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EC-L

5E1780

Roll No. _____ [Total No. of Pages : 2

5E1780

B.Tech. V-Sem. (Main and Back) Examination, January/February - 2024

Electronics and Communication Engg.

5EC3-01 Computer Architecture

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

*Attempt all **Ten** questions from Part A, **Five** questions out of **Seven** questions from Part B and **Three** questions out of **Five** question from Part C.*

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

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

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory **(10×2=20)**

1. What is Von-Neuman Architecture?
2. Differentiate between DRAM and SRAM?
3. What is Segmentation?
4. Explain parallel processing.
5. Explain the rules perform addition of floating point numbers.
6. What do you understand by interleaved memory?
7. What is virtual memory?
8. Mention the various phases in executing an instruction.
9. How overflow occur in subtraction.
10. Distinguish pipelining from parallelism.

PART - B

(Analytical/Problem solving questions)

Attempt any FIVE question **(5×4=20)**

1. Explain flynn's classification of parallel processing with necessary diagram.

2. Explain in detail about the bus Arbitration techniques in DMA.
3. Differentiate between RISC and CISC computers.
4. Describe the Procedure for addition and subtraction for fixed point number. Explain by use of flow chart.
5. What are the addressing modes? Explain each in brief with diagram.
6. What are the various modes of data transfer to and from the computer system? Explain.
7. What is Cache memory? How to improve cache performance? Discuss.

PART - C

(Descriptive/Analytical/Problem solving/Design questions)

Attempt any THREE questions. **(3×10=30)**

1. An address space is specified by 24 bits and the corresponding memory space by 16 - bits.
   i) How many words are there in the address space.
   ii) How many words are there in the memory space.
   iii) If a page consists of 2k words, how many pages and block are there in the system.
2. Explain in detail about the memory technologies.
3. Explain with an example about the operations and operands of the computer hardware.
4. Describe different instruction formats and illustrate with the example.
5. Write short notes on-
   i) DMA controller
   ii) Stacks and queues
   iii) SISD
   iv) MIMD
   v) Arithmetic Pipeline

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5E1392

Roll No. _____ [Total No. of Pages : 2

5E1392

B.Tech. V-Sem. (Back) Examination, January/February - 2024
Electronics & Comm. Engineering
5EC4-02 Electromagnetics Waves

Time : 3 Hours **Maximum Marks : 120**

Min. Passing Marks : 42

Instructions to Candidates:

*Attempt **all Ten** questions from **Part A**, **Five** questions out of **Seven** from **Part B** and **Four** questions out of **Five** from **Part C**.*

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

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

PART - A

(Answer should be given up to 25 words only)

ALL questions are compulsory. **(10×2=20)**

1. Define impedance matching of transmission lines.
2. Write Maxwell's equations.
3. Define boundary conditions of EM waves.
4. What do you mean by Poynting vector?
5. Define polarization in uniform plane waves.
6. What do you mean by total internal reflection?
7. Define power radiated by hertz dipole.
8. Describe plane wave reflection from a conducting medium.
9. What are attenuation in wave guides?
10. What do you mean by VSWR?

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PART - B

(Analytical/Problem solving questions)

Attempt any FIVE questions. **(5×8=40)**

1. Write transmission Lines - Equations of voltage and current on transmission line.
2. Derive boundary conditions at media interference.
3. Derive surface current power loss in a conductor with uniform plane wave.
4. Describe field visualization in wave guides.
5. Differentiate between radiation parameters of monopole and dipole antenna.
6. Differentiate between refection and reflection in dielectric surface of transmission lines.
7. Derive the expression for the fields in rectangular waveguide in case of Transverse Magnetic (TM) wave.

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any FOUR questions. **(4×15=60)**

1. A distortion less line has $Z_0 = 60\Omega$, $\alpha = 20$mNp/m, $\mu = 0.6c$, where c is the speed of light in a vacuum. Find R, L, G, C and λ at 100MHz.
2. In a medium characterized by $\sigma = 0$, $\mu = \mu_0$ and $\mathbf{E} = 20 \sin(10^8 t - \beta z)\, a_y$ Vm Calculate β and $\boldsymbol{H}$.
3. In a lossless dielectric for which $\eta = 60\pi$, $\mu_r = 1$, and $\boldsymbol{H} = -0.1 \cos(\omega t - z)a_x - 0.5\cos(\omega t - z)a_y$ A/m, calculate $\varepsilon r, \omega$ and $\boldsymbol{E}$.
4. Explain :
   a) How wave guide lines are better than micro strip lines between 1 and 30 GHz?
   b) How wave guides are better than micro strip at and above 60 GHz?
5. Derive equations for power calculations by Hertz dipole.

5E1781

Roll No. _____ [Total No. of Pages : 3

5E1781

B.Tech. V Sem. (Main & Back) Examination, January/February - 2024
Electronics and Communication Engineering
5EC4-02 Electromagnetics Waves

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

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

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

PART A

(Answer should be given up to 25 words only)

ALL questions are Compulsory. **(10×2=20)**

1. Write the name of all primary parameter of transmission line.

2. Find the value of $\nabla.D$ at(0, 1, 0) when D = $ux^2y\ i + xy^2\ \widehat{K}$

3. Write the expression of characteristic impedance of free space.

4. If Electric potential $\phi = x^2 + y^2 + z^2$ then find its Electric field.

5. Calculate the reflection coefficient of $\sum M$ wave from Medium (2) $Z_2 = 1+j$ to medium (1) $Z_1 = -2 - j$.

6. What is use of stub in transmission line.

7. If VSWR = 200 then find reflection coefficient magnitude

8. Write the condition of a
   i) Free space and ii) lossy medium

9. Write one equation of Maxwell for Dynamic Electric field.

10. Find the length of a dipole antenna working at 30 MHZ.

PART - B
(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. Derive the expression of Intrinsic impedance of free space.

2. Explain the following
   i) Constant VSWR circle on Smith chart.
   ii) Single stub matching.

3. A rectangular waveguide with dimension a = 2.5cm, b = 1 cm is to operate at 15 GHZ find all possible Ti mode in it.

4. Define and derive the Boundary conditions for electric field.

5. Define the near and far field of an antenna.

6. If the Electric field of a $\sum M$ field is $\sum=0.5 \exp\left(\frac{-z}{3}\right) \text{Sin}(10^8 t - 1.373z)9_x$ find its magnetic field.

7. Define :
   i) Divergence theorem and
   ii) Stoke's theorem

8. Derive the EM Wave equation in form of Magnetic field (H)

PART - C
(Descriptive/Analytical/Problem Solving/Design question)
Attempt any Three questions

1. Determine the values of β, μ_g, μ_p *and* η_{Te10} for a 7.2 cm ×3.4 cm rectangular wave guide operating at 6.2 Gry. **(3×10=30)**

2. What is Poynting Vector find its expression.

3. Draw the voltage and current variation across a tr.line in following conditions.
   i) Open circuit tr.line
   ii) loaded with $Z_2 = 100 + j\ 10$ assume $Z_0 = 50\Omega$

4. Draw and define following antenna parameter.
   i) Dipole radiation pattern
   ii) Antenna directivity
   iii) Radiation resistance of Monopole antenna.

5. Prove stokes Theorem and discuss its applications.

5E1393

Roll No. _____ [Total No. of Pages : 1]

5E1393

B.Tech. V Sem. (Back) Examination, January/February - 2024
Electronics & Comm. Engg.
5EC 4-03 Control System

Time : 3 Hours **Maximum Marks : 120**

Min. Passing Marks :42

Instructions to Candidates:

*Attempt **all Ten** questions from Part A, **Five questions** out of **Seven** from Part B and **Four questions** out of **Five** from Part C.*

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

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

PART - A

(Answer should be given up to 25 words only)

ALL questions are **Compulsory.** **(10×2=20)**

1. What is the necessary condition that the characteristic equation of a feedback system satisfies the BIBO stability?
2. State the Nyquist criterion.
3. Why do you need a feedback controller? Justify your answer with an example.
4. Classify the following as open or closed loop system with valid reasons:
   i) An electrical On-Off switch,
   ii) Room air-conditioner.
5. What are the advantages of State variable model of dynamic system?
6. What is meant by state in control system?
7. State and explain Mason's gain formula.
8. Distinguish between type and order of a system.
9. Describe a stable system.
10. Define gain and phase margins.

PART - B

(Analytical/Problem solving questions)

Attempt any FIVE questions. **(5×8=40)**

1. Obtain the unit step response of a unity feedback system whose open loop transfer function G(S) = 4/S (S+5).
2. Explain the general procedure to construct bode plot.
3. Define effect of feedback on sensitivity, stability and gain.
4. Give any two real time examples for open loop and closed loop control systems and develop its block diagrams.
5. Explain the Routh's criteria with an example. What are its limitations?
6. Obtain the transfer function for linear time invariant system and also draw the state model.
7. Derive an expression for the transfer function of an armature-controlled DC servo motor.

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any FOUR questions. **(4×15=60)**

1. For a unity feedback system whose open loop transfer function is G(S) =4/S(S+5). Find Wn, ξ.
2. a) Define the steady state error and error constants of different types of inputs.
   b) Damping factor and natural frequency of the system are 0.12 and 84.2 rad/sec respectively. Determine the rise time (tr), peak time (tp), maximum peak overshoot (mp) and settling time (ts).
3. a) Distinguish between Transfer function model and State Space model.
   b) Diagonalize the system matrix given below.

$$A = \begin{matrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -2 & -5 & -4 \end{matrix}$$

4. a) Write the equations for time domain specifications of a standard second order system with unit step input.
   b) Explain the effect of Proportional control action on the performance of a second system.
5. a) Define : i) State ii) State variables iii) State space representation.
   b) Find the state transition matrix for the following matrix.

$$A = \begin{matrix} 1 & 0 \\ -1 & 1 \end{matrix}$$

   c) Obtain the state space representation for the following differential equation, $y'' + 5y' + 7y = 114$ Where 'y' is the output.

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5E1782

Roll No. _____ [Total No. of Pages : 3]

5E1782

B.Tech. V-Sem. (Main & Back) Examination, January/February - 2024
Electronics and Communication Engg.
5EC4-03 Control System

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

*Attempt **all Ten** questions from **Part A**, **Five** questions out of **Seven** questions from **Part B** and **Three** questions out of **Five** questions from **Part C**.*

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

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

PART - A

(Answer should be given up to 25 words only)

All questions are **compulsory.** **(10×2=20)**

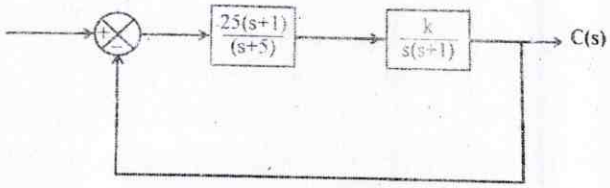
1. Compare open loop system and closed loop system.
2. Define pole and zero and their importance.
3. What are the advantages of signal flow graph?
4. Why step signal is more suitable as a test signal for control system?
5. Define absolute and relative stability.
6. State Nyquist stability criterion.
7. Define gain margin and phase margin.
8. Define controllability and Observability.
9. What is an optimal control problem?
10. What are two types of nonlinear control structure.

PART - B

(Analytical/Problem solving questions)

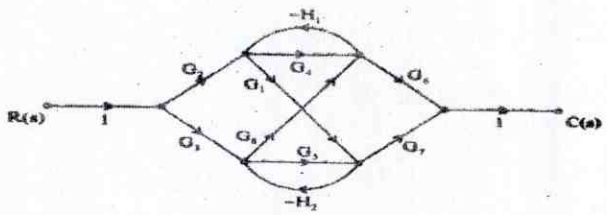
Attempt any Five questions. (5×4=20)

1. Determine the sensitivity of the closed loop system shown in figure w.r.t. forward path transfer function and feedback path transfer function. Also determine the sensitivity of closed loop transfer function to variation in parameter K. Assume the value of K is 1.



2. Explain the properties of transfer function.

3. Use Mason's gain formula to find the transfer function C(s)/R(s) for the signal flow graph shown below.

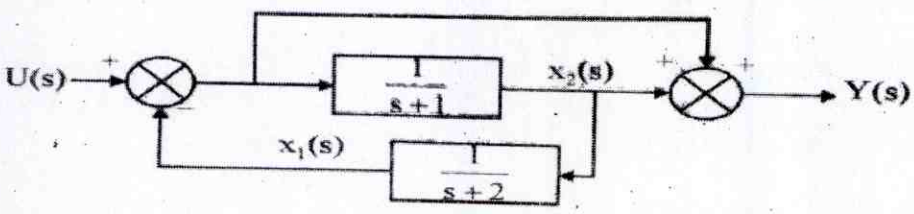


4. Explain cascade and parallel decomposition by giving an example.

5. Determine the gain margin for the open loop transfer function

$$G(s)H(s)=\frac{1}{(s+1)^3}$$

6. Construct state model for the following systems



7. Explain the different types of optimal control problems.

PART - C

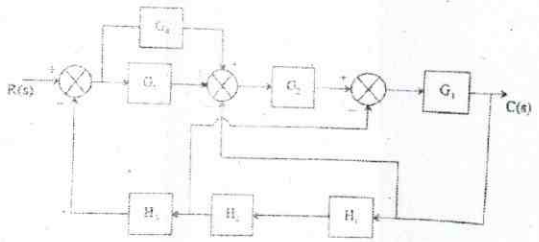
(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Three questions. (3×10=30)

1. Sketch the Bode plot and find the phase and gain margin for the systems.

$$G(s)H(s)=\frac{10(3+s)}{s(s+2)(s^2+s+2)}$$

2. Determine transfer function of the block diagram shown in figure below



3. The Open loop transfer function of a unity feedback system is given by

$$G(s)=\frac{K}{s(s+3)(s^2+s+1)}$$

Determine the value of K that will cause sustained oscillations in the closed loop system. Also find the oscillation frequency.

4. Write short notes on :
   i. Lead and leg compensation network.
   ii. Nonlinear control system.

5. Explain block diagram model. What is the importance of block diagram with reference to control system engineering?

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5E5024

Total No. of Questions: Total No. of Pages:

Roll No. _____

B.Tech. V-Sem (Back) Feb 2024
Electronics & Communication Engg.
5EC4A Analog Communication
5E5024

Time: 3Hours **Maximum Marks: 80**
Min Passing Marks: 24

Attempt any **five questions,** selecting **one question** from **each unit**. All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly.

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

1_____ 2. _____

UNIT -I

Q. 1 (a) The noise figure of a receiver is 20 dB and it is fed by a low noise amplifier which has a gain of 40 dB and noise temperature of 80 K .Calculate the overall noise temperature of the receiving system and the noise temperature of the receiver

(b) Define the term (i) Noise factor (ii) Shot Noise (8+8)

OR

Q.1 (a) Calculate the overall noise factor due to several amplifiers in cascade

(b) Define the term noise and explain the noise in reactive circuits. (8+8)

UNIT -II

Q. 2 (a) Draw the circuit diagram of the balanced modulator using diode and Explain its working

(b) What is a SSB-SC modulator? Draw the block diagram of Phase shift method for generating SSB Signal? (8+8)

OR

Q.2 (a) Define the following term

(I) Selectivity
(II) Fidelity

(III) Double spotting

(b) Differentiate between DSB –SC, SSB-SC modulation scheme (12+4)

UNIT -III

Q. 3 (a) Difference between NBFM and WBFM

(b) Draw and Explain the indirect method (Armstrong method) of FM generation (6+10)

OR

Q.3(a) Define the term Pre-emphasis and De-emphasis?

(b) A FM wave is given by
$S(t)= 10\sin(6*10^8t+7\sin 1050t)$ Determine the following

(I) The carrier and modulating frequencies, the modulation index, and the maximum deviation.

(II) Power dissipated by this FM wave in a 100 ohm resistor (6+10)

UNIT -IV

Q. 4 (a) Explain the FM threshold effect.

(b) Calculate the figure of merit of an AM receiver operating on single tone AM. (4+12)

OR

Q.4 (a) prove that the performance of an SSB system using synchronous detection is equivalent to the performance of both DSB and baseband system

(b) Calculate the figure of merit γ for SSB-SC System? (8+8)

UNIT -V

Q. 5 (a) with the help of neat circuit diagram explain the generation and detection of a PPM signal

(b) Compare PAM, PWM and PPM. (8+8)

OR

Q.5 (a) State and prove sampling theorem in time domain .Also define the term Nyquist rate and Nyquist interval

(b) With the help of neat circuit diagram explain the generation and detection of a PWM signal (8+8)

5E1394

Total No. of Questions: Total No.of Pages:

Roll No. _____

B.Tech.V-Sem.(Back)Exam Feb. 2024
Electronics & Comm. Engg.
5EC 4-04 Digital Signal Processing
5E1394

Time: 3 Hours **Maximum Marks: 120**
Min. Passing Marks: 42

Attempt all ten questions from Part A, five question out of seven from Part B and four questions out of five from Part C.
Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/ calculated must be stated clearly. Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1._____ 2._____

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

All questions are compulsory

Q.1 Define discrete signals.

Q.2 Write short note on sampling.

Q.3 Write the properties of FFT.

Q.4 Define LSI systems.

Q.5 Compare Parametric and non-parametric spectral estimation.

Q.6 Prove that following system is linear or nonlinear

y(n) - x(n) y(n-a) =x(n)

Q.7 What you mean by casualty in discrete time signal/system.

Q.8 Write advantage and application of FIR filters.

Q.9 Define with example Inverse Z transfer function.

Q.10 Differentiate between FFT and DFT.

10 x 2 = 20

Part B(Analytical/Problem solving questions)

Attempt any Five questions

Q.1 Explain the process of reconstruction of signal.

Q.2 Obtain direct form I realization of a system described by:

$$y(n) - \frac{3}{4}y(n-1) + \frac{1}{8}y(n-2)\, x(n) + \frac{1}{2}x(n-1)$$

Q.3 Describe Linear systems with linear phase.

Q.4.Design IIR filter by impulse invariance transformation.

Q.5 Describe Butterworth filter with its response

Q.6 Compare Basic structures for IIR and FIR systems.

Q.7 Explain sampling and different type of sampling technique.

5 x 8 =40

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

Attempt any four questions

Q.1 Drive and explain is the frequency response of LTI systems.

Q.2 Explain & find N-point DFT of following sequence

$$h(n) = \begin{cases} \frac{1}{3} & for\ 0 \le n \le 2 \\ 0 & else\ where \end{cases}$$

Q.3 Determine the four point DFT of the sequence x(n) = (1,0,2,1) using DIT Algorithm.

Q.4 What is Elliptic Approximations, explain it process for design of IIR Digital Filters with neat diagram and derive required equations.

Q.5 Given Analog filter transfer function is

$$\frac{(S+0.1)}{(S+0.1)^2 + 9}$$

Convert this filter into digital IIR filter using impulse invariant method also sketch and write comment on "T"value how it affects aliasing.

4 x 15 = 60

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5E1783

Roll No. _____ [Total No. of Pages : 3

5E1783

B.Tech. V-Sem (Main and Back) Examination, January/February-2024
Electronics and Communication Engineering
5EC 4-04 Digital Signal Processing

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

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

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

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

All questions are compulsory. **(10×2=20)**

1. What is the need for multirate Signal processing?
2. What conditions are to be satisfied by the impulse response of an FIR system in order to have a linear phase?
3. Write computational efficiency of FFT over DFT.
4. Write some examples of multirate digital systems.
5. State two properties of DFT.
6. Explain causality of a linear time invariant system.
7. State the Sampling theorem.
8. What is meant by aliasing? How to avoid it?
9. List the basic characteristics of digital signal processor.
10. Show that the following system is nonlinear and time invariant

$y(n+2)+2y(n) = x(n+1)+2$

PART - B
(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. Compare direct form I and direct form II realization of IIR systems.
2. Compute the DFTs of the sequence $x(n) = 2^{-n}$ where N = 8 using DIT algorithm.
3. What is a Hamming window function? obtain its frequency domain characteristics.
4. Two casual discrete-time signals $x[n]$ and $y[n] = \sum_{m=0}^{n} x[m]$. If the Z-transform of $y[n] = \frac{2}{z(z-1)^2}$, the value of x[2] is
5. A signal $x(t) = \exp^{-2\pi Bt} u(t)$ is the input to an ideal low pass filter with bandwidth B Hz. The output is denoted by y(t). Evaluate $\int_{-\infty}^{\infty} [y(t) - x(t)]^2 dt$
6. A sequence x(n) with the Z- transform $x(z) = z^4 + z^2 - 2z + 2 - 3z^{-4}$ is applied as an input to a linear time-variant system with the impulse response $h(n) = 2\delta(n-3)$ where $\delta(n) = \begin{cases} 1 & n=0 \\ 0 & otherwise \end{cases}$ find the output at $n = 4$
7. Explain the difference between Butterworth and chebyshev filter.

PART - C
(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions. **(3×10=30)**

1. By means of DFT and IDFT, determine the response of the FIR filter with impulse response h(n)={5, 6, 7} to the input sequence x(n)={1, 2,-1, 5, 6}
2. Determine a direct from realization for the following linear phase filter $h(n) = \{1,2,3,4,3,2,1\}$

3. The desired frequency response of a low pass filter is

$$H_d(e^{jw}) = \begin{cases} e^{-j3w} & -\frac{3\pi}{4} \le W \le \frac{3\pi}{4} \\ 0 & otherwise \end{cases}$$ Determine $H(e^{jw})$ for M=7 using a rectangular window.

4. Design a digital Butterworth filter that satisfies the following constraint using bilinear transformation. Assume T = 1 sec.

$0.9 \le |H(e^{jw})| \le 1 \qquad 0 \le w \le \frac{\pi}{2}$

$|H(e^{jw})| \le 2 \qquad \frac{3\pi}{4} \le w \le \pi$

5. Consider an FIR lattice filter coefficients $K_1 = 0.65$, $K_2 = 0.5$, $K_3 = 0.9$. Find its impulse response and draw the direct form structure.

5E1395

Roll No. _____ [Total No. of Pages : 2

5E1395

B.Tech. V - Sem. (Main&Back) Examination, January/February - 2024
Electronics and Comm. Engg.
5EC 4-05 Microwave Theory and Techniques

Time : 3 Hours **Maximum Marks : 120**
Min. Passing Marks : 42

Instructions to Candidates:

Attempt all Ten questions from Part A, five questions out of Seven from Part B and Four questions out of Five from Part C.

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

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

PART - A

(Answer should be given up to 25 words only)

ALL questions are **Compulsory.** **(10×2=20)**

1. Write the frequency range of Radar X and L band.
2. Compare the cutoff frequencies of TE_{10}, TM_{21} and TE_{32} modes.
3. Draw the structure of 10 - planar microstrip line.
4. Write the name of two microwave semiconductor component which works as bulk devices.
5. Write the unit of noise figure.
6. Compare the power level of PIN diode klystron, IMPATT diode and TWT in decreasing order.
7. Write the name of antenna parameter which measure its directional property.
8. Write the S-matrix of a matched magic Tee.
9. Define isolation of a two hole directional coupler.
10. Write expression of wave guide impedance of a rectangular waveguide for TE mode.

PART - B

(Analytical/Problem Solving questions)

Attempt any FIVE questions. **(5×8=40)**

1. The cross section of a rectangular wave guide is $(40\times20)mm^2$. Calculate its cutoff frequency and frequencies of two higher order modes in transverse electrical configuration.
2. The incident power is 100 watts for a directional coupler. It has a coupling factor of 25dB and a directivity of 40 dB. Find coupled and isolated port powers.
3. The reflex klystron operates at $V_0 = 1200V$, f = 10 GHz and $L_r = 8$ cm. Calculate repeller voltage.
4. A circular magnetron has inner radius = 0.15 m and outer radius = 0.45 m. The magnetic flux density is 1.2×10^{-3} w/m^2. Find the Hull cut-off voltage.
5. Explain the working of GUNN diodes and explain its different modes.
6. Explain the application of MW in
   i) RFID and
   ii) GPS.
7. Draw the velocity diagram of two cavity klystron and reflex klystron. Also explain the bunching phenomna in it.

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any FOUR questions. **(4×15=60)**

1. What is low noise amplifier (LNA)? How its equivalent electrical circuit is differ from small signal amplifier? Draw the circuit diagram of a LNA and explain its working. **(5+5+5=15)**
2. Draw the structure of a hybriding and find its S-matrix. Also write its applications. **(5+10=15)**
3. i) Calculate the VSWR of a rectangular waveguide of 2.5cm×1.0 cm. Operating at 100 GHz. The distance between twice minimum power points is 1 mm. **(10)**
   ii) Explain any one method used for measure VSWR in a waveguide. **(5)**
4. i) Draw the structure of schottky Barrier diode and draw its electrical equivalent circuit. Why these diodes are usefull at MW frequencies? **(10)**
   ii) Define EMI and EMC and also discuss their use in MW engineering. **(5)**
5. i) If a matched isolator has insertion loss = 0.5 dB and isolation = 25 dB Then find its S-Matrix component. **(10)**
   ii) What is the different between TEM, TE and TM mode? Also give an example for each where these mode exists. **(5)**

5E1784

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5E1784

B.Tech. V-Sem (Main &Back) Examination, January/February - 2024
Electronics and Communication Engineering
5EC4-05 Microwave Theory and Techniques

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

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

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

PART - A
(Answer should be given up to 25 words only).

All questions are compulsory. **(10×2=20)**

1. Describe the differences between Isolator and circulator.
2. List the properties of scattering matrix for a lossless junction.
3. Why H-plane T junction called as current junction?
4. Why TEM waves are not propagated through waveguide?
5. Express the characteristics of VSWR meter.
6. What is the need of matching networks?
7. Write the applications of PIN diode.
8. Draw the diagram of magic tree.
9. What are the five parameters of antenna?
10. What is a stripline?

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. Draw the field patterns of the dominant mode in a rectangular waveguide.

2. Explain the Gunn Effect. Mention various modes of Gunn diode and explain them in detail.

3. How amplification is achieved in TWT amplifier?

4. What is spectrum analyzer? List the types of spectrum analyzer and applications of it.

5. Calculate the SWR of a transmission system operating at 10 GHz. Assume TE_{10} wave transmission inside a waveguide of dimensions a = 4cm, b = 2.5cm. The distance measured between twice minimum power points = 1on a slotted line.

6. Draw the block diagram of a network analyzer and explain the function of each block.

7. How are microwave meausrements different from low frequency measurements?

PART - C
(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Three questions. **(3×10=30)**

1. Discuss an arrangement to measure low microwave power within 1 to 10mw range.

2. Justify and describe how a microwave filter is designed using insertion loss method.

3. A TWT operates with following parameters, $V_b = 2.5KV$, $I_b = 25mA$, $Z_o = 10$ circuit length L = 50, f = gGHz. Find the gain parameter, power gain and all four propgation constants.

4. Explain the principle of operation of IMPATT diode with suitable diagram and write down the advantages and uses of it.

5. What are the advantages and disadvantages of monolithic microwave ICs? A reciprocal two port microwave device has a VSWR of 1.5 and insertion loss of 2dB. Find the magnitudes of S-parameters for the device.

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B.Tech. V - Sem. (Back) Examination, January/February - 2024
PCC/PEC Electronics & Comm. Engg.
5EC 5-12 Embedded Systems

Time : 2 Hours **Maximum Marks : 80**

Min. Passing Marks : 28

Instructions to Candidates:

*Attempt **all Five** questions from **Part A**, **Four** questions out of **Six** questions from **Part B** and **Two** questions out of **Three** from **Part C**.*

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

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

PART - A

(Answer should be given up to 25 words only)

All questions are **compulsory.** **(5×2=10)**

1. What is the concept of multi - threading? **(2)**
2. Write any two wireless communication devices used in Embedded system. **(2)**
3. What is the role of logic gates in embedded hardware design **(2)**
4. What is meant by embedded firmware. **(2)**
5. Write the name of tools for designing embedded software. **(2)**

PART - B

(Analytical/Problem solving questions)

Attempt any four questions. **(4×10=40)**

1. Explain various form of memories present in embedded system. **(10)**
2. How multitasking embedded system are designed? Give brief review of commercial RTOS used. **(10)**
3. Explain task process and thread with their types and example which aids the real - time system. **(10)**
4. Explain about sequential program model for the development of embedded platform. **(10)**

5. What do you understand by Interrupt in embedded system discuss some common interrupts sources. **(10)**

6. Discuss following with diagram:

   a. LED, LCD interfacing.

   b. ADC interfacing. **(5+5=10)**

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Two questions. **(2×15=30)**

1. Illustrate with functional description about the different phases of embedded design life cycle model. **(15)**

2. Elucidate the selection of processor and memory for any one embedded application with suitable diagram in detail. **(15)**

3. Discuss thread scheduling in RTOS. Also discuss the action of scheduler when interrupt occurs. Take help of suitable diagram to demontrate. **(15)**

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5E1785

B.Tech. V-Sem. (Main & Back) Examination, January/February - 2024
Electronics and Communication Engineering
5EC5-11 Bio-Medical Electronics (Elective - I)

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

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

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

PART-A
(Answer should be given up to 25 words only).

All questions are compulsory. **(10×2=20)**

1. Give any Four Factors to be considered when we design any medical Instrument?
2. Name the Electrodes used for recording EMG and ECG?
3. What are the use of MRI?
4. What is Defibrillator? State its use.
5. What is meant by Resting potential? What is the Range for Resting potential.
6. What are the modes of operation of Pacemakers?
7. What is the Principle of Plethysmography?
8. What are the methods involved in direct blood pressure measurement?
9. Define Cardiac output.
10. Calculate the energy stored in 16 μF capacitor of a DC defibrillator that is charged to a potential of 5000 V dc.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. Identify the various types of transducers used in Biomedical Engineering? Write Principle of operation of any 5 transducers.

2. Explain heart - lung machine with the help of Neat - diagram.

3. Discuss Electrical conduction pathway of heart and Explain the working principle of artificial Cardiac pacemaker with Necessary diagrams.

4. What are hearing aids? Differentiate between Conventional and digital type of hearing aids with suitable sketches?

5. What is an Artificial Kidney machine? Explain any one method of dialysis with suitable sketches.

6. What is plethysmography? Explain Impedance plethysmograph with Necessary diagram.

7. Explain equivalent Circuit of Bio-Potential Electrode Interface.

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Three questions. **(3×10=30)**

1. What are Cardiac Pacemakers? classify them in detail.

2. Discuss about static and dynamic characteristics of medical Instruments.

3. With Neat Diagram Explain the working of X-ray machine. Enumerate the uses of X-rays in medicine?

4. Draw and Explain the Principal blocks of ECG Recorder.

5. With the help of Neat diagram write how the Oscillometric method helps to measure Blood Pressure.

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5E1787

B.Tech. V-Sem (Main&Back) Examination, January/February - 2024
Electronics and Communication Engineering
5EC5 -14 Satellite Communication (Elective-I)

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

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

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

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

All questions are compulsory. **(10×2=20)**

1. Assume a circular orbit: Using Newton's law of gravitation and Newton's second law, determine the acceleration of a satellite.
2. Define payload and transponder.
3. Explain the use of control bits in the data frame?
4. What is the difference between active and passive satellites?
5. What does the acronym VSAT stand for? Also define the term Figure of Merit.
6. State Kepler's third law.
7. Define encryption.
8. What is meant by perigee and apogee?
9. List out the types of modulation scheme employed in satellite communication.
10. Define the term "antenna gain".

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PART - B
(Analytical/Problem solving questions)

Attempt any Five questions. **(5×4=20)**

1. Discuss about frequency allocations for satellite communication.

2. What is thermal control? Why is it required?

3. Define and explain the terms roll, pitch and yaw.

4. Explain the working of global positioning system in detail.

5. An antenna has a noise temperature of 35 K and is matched into a receiver which has a noise temperature of 100 K. calculate the noise power density and the noise power for a bandwidth of 36 MHz.

6. Define Universal time and sidereal time.

7. Satellite is orbiting in a geosynchronous orbit of radius 42500km. Find the velocity and time of orbit. What will be the change in velocity if the radius reduces to 36000km. If G_0=398600.5Km^{3}s^2.

PART - C
(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Three questions. **(3×10=30)**

1. Illustrate what is meant by FDMA, and show how this differs from FDM.

2. Explain the effected of rain and intermodulation noise in the satellite communication system, and describe how it is reduced.

3. Explain the difference types of transmission losses in satellite communication with necessary expression.

4. From the calculation of system noise temperature prove that C/N ratio is directly proportional to G/T ratio.

5. With suitable and neat and clean diagram, illustrate the various modules of Attitude and Orbit Control(AOCS)sub-system.
