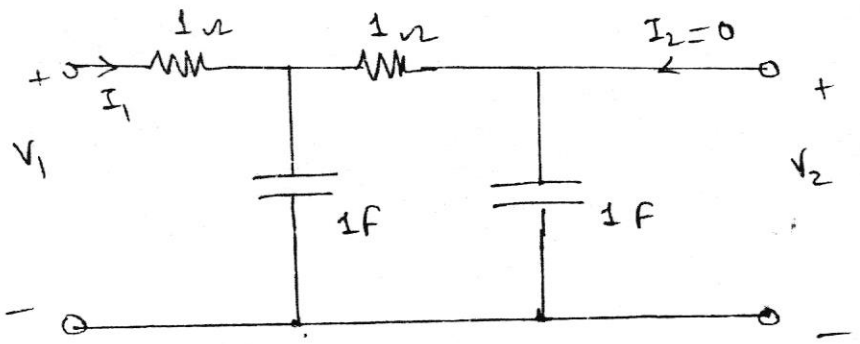
i. $P(s) = s^6 + 3s^5 + 8s^4 + 15s^3 + 17s^2 + 12s + 4$

ii. $P(s) = s^5 + s^3 + s$

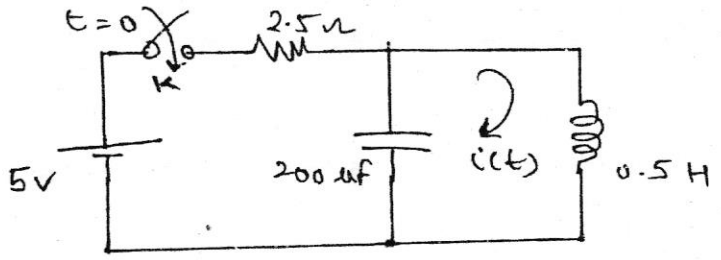
c) Write Mesh equations for the magnetically coupled circuit shown in fig. **5**



Q6 a) Determine $\frac{V_2}{I_1}, \frac{V_2}{V_1}$ for the network shown in the figure. 10



b) For the circuit shown in the figure, the switch 'K' is closed at t =0 and steady state is attained before closing the switch. By using 'Laplace Transform' techniques determine i(t) for $t \geq 0$. 5



c) Derive the condition of Reciprocity and symmetry for ABCD parameters. 5

26-11-2019

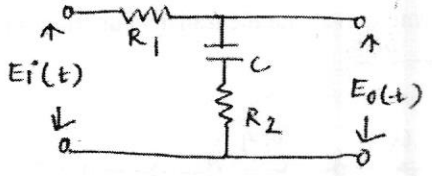
S.E. /ExTc/ choice based / sem - III

(3hours) Marks:80

N.B:

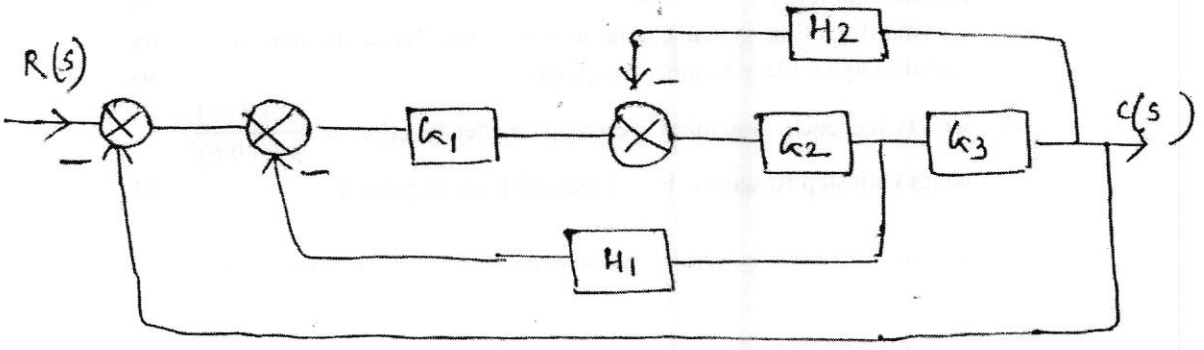
(1) Attempt **four** questions. question **no:1** is Compulsory.
(2) Assume suitable data wherever required.
(3) Answers to the questions should be grouped together.
(4) Figure to the **right** of question indicates **full** marks.

1. Attempt **all:** **20M**
   (a) Derive an expression for the resistance using Wheatstone bridge for balanced condition
   (b) Find the transfer function of the given electrical network



   (c) Explain various criteria for selection of transducers
   (d) Compare analog and digital Data Acquisition system.
   (e) Check whether the given system is stable
   $s^5 + s^4 + 2s^3 + 2s^2 + 3s + 15 = 0$

2.
   (a) Describe how Q meter is used for measurement of low impedance. Also List the various sources of errors in Q meter. **10**
   (b) Using Block diagram reduction techniques, find closed loop transfer function **10**



3

(a) Sketch the root locus of a unity feedback control system with $G(s) = \frac{K}{s(s+4)(s+6)}$ and determine the value of k for marginal stability **10**

(b) A Unity feedback control system has $G(S) = \frac{10}{s(1+0.4s)(1+0.1s)}$, H(s)=1 **10**

Draw the bode plot and predict stability

4

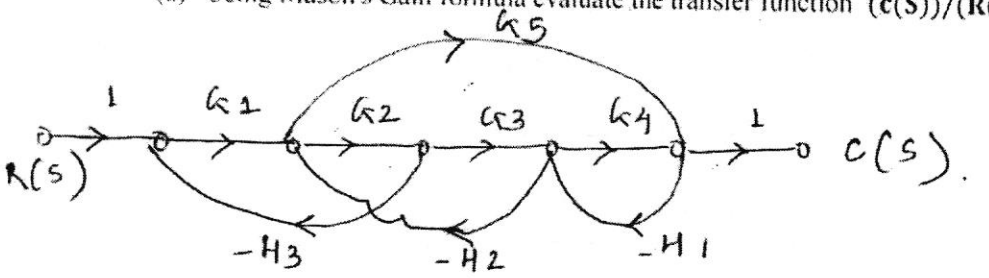
(a) Explain basic telemetry system. **05**

(b) For Unity Feedback system $G(s) = \frac{k}{s(1+0.4s)(1+0.25s)}$, find range of K ,marginal value of K and frequency of sustained oscillation . Using Routh's criterion. **05**

(c) Explain with neat diagram working principle of LVDT and Explain advantages and disadvantages of LVDT **10**

5

(a) Using Mason's Gain formula evaluate the transfer function **(c(S))/(R(s))** **10**



(b) Explain Kelvin's double Bridge and its application for measurement of low resistance and derive expression for unknown resistance. **10**

6

(a)

(i) Compare the temperature transducers with respect to their characteristics and measurement range **05**

(ii) How stability of the system can be analyzed using Nyquist criterion **05**

(iii) Explain Digital Data Acquisition system **05**

(iv) A unity feedback systemhas open loop transfer function as $\frac{(1+0.4s)}{s(s+0.6)}$. Obtain Unit step Response, Rise Time and Peak overshoot **05**

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SE (EXTC) | Sem – IV | Choice Based

4/12/2019

(3 Hours) **[Total Marks: 80]**

N.B.: 1) Question No. 1 is Compulsory.
2) Answer any THREE questions from Q.2 to Q.6.
3) Figures to the right indicate full marks.

1) a) If $A = \begin{bmatrix} 2 & 4 \\ 0 & 3 \end{bmatrix}$ then find the eigen values of $6A^{-1} + A^3 + 2I$ [05]

b) Determine whether the given vectors u= (-4,6,-10,1),v= (2,1,-2,9) are orthogonal with respect to the Euclidean inner product [05]

c) The probability density function of a random variable x is zero except at x =0, I, 2 and

$p(0) = 3\alpha^3$, $p(1) = 4\alpha - 10\alpha^2$, $p(2) = 5\alpha - 1$. Find α [05]

d) Evaluate $\oint_c \frac{z+6}{z^2-4} dz$ where c is (i) $|z| = 1$ (ii) $|z-2| = 1$. [05]

2) a) Using Rayleigh-Ritz method, find an appropriate solution for the extremal of the functional

$I = \int_0^1 \left[2xy - y^2 - y'^2 \right] dx$ given y(0)=y(1)=0 [06]

b) Using Cauchy's Residue theorem evaluate $\int_0^{2\pi} \frac{d\theta}{5 + 4\cos\theta}$ [06]

c)A random variable X has the probability distribution given below:

X=x	-2	3	1
P(X=x)	1/3	1/2	1/6

Find i) the moment generating function ii) the first four moments about the origin [08]

3) a) Compute $A^9 - 6A^8 + 10A^7 - 3A^6 + A + I$ where $A = \begin{bmatrix} 1 & 2 & 3 \\ -1 & 3 & 1 \\ 1 & 0 & 2 \end{bmatrix}$ [06]

b) Verify Cauchy –Schwartz inequality for the vectors u=(-4,2,1) &v=(8,-4,-2) [06]

c) Obtain Taylor's or Laurent's series expansion of the function $f(z) = \frac{1}{z^2 - 3z + 2}$ when

(i) $|z| < 1$ (ii) $1 < |z| < 2$ [08]

4) a)Obtain the equation of the line of regression of Y on X for the following data and estimateY when X = 73 [06]

X	70	72	74	76	78	80
y	163	170	179	188	196	200

b)Show that the functional $\int_{x_1}^{x_2} \left[y^2 + x^2 y' \right] dx$ assumes extreme values on the straight line y = x [06]

c)Let R^3 have the Euclidean inner product.Use the Gram-Schmidt process to transform the basis vectors $u_1=(1,0,0), u_2=(3,7,-2), u_3=(0,4,1)$ in to an orthonormal basis [08]

5) a)Evaluate $\int_c \frac{1}{z} \cos z \, dz$ where c is the ellipse $9x^2 + 4y^2 = 1$ [06]

b) Seven dice are thrown 729 times. How many times do you expectat leastfour 10 dice to show three or five? [06]

c) Show that the matrix $A = \begin{bmatrix} -9 & 4 & 4 \\ -8 & 3 & 4 \\ -16 & 8 & 7 \end{bmatrix}$ is diagnosable. Find the diagonal form D and the diagonalaising matrix M. [08]

6) a) A continuous random variable X has the p.d.f. defined by $f(x) = A + Bx, 0 \le x \le 1$. If the mean of the distribution is $\frac{1}{3}$ find A and B [06]

b) Find e^A, if $A = \begin{bmatrix} \frac{3}{2} & \frac{1}{2} \\ \frac{1}{2} & \frac{3}{2} \end{bmatrix}$ [06]

c) Evaluate $\int_{-\infty}^{\infty} \frac{x^2 dx}{(x^2 + a^2)(x^2 + b^2)} \quad (a > 0, b > 0)$ [08]

****

$33 + 10 = 43$

SE|Extc|Sem-IV| Choice based

9|12|2019

(3 Hours) **[Total Marks: 80]**

N.B. (1) Question **No. 1** is **compulsory.**
(2) Solve any **three** questions from remaining **five** questions.
(3) **Figures** to the right indicate **full marks.**
(4) Assume suitable data if necessary and mention the same in answer sheet.

1. (a) State biasing techniques of Enhancement Type MOSFET and explain any one technique in detail. **05**
   (b) Explain Transformer Coupled Amplifier and give its Advantages and Disadvantages. **05**
   (c) Define efficiency for a Power Amplifier and write the expression for the same. State the efficiency of Class A, Class B and Class C Amplifiers respectively. **05**
   (d) Give the basic principle of an Oscillator. State the types of Oscillators. **05**

2. (a) Design a two stage RC coupled CS – CE Amplifier to meet following specifications: $A_v \geq 750$, $S \leq 10$, $R_i \geq 1\ M\Omega$, $V_{cc} = 10\ V$. Assume the following data: $\beta_{typ} = 290$, $h_{ie} = 4.5k\Omega$, $g_{mo} = 5000\mu\mho$, $I_{DSS} = 7mA$, $r_d = 50k\Omega$, $V_P = -4V$. **15**
   (b) List various negative feedback topologies. Sketch any one topology. **05**

3. (a) Sketch Circuit Diagram, AC equivalent Model and Derive expressions for Input impedance, Output Impedance, Voltage Gain and Current Gain of a two stage CE Amplifier. **10**
   (b) For a 'n' stage cascaded amplifier, show that overall lower 3 dB cut – off frequency is $f_{LT} = \frac{f_L}{\sqrt{2^{1/n}-1}}$ and overall higher frequency is $f_H' = f_H\left(\sqrt{2^{1/n}-1}\right)$. **10**

4. (a) Draw a neat diagram of Class AB power Amplifier and explain its working. **10**
   (b) What is Cascode Amplifier? Explain in detail. **10**

5. (a) Draw RC phase shift oscillator using BJT and derive the frequency of oscillation for same. **10**
   (b) Enumerate the effects of negative feedback on Gain, Bandwidth, Distortion, Input and Output Impedance. **10**

6. (a) Compare Small Signal and Large Signal Amplifer. **05**
   (b) Calculate frequency of Oscillation for Hartley Oscillator if L_1 =5mH, L_2 = 2mH and C = 0.5 μF. **05**
   (c) Explain the concept of Heat Sink in detail required for Power Amplifiers. **05**
   (d) Sketch Symbol of n-channel and p-channel Depletion MOSFET. State giving reasons, why it is known as depletion MOSFET? **05**

SE EXTC SEM IV CHOICE BASED 11/12/2019

(3 Hours) Marks: 80

N.B. : (1) Question No. 1 is compulsory.
(2) Solve any three questions from the remaining five
(3) Figures to the right indicate full marks
(4) Assume suitable data if necessary and mention the same in answer sheet.

Q.1 Attempt the questions.

a) In the circuit given in Fig. 1(a) if the voltage V+ and V- are to be amplified by the same factor, the value of R should be_____. **[01]**
i) 3.3k ii) 33k iii) 330 Ω iv) None of these.
Justify. **[04]**

b) If the input to the ideal comparator shown in Fig. 1(b) is a sinusoidal signal of 8 volt peak to peak without any DC component, then the duty cycle of the output comparator is _____. **[01]**
i) 33.33% ii) 25% iii) 20% iv) None of these.
Justify. **[04]**

c) What is the frequency of IC 555 astable multivibrator shown in Fig. 1(c)? **[01]**
i) 241 Hz ii) 178 Hz iii) 78 Hz iv) 8 Hz.
Justify. **[04]**

d) An amplifier using OPAMP with slew rate SR = 1 V/μs has a gain of 40 dB. If this amplifier has to amplify sinusoidal signal of 20 kHz faithfully without any slew rate induced distortion, then the input signal must not exceed_____. **[01]**
i) 795 mV ii) 395 mV iiii) 79.5 mV iv) 39.5 mV.
Justify. **[04]**

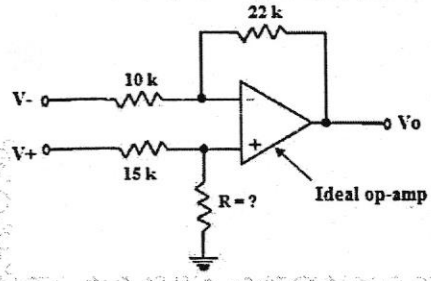

Fig. 1(a)

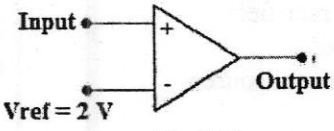

Fig. 1(b)

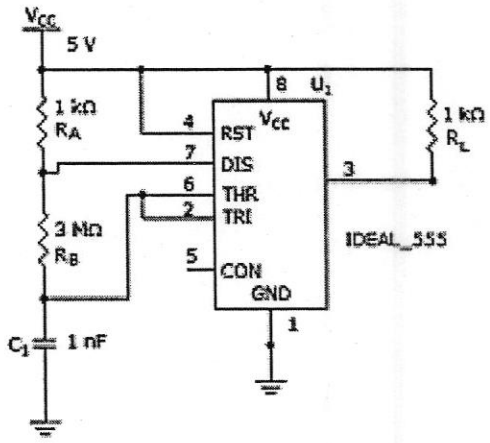

Fig. 1(c)

Q.2 a) Sketch the implementation of an instrumentation amplifier using three opamps and explain its operation. **[10]**

b) Compare ideal and practical opamp. **[5]**

c) Explain current foldback protection in voltage regulators. **[5]**

Q.3 a) Design a Schmitt trigger circuit to convert 5V, 1kHz sinusoidal signal to square wave using 741IC, $V_{UT} = 0.8$ V, $V_{LT} = -0.8$ V and $\pm V_{sat} = \pm 11$ V. Draw its transfer characteristics, input and output waveforms. **[10]**

b) With the help of circuit diagram, derive the expression of output analog voltage for a weighted resistor DAC. **[10]**

Q.4 a) Design an IC 555 astable multivibrator for an output frequency 1 kHz and a duty cycle of 60%. **[10]**

b) With the help of a functional block diagram explain the working of voltage regulator LM317 to give an output voltage variable from 6 V to 12 V to handle maximum load current of 500 mA. **[10]**

Q.5 a) Design a Wein Bridge oscillator using opamp to oscillate at a frequency of 965 Hz and explain the working of Wein bridge oscillator. **[10]**

b) List and explain the various performance parameters of DAC. **[10]**

Q.6 **Short notes on: (Attempt any four)** **[20]**

a) Comparison of linear and switching regulators.
b) Active filters using opamp
c) Precision rectifiers
d) PLL IC 565
e) Widlar current source

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S.E. (EATC) Sem-IV Choice Base 13/12/2019

3 Hours **Total marks: 80**

- Question no. 1 is compulsory
- Attempt any Three questions from remaining

Q1. Answer any 4 questions from the given questions: **20**

a. If system matrix A= [-3, 1 ; -2, 0] find the sate transition matrix.

b. Find the fundamental frequency of the signal

$$x(t) = \cos\left(\frac{10\pi}{3}t\right) + \sin\left(\frac{5\pi}{4}t\right)$$

c. Explain the application of Signals and System in Multimedia Processing.

d. i. Express the signals shown in Fig 1 in terms of unit step function

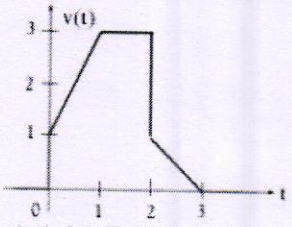


Fig. 1

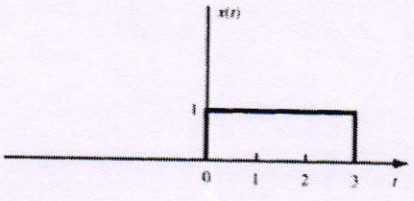
ii. Explain Energy and power of a signal.

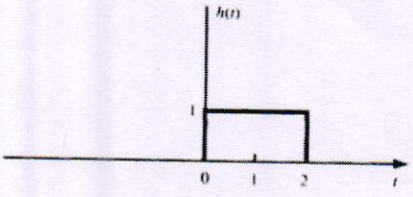
e. Test the given system for linearity, causality, stability, memory and time variant.

$$y(t) = x(t^2)$$

f. Explain the application of Signals and System in Multimedia Processing.

Q2. Evaluate $y(t) = x(t) * h(t)$, where $x(t) = u(t) - u(t-3)$ and $h(t) = u(t) - u(t-2)$ **20**
(a) by an analytical technique, and (b) by a graphical method.





Q3.a. Determine the sequence x[n] associated with Z-Transform using residue method. **10**

$$X(z) = \left\{\frac{(1-e^{-a})z}{(z-1)(z-e^{-a})}\right\}$$

b. State and Prove *Parseval's* Theorem with respect to DTFT. **10**

Q4.a. Determine the state model of the system governed by the equation **10**
y[n]= -2y[n-1]+3y[n-2]+0.5y[n-3]+2x[n]+1.5x[n]+1.5x[n-1]+2.5x[n-2]+4x[n-3]

b. Find Fourier series for $f(x)=x^3$ $(-\pi,\pi)$ **10**

Q5.a Determine DTFS for the sequence $x(n)= \cos^2((\pi/8)n)$ **8**

b. Find Laplace transform of $\frac{d}{dt} sin(t)\, u(t)$. **8**

c. Find Inverse Laplace transform using convolution **4**

$$L^{-1} = \{\frac{s^2}{(s^2 + a^2)(s^2 + b^2)}\}$$

Q6. Write short note on any **two**: **20**

a. Feedforward Control system

b. ROC in Z-Transform and Laplace Transform

c. Relation of ESD, PSD with auto-correlation

$23 + 10 = 33$

17/12/2019

S E (Extc) sem-IV C.B.C.S. Dec-2019
(Choice Base)

Time 3 Hrs. Total Marks: 80

Instructions: 1) Question Number 1 is compulsory.
2) Attempt any three from remaining questions.
3) Use suitable data whenever is required.

Q1	Solve **Any Four**	20 Marks
a	Compare FM and AM.	
b	Explain the necessity of De-emphasis and pre-emphasis in Frequency Modulator.	
c	Define and explain Selectivity and Sensitivity for Radio Receiver.	
d	What is Aliasing? How it can be prevented?	
e	What is Time Division Multiplexing? Also give its applications.	
Q2		
a	Explain balanced modulator using diode for the generation of DSBSC AM signal.	10 Marks
b	How to Generate SSB using filter method?	10 Marks
Q3		
a	List types of noise and explain any four types of internal noise.	5 Marks
b	What do you mean by Noise factor and noise figure. How it can be improved?	5 Marks
c	Draw the block diagram of super- heterodyne receiver and explain the operation. Write frequency components present at the output of each block if audio frequency is 1 KHz and carrier frequency is 540 KHz	10 Marks
Q4		
a	With the help of neat diagram and waveforms explain generation and demodulation of Pulse position modulation	10 Marks
b	A carrier wave of frequency 100 MHz is frequency modulated by sine wave of amplitude 20 volts and frequency 100 KHz. The frequency sensitivity of the modulation is 25 KHz per volt. Determine the approximate bandwidth of FM wave using Carson's rule.	5 Marks
c	A 360 W carrier is simultaneously Amplitude modulated by two audio waves with modulation percentages of 55 and 65 respectively. What is the total sideband power	5 Marks
Q5	Write Short note on **(Any Four)**	20 Marks
a	Frequency Division Multiplexing	
b	Double Spotting and Fidelity of Radio Receiver	
c	Wide Band and Narrow Band FM	
d	Applications of pulse communication	
e	ISB Receiver	
Q6		
a	Describe Foster-seeley Discriminator with a neat circuit diagram and explain its principle with necessary Equations. What are its merits and Demerits?	10 Marks
b	Explain generation of Frequency Modulated wave using Armstrong Method	10 Marks

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Paper / Subject Code: 32201 / Microprocessor & Peripherals Interfacing 15/11/19

TE/EXTC/SEM V/CBCS

(3 Hours) Total Marks-80

N.B.: 1. Question No: 1 is compulsory.

2. Solve any three questions out of remaining questions.

3. Assume suitable data where necessary.

Q 1] a) Explain the instruction pipelining features of 8086.Give its advantages and its disadvantages. **05M**

b) Write a program to display message "TE EXTC" on IBM PC. Use INT 21h function, AH=09 with string of message at DS: DX and terminated by "$". **05M**

c) Differentiate between Assembler and Compiler. **05M**

d) If 16k RAM (2 chips of 8k each) are interfaced with 8086.Assuming that physical address of RAM is 00000H,what will be starting and ending address of each chip? **05M**

Q 2] a) Explain Maximum Mode of 8086 microprocessor. Draw the timing diagram for read operation in maximum mode. **10M**

b) Write a program in assembly language for 8086 microprocessor to find power of a number. Number and power is stored at location 4000h & 4001h respectively. Store the result at location 4002h and 4003h. **10M**

Q 3] a) Explain various operating modes of 8255 PPI. **10M**

b) Draw and explain the block diagram of microprocessor based system in detail. **10M**

Q 4] a) Draw and explain interfacing of Math Co-processor (8087) with 8086. **10M**

b) Draw and explain 8086 based Data Acquisition System. **10M**

Q 5] a) Explain the Interrupt structure of 8086 microprocessor. **10M**

b) Write a program in assembly language for 8086 microprocessor to arrange a block of data 10- numbers in ascending order. **10M**

Q 6] a) Design an 8086 based system with 32K ROM (2 chips of 16K). Draw the memory map of the system designed. **10M**

b) Write a short note on String Instructions of 8086. **10M**

TE (IT) (CBGS) 19/11/19

Time: 3 Hours **Marks: 80**

NB. 1. Question No. **1** is **compulsory**.
2. Attempt **any three** out of remaining five questions.
2. Figures to right indicate full marks.
3. Assume data wherever required and state it clearly.

Q1 20

a) When are two events said to be independent? What is the joint probability of two independent events?

b) What is an optimum receiver and what is it optimized for?

c) Prove $H_{max} = \log_2 M$.

d) Estimate Nyquist rate and Nyquist interval for the signal $10\cos(2000\pi t)\cos(4000\pi t)$ based on low pass sampling theory.

e) For impulse responses $g^1=\{1,0,0\}$, $g^2=\{0,1,0\}$, $g^3=\{1,0,1\}$ design the state diagram.

Q2

a) A discrete memoryless source has an alphabet of six symbol with their probabilities as shown:

Symbol	M_1	M_2	M_3	M_4	M_5	M_6
Probability	1/2	1/4	1/8	1/16	1/32	1/32

i) Determine the Minimum Variance Huffman code-words and average code-word length and hence find Entropy of the system,

ii) Verify the average code-word length using Shannon Fano,

iii) Compare and comment on the results of both. 10

b) A convolution encoder has a constraint length of 3 and code rate of 1/3. The impulses for each are $g^1=100$ $g^2=101$ $g^3=111$. Draw

i) encoder

ii) state diagram

iii) code transfer function

10

Q3

a) What is PDF? How do we get PDF from probability distribution function? 10

b) What is matched filter? Derive the expression for its output SNR. 10

Q4

a) For a systematic linear block, the three parity check digits, C3, C2, C1 are given by:

$C3 = d1 \oplus d2 \oplus d3$

$C2 = d1 \oplus d2$

$C1 = d1 \oplus d3$

i) Find Generator matrix using which find out the code-words of 110 and 010 ,

ii) Determine the error correcting and detecting capability of system,

iii) Prepare suitable decoding table and find transmitted message for received code 101100 and 000110.

10

b) Sketch the encoder and syndrome calculator for the generator polynomial $g(x)=1+x^2+x^3$ and obtain the syndrome for the received code-word 1101011. 10

Q5

a) Discuss QPSK signalling. Derive the bit error probability due to PSK receiver. 10

b) Represent the given data sequence 110011010011 with help of neat waveforms in
   i) Manchester format
   ii) NRZ
   iii) AMI-RZ
   iv) RZ
   10

Q6

Explain with the required diagrams **(Any Three):** 20

i) Compare BPSK and QPSK
ii) Modified duo-binary encoder
iii) Gram- Schmidt orthogonalization procedure
iv) Define the following terms and give their significance

(i) Systematic and Non-systematic codes (ii) Code rate
(iii) Hamming distance (iv) Hamming weight

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T.E/EXTC/SEM V/CBCGS (Choice based) 21/11/19

(3 Hours) (Total Marks : 80)

N.B.: 1. **Q. No. 1 is compulsory.**
2. Attempt **any three** out of the remaining **five** questions.
3. Assume suitable **data.**

Q1. Attempt any **FOUR :** (20)

a) Write a short note on memristor.

b) A circular loop conductor having a radius of 0.15 m is placed in the x-y plane. This loop consists of a resistance of 20 Ω. If magnetic flux density is $\mathbf{B} = 0.5 \sin 10^3 t\, \mathbf{a}_z$ (Tesla) find the current flowing through this loop.

c) Derive Poisson's and Laplace's equation.

d) Derive continuity equation.

e) State and explain Gauss's law.

f) Define and explain the significance of vector magnetic potential.

Q2.a) Evaluate both sides of the divergence theorem for the field $\mathbf{D} = 2xy\, a_x + x^2\, \mathbf{a}_y$ (C/m^2) and a rectangular parallelepiped formed by the planes x=0 to 1, y= 0 to 2, z= 0 to 3. (10)

b) Derive expression to find magnetic field intensity due to infinite long straight conductor on z-axis by Biot- Savart law. (10)

Q3. a) Derive Maxwell's equation for time varying fields in point and integral form and explain its significance. (10)

b) Define reflection coefficient, transmission coefficient and standing wave ratio. For normal incidence, determine the amplitudes of reflected and transmitted electric and magnetic fields **E** and **H** at interface of two regions at z=0. Given: Incident Ei= 1.5 x 10^{-3} V/m. $\varepsilon_{r1} = 8.5$, $\mu_{r1} = 1$, $\sigma_1 = 0$. Second region is free space. (10)

Q4. a) State Poynting theorem. Derive mathematical expression for Poynting theorem and explain the meaning of each term. (10)

b) In free space, $V = 6xy^2z + 8$. Find electric field intensity **E** and volume charge density ρ_v at point P (1, 2,-5). (10)

Q5. a) A lossless transmission line with $Z_0 = 50\ \Omega$ is 30 m long and operates at 2 MHz. The line is terminated with a load $Z_L = 60 + j40\Omega$. If $v = 0.6$ c on the line, find reflection coefficient, standing wave ratio and input impedance.Use analytical method and Smith chart method. (10)

b) Derive boundary conditions for electrostatics and magnetostatics. (10)

Q6. Write short notes on any **FOUR :** (20)

a) Inkjet Printer.

b) Microstrip lines.

c) Graphene.

d) Wave propagation in free space.

e) Electric Dipole.

f) Skin effect.

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25/11/19

T.E / SEM V / Choice Based · EXTC

(3 Hours) **Total Marks: 80**

Note the following instructions.

1. Question **No.1** is **compulsory**
2. Attempt **any three** questions from remaining **five** questions
3. Solve in **total four** questions
4. Assume suitable data wherever necessary, justify the same
5. **Figures** to the **right** indicate **full marks**.

1 a. Compare IIR and FIR digital filters [4]

b. State and prove time shifting property of DFT [4]

c. Compare general purpose and special purpose DSP processors [4]

d. Explain limit cycles in IIR digital filters [4]

e. A digital filter has the following impulse response identify the type of filter from pole zero plot. $h(n) = 0.8\,\partial(n) + 0.36(-0.8)^{n-1}u(n-1)$ [4]

2 a. Using BLT method of IIR filter design. Design a digital Butterworth HPF, monotonic in passband with 3dB frequency of 1000 Hz and down at 10 dB at 350 Hz. The sampling frequency is 5000 Hz [10]

b. Transform analog filter transfer function H(s) given below in to digital filter transfer function H(z) using Impulse Invariance Transformation method with T= 1 sec. $H(s) = \frac{0.5(s+4)}{(s+1)(s+2)}$ [5]

c. Explain the effect of coefficient quantization (truncation and rounding) on IIR filter. [5]

3 a. Design an FIR bandpass filter to meet following specification using frequency sampling method. [8]

i. Cutoff Frequencies = 1000 Hz and 3000 Hz,
ii. Sampling Frequency = 8000 Hz,
iii. Length of filter N=7

b. The unit sample response of a system is h(n) = {1, 2} use overlap-save method of linear filtering to determine output sequence for the repeating input sequences x(n) = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10} [7]

c. One of the zero of an antisymmetric linear phase FIR filter lies at z = 0.5, find the location of the other zeros and hence find the transfer function and impulse response of the filter. [5]

4 a. For the sequences, x[n] ={ 1, 2, 4, 5}, p[n]={6, 3, 6, 9} & q(n) ={ 1, -2, 4,-5} [8]

i. Find X[k] using DFT.
ii. Find P[k] using X[k] only.
iii. Find Q[k] using X[k] only.

where x[n], p[n], q[n] and X[k], P[k], Q[k] are DFT pairs respectively

b. Design a digital FIR low pass filter using Hamming window for following specification, Cutoff frequency= 500 Hz, Sampling frequency = 2000 Hz, Order of filter = 10 [7]

c. Compare the truncation and rounding errors using Fixed point and Floating point representation [5]

5 a. If x(n) = {1, 1, 2, 2, 3, 3, 4, 4 }, Find X(K) using DIF-FFT algorithm. Compare computational complexity of above algorithm with DFT. [8]

b. Find DFT of the sample data sequence x(n) = { 1, 1, 2, 2, 3, 3} and compute the corresponding amplitude and phase spectrum [7]

c. Explain DTMF detection using Goertzel algorithm [5]

6. Write short notes on **any Two** [20]

a. Effect of finite word length in digital filters

b. Architecture of TMS320C67XX digital signal processor

c. Application of DSP for Radar signal processing

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27-11-2019

T.E. / ExTc / choice based / Sem - V

Duration :3hrs **Max.Marks:80**

(1) Question No. 1 is compulsory.

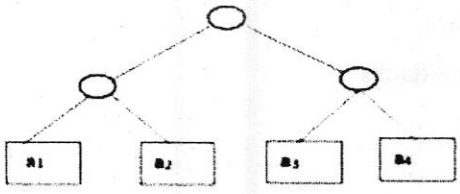
(2)Attempt any three questions out of remaining five.

(3)Figures to the right indicate full marks.

(4)Assume suitable data if required and mention the same in answer sheet

1.Solve **Any Four** **20**

a) For the Huffman Tree shown below show the root node, branch nodes and the siblings. Find the code for a_1,a_2,a_3 and a_4 from the tree. If average length of the code is 2bits/symbol and Entropy is 1.985bits/symbol. Calculate Redundancy and Efficiency of the code.



b) Using LZW algorithm encode the sequence **BABACABABA**

c) Encrypt the plain Text "MEET ME" using the key 421635.name the type of ciphering used here.How does it differ from Substitution ciphering

d) For a frame size of 640x480(WxH) at a colour depth of 24 bits and frame rate of 25 frames per second calculate all the important properties of Digital Video

e) Define Euler's theorem and Euler's Totient function and find $\phi(35)$

2. a) Encode **aabc** in the alphabet {a,b,c,d.....j} using adaptive Huffman coding algorithm, given the fixed length code for a=000, b=001, c=010 and d=100 **10**

b) State the difference between JPEG and JPEG 2000.State the applications advantages and limitations of JPEG 2000,Name the file name extension. **10**

3. a) Explain DPCM and ADPCM used in audio compression **10**

b) Illustrate with a neat sketch Frame sequence of MPEG compression and H.261.How do they differ in their quantization procedure and file name extension **10**

4 a) What are the essential ingredients of symmetric cipher? explain 10

b) Explain the working of DES, How long is the DES key? 10

5. a) What characteristics are needed to secure Hash function? What is the role of compression function in Hash function ? 10

b) Explain RSA algorithm 10

6.Write short note on **(Any Four)** 20

a) SSL architecture

b)Fermat's theorem

c)Kerberos

d)Digital Signature

e)Cryptographic Attacks

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TE | Extc | Sem-VI | Choice Base

Date:- 3/12/2019

(Time: 3 Hours) [Marks: 80]

N.B. : (1) Question No. 1 is **compulsory**.

(2) Solve any **three** questions from the remaining **five**

(3) **Figures** to the **right** indicate **full** marks

(4) Assume suitable data if necessary and mention the same in answer sheet.

Q.1 a) Draw and explain Program Status Word register of 8051. [5]
b) Explain 8051 Assembler directives. [5]
c) List the features of ARM7. [5]
d) Explain following ARM instructions: [5]
1) AND R1, R1, #5
2) LDR R0, [R2]
3) EOR R1, R0, #1
4) MVN R2, #05
5) ADD R2, R3, R3, LSL #2

Q.2 a) Draw & Explain Internal memory organization of 8051 microcontroller. [10]
b) Write a program to copy the value 55H into RAM memory locations 40H and 41H using : [10]
(a) direct addressing mode,
(b) register indirect addressing mode without a loop, and
(c) with a loop.

Q.3 a) Draw and explain the interrupt structure of 8051. [10]
b) Interface LCD to 8051 and write a program to display the message "LCD" on it. Draw the connection diagram of 8051 with LCD. [10]

Q.4 a) Explain Serial communication of 8051 with the help of SCON register. [10]
b) Draw & Explain data flow model of ARM7. [10]

Q.5 a) Explain Addressing modes of ARM7 Processor with example in each. [10]
b) Write assembly language program of ARM to implement following equation: [10]

$$R0 = 3xR1 + 17xR2$$

Without using multiply or multiply and accumulate instruction. Show calculation.

Q.6 a) Explain the implementation of stack in ARM using load-store instructions. [10]
b) Suppose a LED is interface with P0.0 of ARM. Write embedded C language program to blink this LED with certain delay. Software generated delay may be used. [10]

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5/12/2019

TE | Extc | Choice Based | Sem – VI

(3 Hours) [Total Marks: 80]

N.B.: (1) Question No. **1 is compulsory**.
(2) Solve any **three questions** from the **remaining five**
(3) Figures to the right indicate full marks
(4) Assume suitable data if necessary and mention the same in answer sheet.

Q.1 Attempt any 4 questions [20]
a) Explain the persistent strategies of CSMA.
b) Compare between distance vector routing and link state routing.
c) The following is a dump of a TCP header in hexadecimal format :
05320017 00000001 00000000 500207FF 00000000
i) What is the source port number?
ii) What is the destination port number?
iii) What is the length of the header?
iv) What is the type of segment?
v) What is the window size?
d) What is data transparency? How it can be overcome using bit stuffing.
e) Explain Connection establishment in TCP using three way handshaking.

Q.2 a) Explain the OSI-RM model and functions of each layer. [10]

b) Explain in detail the Physical media used for computer communication. [10]

Q.3 a) Explain the various types of frames in HDLC. [10]
b) Explain Go-Back-N ARQ and Selective Repeat ARQ. [10]

Q.4 a) Discuss various Scheduling methods used in Medium access control. [10]
b) An organization is granted the block 211.17.180.0/24. The administrator wants to create 32 subnets. [5]
i) Find the subnet mask.
ii) Find the number of addresses in each subnet.
iii) Find the first and last address in subnet 1.
iv) Find the first and last addresses in subnet 32.

c) Explain Quality of service in terms of flow characteristics. [5]

Q.5 a) Explain the different error reporting messages in ICMP with message format. [10]
b) Explain the features of TCP. [5]
c) List and explain various Timers in TCP. [5]

Q.6 Short notes on: (Attempt any Two) [20]
a) Congestion control in TCP.
b) IPV4 Header.
c) DSL.

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TE EXTC SEM VI CHOICE BASED 10/12/2019

(3 Hours) [Total Marks : 80]

Note: Question no. 01 is compulsory, solve any thee questions from the remaining questions. Assume suitable data if required, figures to the right indicate full marks.

Q.1: (Solve any four questions.)

a) Explain Polarization of antenna. 5

b) What are the feed mechanism of Microstrip antenna, explain any one. 5

c) Explain single wire radiation mechanism. 5

d) Describe five controls of array antenna. 5

e) Derive the expression for FRIIS transmission equation. 5

Q2: a) With neat sketch, describe formation and detachment of electric field lines for short dipole. 10

b) With neat sketch explain Horn antenna, also describe how radiation pattern can be modified using physical dimensions of the same antenna. 10

Q.3:a) With respect to elements of Yag-Uda antenna, describe how radiation pattern of the same can be modified. 10

b) With input impedance expression, explain Folded dipole antenna. 10

Q.4:a) Derive expression for array factor of array antenna, also explain pattern multiplication of the same. 10

b) Obtain radiation pattern for 8- isotropic antennas of equal magnitude & spaced by $\lambda/2$ for array. 10

Q.5: a) Design circular microstrip antenna for 10 GHz frequency application using substrate ε_r=2.2 with thickness of 1.588 mm. 10

b) Explain the mechanism of ionospheric propagation. Define critical frequency & MUF. 10

Q.6: Write short notes on (any four questions, each carry five marks)

a) Polarization measurement of antenna.

b) Ground wave propagation.

c) Microstrip array.

d) Parabolic reflector antenna..

e) Near field and far field radiation

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T.E. (ET) Sem-VI Choice Base 12/12/2019

Time: 3 Hours Marks: 80

N.B.: (1) Question No. **1 is compulsory**.

(2) Solve any **three questions** from the **remaining five**

(3) Figures to the right indicate full marks

(4) Assume suitable data if necessary and mention the same in answer sheet.

Q.1 Attempt **any 4** questions **[20]**

a) What is the function of an image sensor? How array sensor is different from line sensor?

b) If all the pixels in an image are shuffled, will there be any change in the histogram? Justify your answer?

c) Define opening and closing with mathematical expression.

d) Compute the mean value of the marked pixel in given image using 3 X 3 mask and rewrite the image.

2	4	6
10	25	14
1	3	5

e) Explain various boundary descriptors.

Q.2 a) Explain image enhancement techniques in detail. **[10]**

b) Explain edge linking and boundary detection using polygonal method. **[10]**

Q.3 a) Apply histogram equalization to the following image **[10]**

4	4	4	4	4
4	2	5	4	3
3	5	5	5	3
3	4	5	4	3
4	4	4	4	4

b) Filter the following image using 3 X 3 neighbouring averaging by zero padding. **[10]**

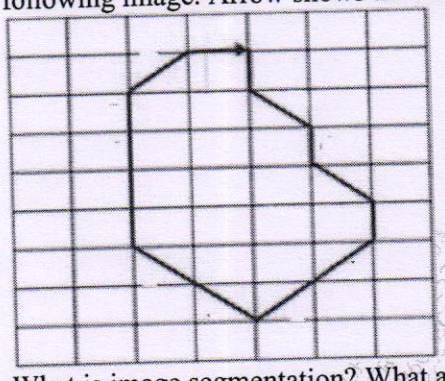
1	2	3	2
4	2	5	1
1	2	6	3
2	4	6	7

Q.4 a) What is Hit or Miss transformation? Explain in brief. **[10]**

b) Explain the principal of Homomorphic filtering. **[5]**

c) Explain advantages of Canny edge detection. **[5]**

Q.5 a) Find chain code and shape number using 8 code connectivity for the following image. Arrow shows the starting point for chain code. **[10]**



What is image segmentation? What are the basic approaches for segmenting an image? Classify segmentation. **[5]**

c) Find the number of co-occurrences of pixel i to neighbouring pixel j. **[5]**

0	0	1	1
0	0	1	1
0	2	2	2
2	2	3	3

Q.6 Short notes on: **(Attempt any Two)** **[20]**

a) SVM

b) B-spline algorithm

c) Noise models.

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$16 + 10 = 26$

TE Sem-VI EXTC - Choice based 16/12/19

(Time: 3 Hours) Max Marks: 80

N:B:
1. Question No. 1 is compulsory.
2. Out of remaining questions, attempt any three questions.
3. Assume suitable additional data if required.
4. Figures in brackets on the right hand side indicate full marks.

Q. 1 (a) Explain Frequency Agility and Diversity Technique. [05]
(b) Compare CW Radar with Frequency Modulated Radar. [05]
(c) Explain factors which govern pulse repetition frequency. [05]
(d) Compare low power and High Power Radar Transmitter along with their applications. [05]

Q. 2 (a) Explain Doppler Filter banks along with its merits and demerits. [10]
(b) Discuss in brief Radar Resolution Cell, land and Sea Clutter. [10]

Q. 3 (a) Derive the radar range equation as governed by minimum detectable signal to noise ratio. Enumerate the system losses that might occur in long range surveillance radar and indicate the typical value of the losses due to each factor. [10]
(b) Give importance of Match filter of Radar and discuss them in detail. [10]

Q. 4 (a) Explain methods of Integration of Radar Pulses to improve its detection. Define Integration Improvement Factor. How does it affect Radar Equation? [10]
(b) What is the maximum Radar Cross section in m^2 of an automobile license plate that is 12 inch wide and 6 inch high at a frequency of 10.525 GHz? What frequency will result in Maximum radar cross section of a metallic sphere whose diameter is 1 m? [10]

Q. 5 (a) With the help of detailed block diagram explain Conical Scanning used in Radar Systems. [10]
(b) What do you mean by Radar Cross Section? Explain RCS of Sphere, Rod and Cone. [10]

Q. 6 (a) Draw and explain Travelling Wave Tube Amplifier used in Radar Transmitter. [10]
(b) Draw block diagram of MTI Radar and explain each block in detail. [10]

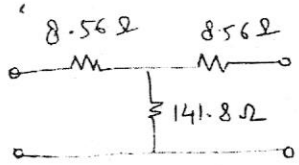
BE (ET) (VII) (Choice Based) 14/11/2019

Time : 3 Hrs | Marks : 80

Note:

1. Question **No.1** is **compulsory.**
2. Attempt **any three** from the remaining questions.
3. Assume suitable data if required.
4. Figures on the right hand side indicate full marks.

1. a) Design Circulator using Magic Tee. **(05)**
   b) Explain Amplification Process in TWT. **(05)**
   c) Compare Isolator and Gyrator. **(05)**
   d) Calculate S parameters for 3dB Attenuator. Assume Zo = 50 Ω **(05)**



2. a) Explain the significance of RWH theory and explain two valley models in GUNN diode. **(10)**
   b) What is the importance of beam coupling coefficient? Derive the expression for velocity modulation in two cavity klystron. **(10)**

3. a) Derive the expression for various parameters that describe the wave propagation in TE/TM mode in Rectangular Waveguide **(10)**
   b) Explain Impedance measurement Technique in microwave. **(10)**

4. a) Design a two lumped element matching network at frequency 500 MHz frequency to match Z_L =200-j100 ohms with a transmission line of Zo=100 ohms using Smith Chart. **(10)**
   b) Draw and explain two-hole directional coupler and derive the S-parameter for the same. **(10)**

5. a) Design two single stub matching network (shunt- short) for a given load of 60-j80 ohms to match with a 50 ohms transmission line using Smith Chart. **(10)**
   b) Compare HMICs and MMICs with suitable diagram. **(10)**

6. Write short note on ***any two*** **(20)**
   a) Magnetron
   b) Transit time diodes
   c) HEMT

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BEC VII) Cchoice based) CE/IT) 18/11/19

(3 Hours) [Total Marks : 80]

Please check whether you have got the right question paper.

N.B.: 1) **Question No. 1 is compulsory.**
2) **Attempt any three from remaining questions.**

1. a) Define following terms. **(05)**
   i) Control channel
   ii) Forward channel
   iii) Hand-off
   iv) Reverse channel
   v) Page
   b) What is frequency Re-use? Derive the relationship between capacity C and cluster size N. **(05)**
   c) List and discuss factors influencing small scale fading. **(05)**
   d) Explain soft-hand-off and power control in 3G. **(05)**

2. a) For given path loss exponent (a) n = 4 and (b) n = 3, find the frequency re-use factor and the cluster size that should be used for maximum capacity. The S/I ratio of 15db is minimum required for satisfactory forward channel performance of a cellular system. There are six co-channel cells and all of them at same distance from mobile use suitable approximations. **(10)**
   b) Draw the block diagram and explain GSM architecture in detail indicating all the interfaces. **(10)**

3. a) Explain IS-95 forward and reverse channel structure in details. **(10)**
   b) Describe GSM frame structure in detail. **(10)**

4. a) Compare IS-95, W-CDMA and CDMA 2000 with respect to channel Bandwidth, chip rate, modulation schemes, data rates and frame size. **(10)**
   b) Sketch UMTS Network Architecture and explain it in detail. Give in brief Features and services provided by UMTS. **(10)**

5. a) Draw and explain 3GPP LTE architecture and also discuss frames and slots in LTE. **(10)**
   b) Explain the concept of MIMO with respect to 4G technology. **(10)**

6. Write short notes on **Any Two**:- **(20)**
   a) Indoor propagation Models
   b) Rake Receiver
   c) Software defined radio

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BE (E&T) sem VII choice based 20/11/19

Time : 3 Hours **Marks: 80**

N.B. : (1) Question No. 1 is compulsory
(2) Attempt any three questions out of the remaining five questions.
(3) Figures to the right indicate full marks.
(4) Assume suitable data wherever necessary and justify the same.

1. Solve **any four**
   (a) Differentiate LED and LASER. 5
   (b) Explain different types of fibers with their refractive index profile and-mention its dimensions. 5
   (c) Draw and explain fusion splicing. 5
   (d) Explain the concept of Fiber Bragg Grating. Give its applications. 5
   (e) Derive expression for cut off wavelength for single mode step index fiber 5

2. (a) Explain in brief VAD and MCVD fiber fabrication techniques. 10

   (b) Explain linear and non-linear scattering losses in optical fiber. 10

3. (a) What are the different factors responsible for attenuation and dispersion in optical fiber. 10

   (b) Explain in detail working, principle of RAPD. Why it is called reach through APD and compare its working with PIN diode? 10

4. (a) Explain working principle of EDFA with diagram . 10

   (b) An analog optical fiber system using LASER with 3 dBm optical power into air. A coupling loss of 17.5 dB is present while launching power into fiber. Length of fiber is 6 km with a loss of 5dB/km. It is spliced at every 1.5 km with 1.1dB loss per splice. Connector loss at receiver is 0.8dB. The PIN receiver has sensitivity of -54 dBm. Estimated safety margin is 4 dB. Design the link power budget. 10

5. (a) If a multimode step index fiber having the core refractive index of 1.5, cladding refractive index of 1.38, core radius of 25 μm operates at a wavelength of 1300 nm. Calculate - 10
   (i) Numerical Aperture.
   (ii) Normalized frequency
   (iii) Solid acceptance angle.
   (iv) Total no. of modes entering the fiber.

   (b) Draw and explain block diagram of cutback method of attenuation measurement. 10

6. Write short note on: - 20
   (i) RF over Fiber
   (ii) Quantum Well Laser
   (iii) Solitons
   (iv) Optical Switches

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22/11/19.

B.E/ SEM VII/ EXTC/ Choice Base

Time : 3 Hrs **Marks: 80**

Instructions
1. Q1 is compulsory.
2. Attempt any three out of the remaining five questions.
3. Assume suitable data.

Q1. Attempt any **FOUR.** **(20)**

a) What is watchdog timer, its use and typical application for an embedded system.
b) Explain I2C in brief.
c) Explain various types of operating systems.
d) Differentiate between embedded systems and general computing systems.
e) Explain pre-emptive scheduling in RTOS.
f) What is process and various states that a process can lie in an embedded system?

Q2.a) Explain various steps of design of digital camera using microcontroller and CCDPP. **(10)**

b) Describe any two wireless communication means for embedded systems. **(10)**

Q3. a) Describe design metrics and optimization challenges for embedded systems. **(10)**

b) What is interprocess communication (IPC) in RTOS? Explain various IPCs. **(10)**

Q4. a) Define finite state machine (FSM). Draw and explain FSM for automatic chocolate vending machine. **(10)**

b) Explain various task scheduling models in RTOS. **(10)**

Q5. a) Write a note on program models: DFG, FSM, Petri-net, UML. **(10)**

b) Compare RISC and CISC architectures along with advantages and disadvantages. **(10)**

Q6. a) How to choose RTOS for a given embedded system application. **(10)**

b) What is CAN protocol. Describe topology and frame formats with significance of fields. **(10)**

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BE / ExTc / choice based / Sem - VII

26-11-2019

(3 Hours) (Total Marks : 80)

N.B: 1) **Q.1** is **compulsory.**
2) Attempt **any THREE** questions from the remaining questions.
3) Assume suitable **data** if **necessary**.

Q.1 Attempt **any four** :

a) Compare active attacks vs Passive attacks. [5]

b) Explain various types of key-loggers in brief. [5]

c) Classify the cybercrimes and explain any one briefly. [5]

d) Explain how the appeals can be made under The IT ACT 2000. [5]

e) Write brief note on : Cyber-terrorism. [5]

Q.2 a) How criminals plan the attack? Discuss various steps involved [10]

b) Explain how Intellectual property laws protect the rights of the owner of the intellectual Property. [10]

Q.3 a) Compare Vishing, Phishing and Smishing in cyber security. [10]

b) What is E-commerce? Explain different types of e-commerce with suitable examples. [10]

Q.4 a) What is Bluetooth hacking? Explain Bluetooth hacking tools in brief. [10]

b) How the Indian penal code IPC 1860 addresses cybercrime? [10]

Q.5 a) Discuss basic security precautions to be taken to safeguard Laptops and wireless devices. [10]

b) What is E-contract? Discuss E-contract Act 1872. [10]

Q.6 Write short note on **(Any 2)** : [20]

1) Computer Sabotage.
2) Indian Information Technology Act 2000
3) Write key IT requirements for SOX and HIPAA.

Paper / Subject Code: 52901 / Wireless Networks

BE | Extc | CBSGS | Sem - VIII | 4/12/2019

(3 Hours) [Total Marks - 80]

N.B i) Question no.**1** is compulsory

ii) Solve any **three** from the remaining **five** questions

1	a.Explain the 'Zone planning' concept for the Indoor radio planning.	5
	b. What is the pole capacity of the cell ?	5
	c. Discuss the Advanced Antenna systems used in HSPA and LTE.	5
	d. With a suitable example explain category 1 and category 2 of sensor network	5
2	a.] 'CDMA is interference limited system' Justify and explain the need for power control.	10
	b. Give the detailed radio access network overview. Explain in detail functions of Node B and RNC also draw UTRAN logical architecture.	10
3	a. Explain Bluetooth security features and security levels with proper diagram	10
	b. Elaborate on Zigbee components , topologies and protocol stack.	10
4	a. Explain the relevance of CSMA/CA technique in WLAN and the concept of Hidden Node and Exposed Node.	10
	b. There are various resource constraints in the design and implementation of WSN . Justify.	10
5	a. How does a typical RFID system work ? Discuss its components and list its applications.	10
	b. Why TCP and UDP protocols are unsuitable for implementation in WSN.	10
6	Write notes on **[any two]**	20
	a. Middleware architecture of WSN	
	b. UWB technology	
	c. Routing challenges in WSN	

BE | Extc | CBSGS | Sem – VIII

9|12|2019

(3 Hours) [Total Marks: 100]

N.B.: (1) **Question No.1** is **compulsory**.
(2) Attempt **any three** questions from the remaining questions.
(3) Assumptions made should be clearly stated.
(4) Assume any suitable **data** wherever **required** but **justify the same.**
(5) **Figures** to the right indicate **full marks**.
(6) **Illustrate answer** with **sketches** wherever **required**.

1 a) Explain two-tier network management organization model. **[05]**

b) Compare between CMIS/CMIP and SNMP. **[05]**

c) Explain TNM conceptual model. **[05]**

d) Explain the challenges faced by the network managers while managing a network. **[05]**

2 a) Explain the purpose of TRAP and Discuss the SNMP TRAPS. **[10]**

b) Describe SNMP various command with syntax. **[10]**

3 a) Explain ATM Network Management. **[10]**

b) Explain User security model (USM) of SNMP v3. **[10]**

4 a) Explain various M interfaces used between ATM end user or Device and ATM network. **[10]**

b) Explain ATM remote monitoring. **[10]**

5 a) Describe network management information Model. **[10]**

b) Describe Network Management Communication and Function Model. **[10]**

6 a) Explain the need for TMN and Hence OSI network Management Architecture. **[10]**

b) Explain the service offered by CMISE. **[10]**

B.E. (E+TC) Sem-VIII CBSGS 13/12/2019

Duration: 3 hours **Max marks: 80**

Note the following instructions.

i) **Question No.1** is **compulsory.**
ii) Total **four** questions need to be solved.
iii) Attempt **any three** questions from remaining five questions.
iv) Assume suitable data wherever necessary, justify the same.

Q.1 (a) How iterative resolution differs from recursive resolution in DNS ? **[5]**
(b) What is the role of registration server in tracking a callee ? **[5]**
(c) Differentiate between Subnetting and Supernetting. **[5]**
(d) Explain the connection establishment Process in TCP with suitable diagram. **[5]**

Q.2 (a) What are the special addresses used in classful addressing? Explain any three with suitable example. **[10]**
(b) Explain the various phases of congestion control in TCP with suitable diagram. How the window size is set in each phase? **[10]**

Q.3 (a) Draw the DHCP packet format. With reference to this which field determines- **[10]**
i) The no. of hops a packet can travel.
ii) The command is a request or reply.
iii) Why there is a need of transaction Id apart from IP address and port address ?
iv) What is the maximum number of seconds that can be stored in the Number of Seconds field of a DHCP packet ?
v) Which field determines that the response from the server is unicast or broadcast ?
vi) If DHCP packet is request from client, which fields are used ?
vii) If DHCP packet is a reply message from server, which fields are used ?

(b) Name the various components of Email system. List the function of them. Which protocol defines the MTA client and server in internet ? **[10]**

Q.4 (a) What are various schemes to improve QoS ? Explain any one in brief. **[10]**
(b) Which protocol is used to communicate between public telephone network and computer on internet ? Explain its operation with suitable illustrations. **[10]**

Q.5 (a) One of the addresses in a block is 17.63.110.114/24. Find the network address, network mask, number of addresses, the first address, and the last address in the block. **[10]**
(b) Why do we need fragmentation at each router? Explain the various fields associated with fragmentation in IP header. A host is sending 100 datagrams to another host. If the identification no. of the first datagram is 1024. What is the identification no. of the last ? **[10]**

Q.6 (a) Why there is need of ICMP Protocol at network layer ? List various messages used in ICMP protocol. Explain the function of any two messages in brief. **[10]**
(b) Compare the TCP header and UDP header. List the fields in the TCP header that are not the part of UDP header. **[10]**

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