

Model Question Paper

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P.E.S.COLLEGE OF ENGINEERING, MANDYA-571401
(An Autonomous Institution Under VTU, Belagaum)
Department of Electronics and Communication Engineering
Sixth Semester B.E Degree Examination
Model Question Paper
P08EC61- Antennas and Wave Propagation

Duration: 3 hrs

Max. Marks: 100

Note: Answer any FIVE full questions selecting at least two questions from each part.

PART-A

1. a) Define the following antenna terminologies. 08
 - i) Antenna field zones
 - ii) Effective height
 - iii) Effective Aperture
- b) Determine the directivity of the following source. 06
 - i) $u = u_m \cos^3 \theta$
 - ii) $u = u_m \sin \theta \sin^2 \phi$
- c) Determine the effective aperture and directivity of a linear $\lambda/2$ dipole Antenna. 06
2. a) Derive an expression for the resultant field of an array of N isotropic source and obtain the condition for operating it as 08
 - i) Broad side array
 - ii) End fire array
- b) Explain the concept of principle of pattern multiplication with an example. 06
- c) Obtain the field equation for a linear uniform array of 6 isotropic point sources spaced $\lambda/2$ distances apart. The power is applied with equal amplitude and in phase. Also find FNBW. 06
3. a) Derive an expression for the field components of a short dipole starting with expressions of electric potential and vector magnetic potential. Also determine the far field components. 12
- b) Determine the radiation resistance of a $\lambda/2$ dipole. 08
4. a) Derive the expression for the field strength E_ϕ and H_θ in far field for small loop. 08
- b) Explain Bobinet's Principle with illustration. 05
- c) Write note on patch or micro strip antenna. 07

PART-B

5. a) Explain the following design parameters of a helical antenna. 06
 - i) Beam width
 - ii) Axial ratio
 - iii) Impedance
- b) Design a yagi-uda Six element antenna for operation at 500 MHz with folded dipole feed. 06

What are the lengths of

 - i) Reflector element
 - ii) Driven element
 - iii) Four director element
 - iv) Between reflector and driven element
 - v) Between director element.
- c) Explain the working of log periodic antenna. 08

6. a) Explain the working of corner reflector and plasma Antenna with figure. 10
- b) Explain the antennas used for terrestrial mobile communication system. 10
7. a) An Antenna located at the surface of the earth is used to receive the signals transmitted by another antenna located at a height of 80mt from the spherical surface of the earth. Calculate the optical and radio horizon if $\frac{dn}{dh} = -39/\text{kmt}$. 06
- b) In tropospheric propagation, show that radius of curvature of path is a function of the rate of change of dielectric constant with height and explain the duct wave propagation. 08
- c) Explain the ground wave propagation by means of 06
- i) Surface waves
- ii) Diffraction
8. a) For ionospheric layers, derive the expression for conductivity and relative permittivity as a function of electron density and angular frequency. 08
- b) Define the terms 08
- i) Critical frequency f_C
- ii) Skip distance D_{skip}
- iii) Maximum usable frequency f_{MUF} . Obtain the relation for D_{skip} in term of f_C and f_{MUF} .
- c) Ionospheric wave is reflected from E layer with virtual height 100kmt and from F layer with virtual height 300kmt. Determine the single-hop distance for each layer. 04

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Model Question Paper
P08EC62-COMPUTER COMMUNICATION NETWORKS

Duration: 3 hrs

Max. Marks: 100

Note: Answer any FIVE full questions selecting at least two questions from each part.

PART-A

1. a) What are the classes of packet switched networks? And distinguish between them? 07
- b) Explain in detail nodal delays and end-to-end delay? 10
- c) What is the difference between host and end systems? List-out the end systems? 03
2. a) Name the different architecher's used in modern network application's and explain each one? 10
- b) Write the HTTP Required message format and explain all the fields? 07
- c) List out FTP commands and Explain their use? 06
3. a) Explain Socket programming with TCP? 06
- b) List out the popular internet applications and their underlying transport protocols? 06
- c) Explain Go-Back-N (GBN) protocol? 08
4. a) Write the TCP segment Structure and explain? 08
- b) Explain the congestion control with ATM ABR? 06
- c) Consider sending an object of size $O = 100k$ bytes from server to client. Let $S = 536$ bytes and $RTT = 100msec$. suppose the transport protocol uses static window with window size W . 06
 - i) For a transmission rate of 28kbps, determine the minimum possible latency. Determine the min window size that achieves this latency.
 - ii) Repeat (i) for 100kbps.
 - ii) Repeat (i) for 1Mbps.
 - iii)Repeat (i) for 10Mbps.

PART-B

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|-------|---|----|
| 5. a) | Explain router architecture? | 05 |
| b) | Explain IPv4 datagram format? | 08 |
| c) | How will the public internet, which is based on IPv4 be transitioned to IPv6? | 07 |
| 6. a) | Explain link state routing algorithm? | 08 |
| b) | Explain Spanning tree Broadcast? | 05 |
| c) | Explain OSPF intra- AS routing in the internet? | 07 |
| 7. a) | Explain Important of adapters in communication link? | 07 |
| b) | Explain slotted ALOHA? | 07 |
| c) | Consider the 4-bit generator $G=[1001]$ and $D=[10101010]$, Find the value of 'R' using CRC? | 06 |
| 8. a) | Describe the various versions of CSMA protocol and CSMA/CD? | 08 |
| b) | Explain PPP data framing? | 06 |
| c) | Compare 10 Base T, 100 Base T and Gigabit Ethernet? | 06 |

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Model Question Paper
P08EC63- Microwave devices and Integrated Circuits

Duration : 3 hrs

Max. Marks :100

Note : Answer any FIVE full questions selecting at least Two questions from each part.

PART-A

- 1.a) Derive the equation for the following at microwave frequency.
i) Propagation constant ii) Attenuation constant iii) Phase constant
iv) Characteristic impedance & v) Phase velocity 12
- b) Derive the relationship between SWR and reflection co-efficient. 03
- c) The characteristic impedance of the line is 50Ω and SWR $\rho=2$ when the line is loaded. When the line is shorted, the minima shifts 0.15λ towards load. Determine the load impedance. Use Smith chart. 05
- 2.a) Give the comparison between waveguide and co-axial cable. 06
- b) An air filled rectangular waveguide of inside dimension $a = 7$ cms and $b = 3.5$ cm operates in the dominant TE_{10} mode.
i) Find the cut-off frequency
ii) Determine phase velocity of the wave in the guide at a frequency of 3.5 GHz. 06
iii) Determine the guide wavelength at the same frequency.
- c) How to realize the four -port circulator with directional couplers and phase shifter? Explain. 08
- 3.a) Explain mechanism of oscillation in Reflex klystron oscillator with neat sketches? 10
- b) Explain TWT amplifier with neat sketches? 10
- 4.a) Explain the relation between incident and reflected waves in terms of scattering parameters for a two port network. Also explain physical significance of s-parameters. 08
- b) Which properties are common in S, Z and Y matrices? 03
- c) Two transmission lines of characteristic impedances Z_1 and Z_2 are joined at plane PP' Express s- parameters in terms of impedances. 09

PART-B

- 5.a) Explain with a neat sketch a precision rotary phase shifter. 06
- b) A 20 mw signal is fed into one of collinear port 1 of a lossless H- plane T-junction calculate the power delivered through each when other ports are terminated in matched load. 06
- c) With a neat sketch explain the different types of strip lines. 08

- 6.a) Explain with relevant figures the fundamental concept of RWH theory. 05
- b) A typical h-type GaAs Gunn diode has the following parameters:
 Threshold field = $E_{th} = 2800 \text{ v/cm}$
 $E = 3200 \text{ V/cm}$
 Device length = $L = 10 \mu\text{m}$
 Doping concentration = $n_0 = 2 \times 10^{14} \text{ cm}^{-3}$
 Operating frequency = $f = 10 \text{ GHz}$.
- i) Compute electron drift velocity
 ii) Calculate the current density 04
 iii) Estimate the negative electron mobility.
- c) Explain the principle of operation of read diode with suitable diagrams. 06
- d) Draw the equivalent circuit for parametric amplifier and explain. 05
- 7.a) Briefly explain the characteristics of micro strip line. 06
- b) A lossless parallel strip line has a conducting strip width W . The substrate dielectric separating the two conducting strips has a relative dielectric constant ϵ_r of 6 and a thickness d of 4 mm. Evaluate w , c and u_p (in usual notations). 08
- c) Obtain attenuation losses in parallel strip lines for both conductor and dielectric. 06
- 8.a) Distinguish between thick film and thin film technology. Describe the fabrication process of MMIC and hybrid MIC's. 10
- b) Describe the basic fabrication process of MOSFET's? 10

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Model Question Paper
P08EC64- Image Processing and Pattern Recognition

Duration : 3 hrs

Max. Marks :100

Note : Answer any FIVE full questions selecting at least Two questions from each part.

PART-A

1. a) What is digital image processing? Explain the fundamental steps in digital image processing. 08
b) Explain the various components of an image processing system. 08
c) Define the following terms.
i) Adjacency
ii) Connectivity
iii) Spatial resolution
iv) Gray level resolution 04
2. a) Explain the process of image sampling and quantization in digital image formation. 08
b) Discuss the role of brightness adaption curve in human vision system. 06
c) Discuss the significance of distance measures as applied to image processing 06
3. a) Explain some of the widely used gray level transformations. 06
b) What is an image histogram? Explain histogram equalization technique for image enhancement. 08
c) Perform histogram equalization of the image

4	4	4	4	4	4
3	4	5	4	3	3
3	5	5	5	3	3
3	4	5	4	3	3
4	4	4	4	4	4

06
4. a) Explain the basic steps for filtering in the frequency domain. 07
b) What is zero – phase shift filter? Explain their significance in image enhancement. 07
c) Write a short note on
i) Gaussian low pass filter
ii) Butterworth high pass filter. 06

PART-B

5. a) Define the process of image restoration. Explain the order statistics filter for restoring images in the presence of noise. 10
- b) Explain the following methods to estimate the degradation function used in image restoration.
- i) Estimation by image observation.
 - ii) Estimation by experimentation.
 - iii) Estimation by mathematical modeling. 10
6. a) Explain the following color models:
- i) RGB color model
 - ii) HSI color model 07
- b) Explain the procedure in converting colors from RGB to HSI and vice-versa. 07
- c) Write a note on pseudo color image processing. 06
7. a) List the applications of pattern recognition. 07
- b) Discuss the importance of feature extraction for the classification of images. 07
- c) Explain the following:
- i) Feature vector
 - ii) Conditional probability
 - iii) Random variables. 06
8. a) What are the various types of distribution commonly employed in statistical decision making? 08
- b) State and prove Baye's theorem as applied to pattern recognition. 06
 - c) With an example, write a note on confusion matrices. 06

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Model Question Paper
P08EC65- Design & Synthesis using Verilog HDL

Duration : 3 hrs

Max. Marks :100

Note : Answer any FIVE full questions selecting at least Two questions from each part.

PART-A

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|------|--|----|
| 1.a) | Explain the different system task with example. | 08 |
| b) | Explain the hierarchical names with example. | 07 |
| c) | What are the basic components of a module? Which components are mandatory? | 05 |
| 2.a) | Write a verilog code and stimulus for 4 bit ripple carry full adder. | 08 |
| b) | Explain Rise ,fall and turnoff delays with example | 06 |
| c) | Explain the different types of operator in verilog | 06 |
| 3.a) | Explain the blocking and non blocking assignment statements with examples. | 07 |
| b) | Explain the timing controls constructs available in verilog with examples. | 08 |
| c) | Write a verilog code for 4 bit counter. | 05 |
| 4.a) | Describe the difference between tasks and functions. | 06 |
| b) | Define a function to calculate the factorial of a 4 bit numbers. The output is a 32 bit value. Invokes the function by using stimulus and check results. | 06 |
| c) | Explain how to override paramete by using the defparm statement at the time of module Instantiation with example. | 08 |

PART-B

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|------|--|----|
| 5.a) | Explain the different types of Delay models with example. | 09 |
| b) | Describe delay back annotation. Draw the flow diagram for delay back annotation. | 05 |
| c) | Write a verilog code for 2 input CMOS nor gate. | 06 |
| 6 a) | List the User defined primitives (UDP) rules of verilog language. | 06 |
| b) | Define the sequential and Combinational UDPs with examples | 06 |
| c) | Explain how PLI routines are used in a verilog simulation | 08 |
| 7.a) | Define Logic synthesis and explain the benefits of logic synthesis. | 05 |
| b) | Explain the design flow from RTL description to an gate level description. | 10 |
| c) | Design sequential circuits using logic synthesis. | 05 |
| 8.a) | Explain the components of a traditional verification flow. | 10 |
| b) | Describe different technique for effective simulation. | 10 |

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Model Question Paper
P08EC6A0- (Elective) Programming in C++

Duration : 3 hrs

Max. Marks :100

Note : Answer any FIVE full questions selecting at least Two questions from each part.

PART-A

1. a. Explain the different data types supported in C++. Give examples. 07
b. What is reference? With example explain the different between pointer and reference. 06
c. With example explain vector container type 07
2. a. Discuss the following with example:
i) Increment and decrement operator. 08
ii)The bitwise operators. 08
b. Explain with the syntax, the components of the switch statement. Write a program in C++ to count the number of vowels in a given string using switch case statement. 12
3. a. What is preprocessor directives? What are the different types of preprocessor directives used in C++? Explain each with example. 10
b. What is function prototype? With example explain the different types of argument passing mechanisms. 10
4. a. What is the difference between class and object? Give example. 04
b. What is the different between constructor and destructor? Give example. 06
c. With example explain class object arrays and vectors. 10

PART-B

5. a. What is inheritance? Give example 06
b. What is the difference between multiple inheritance and multilevel inheritance? Give example. 06
c. With example explain public, private and protected inheritance. 08
6. a. What is operator overloading? Write a program to overload operator -- 10
b. With example explain overloaded operator new and delete 10
7. a. What is exception handling. Write a program to thrown an exception when divided by zero is occurred. 10
b. With example explain exception specification. 10
8. a. With example explain the following:
i) friend function ii) friend class iii) static function. 12
b. What is this pointer? Give example. 08
