

TE

SEM - Vth

C O L D) NOV - DEC 15 18/12/15

EXTC
MechSub! - EVS

MECH & EXTC



Q.P. Code : 1827

(2 Hours)

[Total Marks :50

- N.B. :
- (1) Question No. 1 is compulsory.
 - (2) Attempt any four questions from Q.2 to Q.7.
 - (3) Draw neat labelled diagrams wherever required.
 - (4) Figures to the right indicate full marks.

1. Attempt any five from following :- 10
 - (a) What is Ecological Succession?
 - (b) Why awareness on Human Rights is important?
 - (c) Why there is constant growing need for energy?
 - (d) Why there is a need for wasteland reclamation?
 - (e) Why it is necessary to understand human environment relationship?
 - (f) Explain importance of water conservation.
 - (g) What are the causes and effects of Thermal pollution?
2. (a) What are the reasons for depleting nature of our food resources? 5
 (b) What are the causes, effects of air pollution? 5
3. (a) Discuss characteristic features and functions of Aquatic ecosystem. 5
 (b) What role an individual can play in prevention of pollution? 5
4. (a) Explain the salient features of water pollution prevention act. 5
 (b) Why biodiversity needs to be conserved? What are the threats to biodiversity? 5
5. (a) Why solid waste management is important? How it is carried out? 5
 (b) What is population explosion? Describe important features of family welfare program. 5
6. (a) What are the causes and effects of noise pollution? 5
 (b) What is sustainable development? How it is carried out? 5
7. (a) What are the causes of global warming? What are its adverse effects? 5
 (b) Explain the role of Information Technology to better human health and environment. 5

QP-Con. 11864-15.

AC

07/12/15

EXTC



Sub:- AC

Q.P. Code : 5705

(3 Hours)

[Total Marks : 80

- N.B. : 1) Question No. 1 is compulsory.
 2) Attempt any three questions out of the remaining five questions.
 3) Assume suitable data is necessary.

1 Solve any four :

- a) What is modulation ? Explain the need of modulation. 20
 - b) Explain Pre - emphasis and De - emphasis in FM.
 - c) Define sensitivity, selectivity, fidelity and image frequency in radio receiver.
 - d) What are the causes of fold over distortion or aliasing ? How can it be prevented or removed.
 - e) Explain companding in detail.
- 2 (a) Derive Friss formula for calculation of total noise figure, if two amplifiers are connected in cascade.
- (b) Draw the block diagram of phase cancellation SSB generator and explain how carrier and unwanted sidebands are suppressed ? 10
- 3 (a) With the help of a neat block diagram explain the principle and generation of indirect method of FM generation. 10
- (b) Draw and explain Adaptive delta modulation transmitter and receiver with its advantages. 10
- 4 (a) An AM transmitter radiates 5 MHZ carrier with 80KW power, carrier is modulated by 600HZ and 2 KHZ signals. 10
- 1. What will be the total modulation index if each signal modulates at 60 % of modulation ? 10
 - 2. Determine the transmitted power.
 - 3. Draw the frequency spectrum of modulated signal.
 - 4. What is % of power saving if one of the sideband and carrier is suppressed? 10
- (b) What is signal multiplexing ? Explain FDM in detail.

TURN OVER

MD-Con. 10169-15.

Q.P. Code : 5705

2

- 5 (a) Explain the operation of Foster Seeley discriminator with the help of circuit diagram and phasor diagram. 10
- (b) Explain with block diagram and waveform of AM Super - heterodyne radio receiver. 10
- 6 Write a short notes on (solve any four) : 4
- (a) Aliasing error and aperture effect.
 - (b) Applications of pulse communication.
 - (c) Practical diode detector.
 - (d) ISB receiver.
 - (e) Wide band FM and Narrow band FM.



T.E (Sem V) EXTC (old) Nov-Dec-15
 SFS 07/12/15

EXTC

Sub: - S & S

QP Code : 1764

(OLD COURSE)

(3 Hours)

[Total Marks : 100

- N.B. (1) Question no. 1 is compulsory
 (2) Answer any four questions out of remaining six questions
 (3) Figure to right indicates full marks
 (4) Illustrate the answers with sketches whenever required.
1. (a) Prove differentiation in Z domain property of Z transform. 5
 (b) Determine the direct form-I realisation of the following transfer function 5

$$H(z) = 1 - 0.7z^{-1} + 0.4z^{-2}$$

 (c) Let $x[n] = u[n] - u[n-5]$. Find and sketch even and odd parts of $x[n]$ 6
 (d) Determine whether the following signals are energy signals or power signals? Calculate their energy or power 4
 (i) $x(t) = A \cos(2\pi f_c t + \theta)$
 (ii) $x(n) = \left(\frac{1}{4}\right)^n u(n)$
2. (a) Convolve $x(t) = 1 \quad 0 \leq t < 1$
 $= 0 \quad \text{elsewhere}$
 with $h(t) = 1 \quad 0 \leq t < 1$
 $= 0 \quad \text{elsewhere}$ 10
- (b) Consider the analog signal $x(t) = 8 \sin 200\pi t$ 10
 (i) Determine minimum required sampling rate to avoid aliasing.
 (ii) If the signal is sampled at the rate $F_s = 100\text{Hz}$.
 What is discrete time signal obtained after sampling.
 (ii) If the signal is sampled at the rate $F_s = 300\text{Hz}$, what is discrete time signal obtained after sampling.
3. (a) Determine the exponential form of Fourier series representation of signal shown below in fig 3(a). Hence determine the trigonometric form of Fourier series. 10

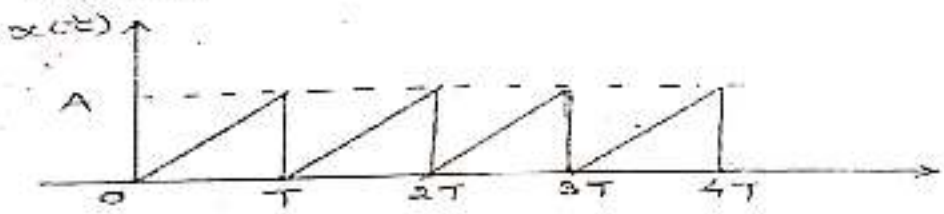



Fig. 3(a)

[TURN OVER

QP-Con. 10121-15.

- (b) Determine the output response of the system $h(t) = u(t)$ to an input $x(t) = e^{-at}u(t)$, $a > 0$ 10
4. (a) Find z transform along with its ROC of  10
- (i) $x[n] = \left(\frac{-1}{5}\right)^n u(n) + 3\left(\frac{1}{2}\right)^n U(-n-1)$
- (ii) $x[n] = 2^n u(n-2)$
- (b) Prove that LTI system is stable if its impulse response is absolutely summable
5. (a) Obtain the inverse Laplace transform of 10
- (i) $x(s) = \frac{5s^3 - 15s - 11}{(s+1)(s-2)^2}$ (ii) $x(s) = \frac{s-3}{s^2+4s+13}$ 10
- (b) Realize Direct Form-I, Direct Form-II, First order cascade and First order parallel structures if 10
- $$x(z) = \frac{1 + 3z^{-1} + 2z^{-2}}{\left(1 + \frac{1}{8}z^{-1}\right)\left(1 + \frac{1}{2}z^{-1}\right)\left(1 - \frac{1}{4}z^{-1}\right)}$$
6. (a) The difference equation of the system is given by $y[n] = 3y[n-2] + 4[n-1] + x[n]$ 10
 If $x[n] = [0.5]^n u[n]$ and
 $y[-1] = 1$, $y[-2] = 0$
 Find (i) Zero Input Response
 (ii) Zero State Response
 (iii) Total Response
- (b) Prove time sifting property of Fourier transform
- (c) Determine the unit step response of the system whose impulse response is given as $h(t) = 3t^2 u(t)$ 5
7. (a) Determine the state variable model of $y[n] = -2y[n-1] + 3y[n-2] + 0.5y[n-3] + 2x[n]$ 10
- (b) Using a suitable method obtain state transition matrix e^{AT} for the following 10
- $$\text{system } \begin{bmatrix} \frac{3}{4} & 0 \\ -\frac{1}{2} & \frac{1}{2} \end{bmatrix}$$

TE Sem VI EXT C CBGS Nov-Dec-15

RFM&A 01/12/15

EXTC

Sub:- RFM&A

Q.P. Code : 5662

(3 Hours)

Total Marks : 80

- N.B. : (1) Question No. 1 is compulsory
(2) Solve any three questions from the remaining
(3) Assume suitable data wherever necessary and justify the assumption.
(4) Draw suitable diagrams wherever required.

- 1a. Explain hazards of electromagnetic radiation. 5
- b. Find the attenuation of a 4 element 2.5 db ripple low pass Chebyshev filter at $\omega/\omega_c=2.5$ 5
- c. What are isotropic pattern and Omnidirectional pattern Give one example for each. 5
- d. Explain near and far field radiation related to antenna
- 2a. Discuss design procedure for filter using image parameter method. 10
- 2b. Design a LPF whose input and output ports are matched to 50 Ω impedance with cutoff frequency of 3 GHz, equi ripple of 0.5 dB and rejection of atleast 40 dB at approx twice the cutoff frequency. 10
- 3a. Explain significance of retarded magnetic vector potential and retarded electric scalar potential. 10
- 3b. Derive radiation resistance of half wave dipole antenna and a monopole antenna 10
- 4a. Find the radiation pattern for an array of 4 elements fed with same amplitude and same phase. Find its HPBW and BWFN.
- 4b. State and prove Reciprocity theorem as applicable to antennas.
- 5a. Design Dolph- TChebyshev array of 6 elements with spacing 'd' between elements with a major to minor lobe ratio of 26 dB. Calculate the excitation coefficients. 10
- 5b. Explain the structure of Microstrip antenna. Discuss its feed mechanisms and applications. 10
- 6 Write short notes on the following-
- a. Log periodic antenna
- b. Schottky diode
- c. Broad side and End fire array.
- d. Feeding methods of Parabolic antenna.



ETTC (Old) Sem V TE 01/12/15
Te sem-V (Old) NOV-DEC-15
RPCB

Sub: RFCD

Q.P. Code : 1722

ETTC

(3 Hours)



[Total Marks : 100]

- N.B. : (1) Question No. 1 is compulsory.
(2) Answer any four out of remaining six questions.
(3) Assume suitable data wherever required but justify the same.

1. (a) State all four kuroda's identifies. 5
(b) A typical PCB substract has a dielectric constant of 4.3 and loss factor of 0.02 at 6 GHz. Find the conductivity of the substract. 5
(c) Define VSWR, reflection coefficient and characteristic Impedance. 5
(d) Draw an equivalent circuit of two wire transmission line. Derive the expression for voltage and current travelling wave. 5
2. (a) Explain with equivalent circuits the RF behaviour of resistor and capacitor. 10
(b) A transmission line of characteristic impedance $Z_0 = 50 \Omega$ and length 0.2λ is terminated in a load impedance $Z_L = 25 + j30 \Omega$. Find the reflection coefficient, VSWR and input impedance by using smith chart. 10
3. (a) Derive expressions for internal, external and loaded quality factors for the standard series and parallel resonance circuits. 10
(b) Explain schottky contact diode with cross sectional view and circuit model. 10
4. (a) For a parallel plate (copper) transmission line operating at 1GHz, the following parameter are given $w = 6\text{mm}$, $d = 1\text{mm}$, $\epsilon_r = 2.25$
 $\sigma_{\text{diel}} = 0.125\text{ mS/m}$, $\sigma_{\text{cu}} = 64.516 \times 10^6\text{ S/m}$
Find line parameters R , L , C and G per unit length. 10
(b) Discuss power consideration in transmission lines when
(i) Source and load impedances are matched. 10
(ii) Load impedance is matched and source impedance is not matched.
5. (a) Design a Butterworth Low pass filter having a cutoff frequency of 250MHz and attenuation of 15dB at 300 MHz. 10
(b) Show the RF small signal model of BJT and equivalent model using miller effect. Find the value of C_{m1} and C_{m2} in terms of C_{cb} , V_{be} and V_{ce} . 10

[TURN OVER]



Q.P. Code : 1722

2

6. (a) Explain construction and functionality of HEMT.
(b) An abrupt p-n junction made of silicon has the acceptor and donor concentration of $N_A = 10^{18}$ and $N_D = 5 \times 10^{13} \text{ cm}^{-3}$ respectively. Assuming that the device is at room temperature.
(i) barrier voltage
(ii) the space charge width in p and n type semiconductors.
7. Write short notes on
(a) Microstrip transmission line
(b) Chip resistor, capacitor and inductors.
(c) Measurement of AC parameters.

SWAMI COLLEGE OF ENGINEERING, KHARGHAR 01-12-2015 13:37:59 MUPD15445 SARASWATI

EXTC

TE Sem V (EXTC)
Sub: MRA

24/11/15

CBGS Nov-DEC-15

(3 Hours)

QP Code : 5621
[Total Marks : 80]

Notes: 1. Q.1 is compulsory
2. Answer any three from Q.2 to Q.6



- Q.1
- a) List and explain design metrics of an Embedded system. 05
 - b) Explain pipeline stages used in ARM7 processor. 05
 - c) Draw format of IE SFR and write purpose of each bit in this SFR. 05
 - d) Explain Program status register of 8051 microcontroller. 05
- Q.2 a) Interface stepper motor with 8051 microcontroller and write assembly language program to rotate it in clockwise direction. 10
- b) Which are different core extensions used with ARM processor? Explain. 10
- Q.3 a) Explain different addressing modes of ARM7 processor. 10
- b) Discuss Digital camera as an embedded system. 10
- Q.4 a) Design 8051 based system with following specifications 10
- i) 8051 is working at 10 MHz.
 - ii) 8KB external Program memory using 4 KB chips
 - iii) 16 KB external Data memory using 8 KB chips
- b) Write assembly language program to generate square wave with 50% duty cycle on pin P1.0 of 8051. 10
- Q.5 a) Explain register organisation of ARM7. 10
- b) Interface ADC 0808 with 8051 microcontroller and write assembly language program to convert analog signal which is available on channel no. 3 to digital and store digital value at memory location 30H. 10
- Q.6 Write note on 20
- a) Internal and external Program memory 8051
 - b) Current program status register of ARM7
 - c) Operating modes of ARM7 processor
 - d) Serial port modes of 8051

MD-Con. 8240-15.

Nov-Dec-15

MP&MC-I 24/11/15

TE Sem V (old) EXTC

EXTC

Sub:- MP&MC-I

QP Code : 1676

Total marks: 100

N.B: (1) Question No. 1 is compulsory. (3 Hours)

(2) Solve any four questions from the remaining six questions.

(3) Figures to the right indicate full marks.

(4) Assume suitable data where necessary.

1. (a) Specify the register contents and flag status of 8085 as following instructions are executed.

5

A	B	S	Z	CY
---	---	---	---	----

XX	XX	x	x	x
----	----	---	---	---

XRA A

MVI B, 5A H

SUI 5FH

ANA B

HLT



(b) Explain how interrupts are handled in 8051.

5

(c) Explain functions of ALE and IO/M signals of 8085 microprocessor.

4

(d) Explain any three addressing modes of ARM processor.

6

2. (a) Explain addressing modes of 8051.

10

(b) Design a 8085 based microprocessor based system with following specifications:

CPU of 3 MHz, EPROM of 16 KB using 8 KB chips and RAM of 16 KB using 8 KB chips. Discuss schematic and show the memory map.

10

[TURN OVER

QP-Con. 8081 -15.



3. (a) Draw and explain architecture of ARM processor. 14
(b) Interface 8259 with 8085 using I/O mapped I/O technique and initialize 8259 to meet following specifications 14
(i) Level triggered, single and ICW4 not needed.
(ii) Mask interrupts IR2 and IR4.
(iii) Interrupt vector address for IR0 is 4250 H.
4. (a) Explain control word register format of 8253 14
(b) Explain the following instructions of ARM processor. 14
(i) BNE label (ii) ADDEQ R1,R2,R3 (iii) LDRB R2,[R1],#1
(iv) SMULTB R1,R2,R3 (v) MVN R2,#10
5. (a) Explain TMOD and TCON register of 8051. 14
(b) Write assembly language for 8085 to multiply two 8 bit number using add and shift method. 14
6. (a) Explain the interrupt structure of 8085. 14
(b) Interface DAC 0808 to 8051 and write assembly language program using 8051 to generate triangular waveform. 14
7. Write short note on any four of the following 20
(a) Serial communication in 8085. (b) PORT 3 structure of 8051.
(c) BSR mod. of 8255. (d) PSW register of 8051.
(e) 8051 unconditional jump instructions.

EXTC (R21) Sem V
Te sem - V

Subj - RSA

QP Code : 5579

18/11/15

EXTC

Time of hours:

Max Marks: 80

Instructions to candidate

1. Q.1 is compulsory
2. Attempt any THREE from remaining
3. Figures to the right indicate full marks
4. Assume suitable data if necessary



1. a) Explain concept of power spectral density 5
 b) state and prove Central limit theorem 5
 c) Explain properties of cross correlation function 5
 d) state and prove Bayes' theorem 5
2. a) Box 1 contains 5 white balls and 6 black balls, box 2 contains 3 white & 4 black balls. A box is selected at random and then a ball is chosen at random from the selected box. (i) What is the probability that the ball chosen will be a white ball 10
 (ii) Given that the ball chosen is white what is the probability that came from box 1 10
- b) Give the properties of CDF, pdf, and PMF. 10
3. a) Explain concept of conditional probability and properties of conditional probability 10
 b) Explain what do you mean by? 08
 - (i) Deterministic system
 - (ii) stochastic system
 - (iii) Memoryless system
- c) Prove that if input to memoryless system is strict sense stationary (SSS) process then output is also strict sense stationary 07
4. a) Explain Random process, Define ensemble mean, Auto correlation and Auto covariance of the process in terms of indexed random variables in usual mathematical forms 10
 b) Let $Z=X+Y$ Determine pdf of Z $f_z(Z)$ 10
5. a) state and prove Chapman Kolmogorov equation 10
 b) Explain Chebyshev's inequality with suitable example. 10

TURN OVER

MD-Con. 6900-15.



a) The joint probability density function of two random variables is given by

$$f_{xy}(x, y) = 15 e^{-2x-3y}, \quad x \geq 0, y \geq 0$$

- i) Find the probability that $x < 2$ and $Y > 0.2$
- ii) Find the marginal densities of X and Y
- iii) Are X and Y Independent?
- iv) Find $E(x/y)$ and $E(y/x)$

10

b) Write short Notes on following special distributions

- i) Poisson distributions
- ii) Rayleigh distributions
- iii) Gaussian distributions

10

— END —

EXTC
Max. Marks: 100

TE Sem V RSA
Sub: - RSA

18/11/15
Date: 18/11/15
QP Code: 1631

Instructions:

- (1) Question No.1 is Compulsory.
- (2) Solve any four out of remaining six questions.
- (3) Assume suitable data if necessary.

Duration: 3 Hr.



- Q1(a) State and prove Baye's Theorem. 05
- (b) Suppose X and Y are two random variables, when do we say that X and Y are 05
1) Orthogonal 2) Uncorrelated
- (c) Prove that Poisson process is Markov Process. 05
- (d) Define probability density function. State and prove any two properties of 05
probability density function (p.d.f).
- Q2(a) Box 1 contains 5 white balls and 6 black balls. Box 2 contains 6 white balls and 4 10
black balls. A box is selected at random and then a ball is chosen at random from
the selected box.
- 1) What is the probability that the chosen ball will be a white ball?
 - 2) Given that the ball chosen will be white, what is the probability that it
came from Box 1?
- (b) The transmission times X of messages in a communication system obeys the 10
following exponential probability law with parameter K.
- $$f(x) = k e^{-kx}, x > 0$$
- 1) Find the value of K.
 - 2) Find the probability density function (p.d.f) of X and cumulative density
function (c.d.f) of X. sketch both functions.
- Q3(a) The joint probability density function of a two dimensional random variable (X,Y) 10
is given by $f_{X,Y}(x,y) = k e^{-(x+y)}, x > 0, y > 0$
- 1) Find the value of K.
 - 2) Find the marginal probability density functions of X and Y.
 - 3) Check for independence of X and Y.
- (b) If x and y are two independent exponential random variables and $Z = X + Y$, then 10
prove that the probability density function of Z is given by convolution of their
individual density functions.
- Q4(a) Find the moment generating function of Binomial distribution and hence, find its 10
mean and variance.

[TURN OVER

QP-Con. 6862-15.

- (b) Let X_1, X_2, \dots be a sequence of random variables.
Define 1) Convergence almost anywhere
2) Convergence in probability
3) Convergence in mean square sense
4) Convergence in Distribution
for the above sequence for a random variable X . 10
- Q5(a) State and prove Chapman-Kolmogorov equation. 10
- (b) 1) Define Central Limit Theorem and give its significance. 10
2) Define strong law of large numbers.
3) Describe sequence of random variables.
- Q6(a) Explain power spectral density function. State its important properties and prove any one property. 10
- (b) Show that the random process given by
$$x(t) = A \cos(\omega_0 t + \theta)$$
where A and ω_0 are constants and θ is uniformly distributed over $(0, 2\pi)$ is Wide Sense stationary (WSS). 10
- Q7(a) Three boys A, B, C play a game of throwing a ball to each other. A always throws the ball to B and B always throw the ball to C, however C is just as likely to throw the ball to B as to A. Find the transition matrix. Show that the process is Markovian. Also classify the states. 10
- (b) Write Short notes on any two : 10
- 1) Ergodic Process
 - 2) Poisson Process
 - 3) Gaussian Process

