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**B. Tech. (CSE/IT) EXAMINATION, Dec. 2023**

(Seventh Semester)

ADVANCED OPERATING SYSTEM

PEC-CS-403

Elective-IV

*Time : 3 Hours*

*Maximum Marks : 80*

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

प्रत्येक इकाई से **एक** प्रश्न चुनते हुए, कुल **पाँच** प्रश्नों के उत्तर दीजिए । प्रश्न संख्या **1** अनिवार्य है । सभी प्रश्नों के अंक समान हैं ।

1. (a) What is an operating system ? How does it work ?

4

एक ऑपरेटिंग सिस्टम क्या है ? यह काम किस प्रकार करता है ?

(b) How is communication system established in distributed operating systems ?

4

वितरित ऑपरेटिंग सिस्टम में संचार प्रणाली कैसे स्थापित की जाती है ?

(c) Draw the structure of Multi-Processor Operating Systems. **4**

मल्टी-प्रोसेसर ऑपरेटिंग सिस्टम की संरचना बनाइए ।

(d) For which purpose scheduling technique is used ? **4**  
शेड्यूलिंग तकनीक का उपयोग किस उद्देश्य के लिए किया जाता है ?

### Unit I (इकाई I)

2. Explain different types of operating systems with examples. **16**

विभिन्न प्रकार के ऑपरेटिंग सिस्टम को उदाहरण सहित समझाइए ।

3. Explain, how does Mobile Operating System work ? **16**  
बताइए कि मोबाइल ऑपरेटिंग सिस्टम कैसे काम करते हैं ?

### Unit II (इकाई II)

4. Draw the architecture of distributed operating system and explain various remote services provided by the same. **16**

वितरित ऑपरेटिंग सिस्टम का आर्किटेक्चर बनाइए और इसके द्वारा प्रदान की जाने वाली विभिन्न दूरस्थ सेवाओं की व्याख्या कीजिए ।

5. What is Mutual Exclusion ? Explain Election Algorithms. **16**

पारस्परिक बहिष्करण क्या है ? चुनाव एल्गोरिदम समझाइए ।

### Unit III (इकाई III)

6. Explain Semaphores. **16**  
सेमाफोर्स को समझाइए ।

7. Explain classic problem of synchronization. **16**  
तुल्यकालन की क्लासिक समस्या को समझाइए ।

### Unit IV (इकाई IV)

8. How is resource management done in Mobile Devices ? Explain with examples. **16**

मोबाइल उपकरणों में संसाधन प्रबंधन कैसे किया जाता है ? उदाहरण सहित समझाइए ।

9. Explain Battery management is done by operating system in Mobile devices. **16**

मोबाइल उपकरणों में ऑपरेटिंग सिस्टम द्वारा किये जाने वाले बैटरी प्रबंधन को समझाइए ।

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**B. Tech. (CSE/IT) EXAMINATION, Dec. 2023**

(Seventh Semester)

HUMAN RESOURCE MANAGEMENT

OE-CS-417

*Time : 3 Hours*

*Maximum Marks : 80*

**Note :** Nine questions will be set in all by the examiner taking two questions from each Unit and *one* question containing short answer type questions from entire syllabus. Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory which is from entire syllabus.

1. (a) What is Human Resource Information System ?  
Briefly discuss. 4
- (b) Explain Performance Management System. 4
- (c) What is training evaluation ? Explain. 4
- (d) What do you mean by corporate social responsibility ? 4

**Unit I**

2. (a) Discuss the scope of Human Resource Management and its strategic objectives. **8**

- (b) What are roles, responsibilities and competencies of HR manager ? Explain. **8**
3. Discuss Human Resource Planning and Forecasting in detail. **16**

## **Unit II**

4. (a) Discuss HR Sourcing and Recruitment Process and its significance. **8**
- (b) What is job description and job specification ? Discuss. **8**
5. State and explain job design, approaches and methods in detail. **16**

## **Unit III**

6. (a) Discuss training process and training need analysis (TNA) in detail. **8**
- (b) How can you design training programs and evaluate the training process ? **8**
7. What is potential appraisal and succession planning ? Also discuss employee compensation. **16**

## **Unit IV**

8. (a) What is Grievance handling and employee welfare ? Discuss. **8**

- (b) What is international HRM ? What are its features and role ? Discuss. **8**

9. State the role and importance of HR audit and accounting. Also highlight role of HR in virtual organizations. **16**

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**B. Tech. (CSE/IT) EXAMINATION, Dec. 2023**

(Third Semester)

HUMANITIES-I

HSMC-201

Effective Technical Communication

*Time : 3 Hours*

*Maximum Marks : 80*

**Note :** Attempt *Five* questions in all. Q. No. **1** is compulsory.

All questions carry equal marks.

**1.** Write short notes on any *four* of the following : **4×4=16**

- (a) Writing for print media
- (b) Collaborative Writing
- (c) Localization
- (d) Personal goal setting
- (e) Public Speaking
- (f) Interview
- (g) Managing time
- (h) Personal Memory.

2. Discuss in detail the technical writing process. Also, mention the forms of discourse used. **16**

*Or*

3. What are various kinds of technical documents ? Explain in detail. **16**

4. What do you mean by technical communication ? How do you manage technical communication projects ? **16**

*Or*

5. Discuss in detail various aspects of self-development and assessment. **16**

6. You ordered 110 shirts from Ms. Readymade Garments. When delivered to you, 50 were found defected. Write a letter to the manager of Ms. Readymade Garments to return the defected pieces of shirt. **16**

*Or*

7. Your university organized Youth Festival. Write a report on the same. **16**

8. What is meant by business ethics ? Discuss in detail. **16**

*Or*

9. What are the roles and responsibilities of an engineer ? Discuss. **16**

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**B. Tech. (CSE/IT) EXAMINATION, Dec. 2023**

(Seventh Semester)

R PROGRAMMING

OE-CS-429

*Time : 3 Hours*

*Maximum Marks : 80*

**Note :** Nine questions will be set in all by the examiner taking *two* questions from each Unit and *one* question containing short answer type questions from entire syllabus. Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory which is from entire syllabus.

1. (a) What is the R environment ? Briefly discuss. 4
- (b) Explain if and else statement using R function. 4
- (c) What is Stepwise Variable Selection ? Explain. 4
- (d) What do you mean by Hierarchical Clustering ?  
Discuss. 4

**Unit I**

2. (a) Discuss the need and scope of R Studio and  
Revolution Analytics RPE. 8

(b) What is function documentation using R ? Explain.  
Also explain data frames. **8**

3. What is R binary file ? Discuss data included with R.  
How can data be extracted from websites ? **16**

### Unit II

4. (a) What are function arguments in R ? Discuss the  
values returned with example. **8**

(b) Discuss compound Tests Loops; for and while loops  
with implementation in program. **8**

5. State and explain cbind and rbind data reshaping. Also  
discuss *two* manipulating strings. **16**

### Unit III

6. (a) Differentiate between Normal Distribution Binomial  
Probability with examples. **8**

(b) What are ANOVA linear models ? Give their types  
and features. **8**

7. What is Poisson Model Diagnostics ? Discuss Residuals  
and Cross-Validation concept citing relevant examples.

**16**

### Unit IV

8. (a) What are Nonlinear Least Squares ? Give their  
features with significance. **8**

(b) State and explain Generalized Additive Models in  
detail. **8**

9. What do you understand by Random Forests Clustering ?  
What are K-means ? Discuss. **16**



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**B. Tech. (CSE/IT) EXAMINATION, Dec. 2023**

(First Semester)

SEMICONDUCTOR PHYSICS

BSC-101

*Time : 3 Hours*

*Maximum Marks : 80*

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory. All questions carry equal marks.

1. (a) What are radiative and non-radiative transitions ?
- (b) Semi-conductors have negative temperature coefficient of resistance. Explain.
- (c) Define mobility and how it is related to drift velocity.
- (d) Calculate the static and dynamic resistance of Si diode at 30°C. Given reverse saturation current ( $I_S$ ) = 1A and bias voltage (V) = 0.5V.
- (e) Discuss quantum confinement.
- (f) What are Brillouin zones ? Write K (wave vector) values of first and second Brillouin zone.
- (g) Define top down and bottom up process.
- (h) How is depletion layer formed in a p-n junction diode ? **8×2=16**

## Unit I

2. Write short notes on the following :
- (a) Brilluoin Zones
  - (b) Effective mass
  - (c) E-k diagrams. **5+6+5=16**
3. (a) Discuss the formation of metal semiconductor junctions. Explain the conditions for formation of Ohmic and Schottky contacts. **10**
- (b) Show that effective number of electrons vanishes for completely filled band. **6**

## Unit II

4. (a) What is photovoltaic effect ? Give construction, working and characteristics of a p-n junction Si solar cell. **12**
- (b) Write a short note on Fermi Golden rule. **4**
5. (a) Derive an expression for joint density of states in semiconducting materials. **12**
- (b) Differentiate between Frenkel excitons and Wannier-Mott excitons. **4**

## Unit III

6. Describe, how Vander Pauw method is used to determine resistivity of a semiconductor crystal and then further how this contact assembly in Hall's effect is used for measurement of carrier concentration and mobility of carriers. **16**
7. (a) Draw the I-V characteristics of a p-n junction diode and explain the extraction of ideality factor and Boltzmann constant. **8**
- (b) Explain C-V measurement technique for characterization of semiconductors. **8**

## Unit IV

8. (a) Explain with a typical example why surface area to volume ratio is very large for nano-materials. **6**
- (b) Discuss Sol-Gel and ball milling techniques for synthesis of nano-materials. **5+5**
9. What do you understand by low dimensional systems such as quantum well, wires and dots ? Make a plot of density of states in 2-D, 1-D and 0-D. Also present practical examples of each quantum system. **16**

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**B. Tech. (CSE) EXAMINATION, Dec. 2023**

(Fifth Semester)

SIGNALS AND SYSTEMS

ESC-301

*Time : 3 Hours*

*Maximum Marks : 80*

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

1. (a) Define CT signals. Give few examples of CT signals. **4**
- (b) Explain unit step, ramp and delta functions for CT. **4**
- (c) What is an anti-aliasing filter ? What are the effects of aliasing ? **4**
- (d) Define Nyquist rate and Nyquist interval. **4**

**Unit I**

2. (a) Explain major classification of signals. **8**
- (b) Define discrete time signals and classify them with explanation. **8**

3. (a) The step response of a system is given by  $y(t) = 2at$ ,  $a < T$ . Find the impulse response of the system. **10**
- (b) Explain periodic and non-periodic signals. **6**

### Unit II

4. (a) Explain the discrete-time unit impulse response and the convolution-sum representation of LTI systems. **10**
- (b) Explain state-space analysis. **6**
5. (a) Discuss continuous-time LTI systems :  
The convolution integral. **10**
- (b) Explain Invertibility of LTI systems. **6**

### Unit III

6. (a) Determine the Fourier series representation of the periodic rectangular pulse with period of 2. **8**
- (b) State multiplication property of Fourier transform.  
Prove it. **8**
7. The system function of a casual and unstable system S is given by  $H(S) = \frac{S-1}{(S+1)(S-2)}$ . Plot pole-zero plot along with Region of Convergence (RoC). **16**

### Unit IV

8. (a) State sampling theorem. Define sampling of band pass signals. **8**
- (b) What are the aliasing effects ? How is the aliasing process eliminated ? **8**
9. Write short notes on any *two* of the following : **16**
- (a) Properties of RoC
- (b) Zero-order hold and First-order hold
- (c) Relation between continuous and discrete time systems.

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**B. Tech. (CSE) EXAMINATION, Dec. 2023**

(Seventh Semester)

WEB AND INTERNET TECHNOLOGY

PCC-CS-415

(Elective-V)

*Time : 3 Hours*

*Maximum Marks : 80*

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

- 1.** Explain the following : **4×4=16**
- (a) Classful addressing
  - (b) Benefits of using CSS
  - (c) Client-side programming
  - (d) Java server pages.

**Unit I**

- 2.** (a) What is a Crawler ? Discuss various functions and types of Crawlers. **10**
- (b) Discuss various search strategies. **6**

3. An ISP is granted a block of addresses starting with 120.90.0.0/16. The ISP wants to distribute these blocks to 1720 customers as follows : **16**
- (i) The first group has 180 customers; each need 16 addresses.
  - (ii) The second group has 320 customers; each need 8 addresses.
  - (iii) The third group has 1200 customers; each need 4 addresses.
  - (iv) The fourth group has 20 customers; each need 32 addresses.

Design the sub blocks and give the slash notation for each sub block. Find out how many addresses are still available after these allocations.

### Unit II

4. Explain any *ten* tags in HTML related to tables, frames and images with their syntax. **16**
5. Discuss the following :
- (a) Adding forms using CSS **8**
  - (b) Internal and external CSS in HTML document. **8**

### Unit III

6. How form processing takes place using Java Script ? Assume any example of form processing using Java Script. **16**

7. Discuss the following :
- (a) VB script **8**
  - (b) Document object model. **8**

### Unit IV

8. (a) What do you mean by server-side scripting ? Explain main feature of any server-side scripting language. **8**
- (b) Discuss architecture of servlet. **8**
9. Explain the following :
- (a) Java beans **8**
  - (b) JSP Engine. **8**

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**B. Tech. (IT) EXAMINATION, Dec. 2023**

(Fifth Semester)

DIGITAL SYSTEM DESIGN

ESC-303

*Time : 3 Hours*

*Maximum Marks : 80*

**Note :** Nine questions will be set in all, taking two questions from each Unit and *one* question containing short answer type questions from entire syllabus. Attempt *Five* questions, selecting *one* question from each Unit. Q. No. 1 is compulsory which is from entire syllabus.

1. (a) State and explain De-Morgen's theorem. 4
- (b) What is clock generation ? Discuss. 4
- (c) Discuss in brief the concept of fan in and fan out. 4
- (d) What is FSM ? Give its features and usage. 4

**Unit I**

2. (a) Compare half adder and full adder with features and block diagrams. 8

(b) What are Multiplexers ? Give their use. Discuss multiplexed display. **8**

3. What are canonical forms ? Discuss. Also state and explain Karnaugh maps upto six variable with example. **16**

### Unit II

4. (a) Compare building blocks SR, JL and master slave JK. **8**

(b) What are ripple and synchronous counters ? Discuss. Also explain shift registers. **8**

5. What is clock generation ? Explain. How can you design circuit like pulse train generator ? Discuss. **16**

### Unit III

6. (a) State and explain noise margin and propagation delay. **8**

(b) Discuss TTL and NAND gate with specifications. **8**

7. What are memory elements ? Discuss programmable logic devices like FGPA in detail. **16**

### Unit IV

8. (a) What is VHDL ? Discuss its different modeling styles. **8**

(b) What is HDL ? Discuss in detail with its features. Also discuss dataflow. **8**

9. Compare behavior and structural modeling in detail. Also discuss codes for combinational and sequential circuits. **16**



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**B. Tech. (IT) EXAMINATION, Dec. 2023**

(Fifth Semester)

SOFTWARE ENGINEERING

PEC-CS-308

*Time : 3 Hours*

*Maximum Marks : 80*

**Note :** Nine questions will be set in all by the examiner taking two questions from each Unit and *one* question containing short answer type questions from entire syllabus. Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory which is from entire syllabus.

1. (a) State and explain software characteristics in brief. 4
- (b) What do you mean by staffing ? Explain. 4
- (c) What is control flow model ? Give its main features and importance. 4
- (d) What is acceptance testing ? Discuss. 4

**Unit I**

2. (a) State and explain waterfall model with characteristic features and significance. 8

- (b) What is a software process ? Compare team s/w process and personal s/w process. **8**
3. Differentiate between spiral and RAD model with merits in detail. **16**

### **Unit II**

4. (a) What is software project management ? Discuss its various steps. **8**
- (b) Discuss LOC and FP for project estimation. **8**
5. State and explain empirical estimation COCOMO model. Give its significance in software engineering. **16**

### **Unit III**

6. (a) State and explain ER diagrams, their types and relevance. **8**
- (b) Differentiate between cohesion and coupling with features. **8**
7. What is SRS document ? Give its main points. Also discuss data modeling with role in software engineering. **16**

### **Unit IV**

8. (a) What is an error ? How is it different from bug ? Also discuss system failure with remedies. **8**

- (b) What is test case design ? Discuss. Also explain structural testing. **8**

9. Differentiate between basis path testing and boundary value analysis in detail. **16**

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**B. Tech. (CSE) EXAMINATION, Dec. 2023**

(Seventh Semester)

ADVANCED COMPUTER ARCHITECTURE

CSL-401

*Time : 3 Hours*

*Maximum Marks : 80*

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

**1.** Define the following : **4×4=16**

- (a) Data flow architecture
- (b) Crossbar switch
- (c) Vector
- (d) Associative cache.

**Unit I**

**2.** Explain various parallel computer models. List merit and demerit of each type. **16**

3. (a) Explain, how scheduling and program partitioning is important in parallel computers. **8**
- (b) Compare various program flow mechanisms. **8**

### Unit II

4. (a) Compare RISC and CISC scalar processors. **8**
- (b) What is a superscalar processor ? How is it different from multiprocessor ? **8**
5. (a) What is coherence and locality ? Explain various hierarchical memory technology. **8**
- (b) Discuss various interconnection networks. **8**

### Unit III

6. Explain various cache addressing models. Discuss in brief addressing and timing protocols of Backplane Bus system. **16**
7. What is instruction pipeline ? Explain various mechanisms for instruction pipeline. **16**

### Unit IV

8. Explain various vector-access memory schemes with merits and demerits of each. **16**
9. What is synchronous parallel processing ? Explain architecture of SIMD. Discuss, how performance of SIMD can be enhanced. **16**

## Unit II

4. What is modular arithmetic ? Discuss various properties of modular arithmetic and role of modular arithmetic in cryptography. **16**
5. (a) Explain DES algorithm and compare it with AES. **8**
- (b) What is Key Escrow ? Explain its importance in symmetric systems. **8**

## Unit III

6. Explain RSA algorithm in detail. **16**
7. (a) Discuss Diffie Hellman algorithm. **8**
- (b) Explain X.509 structure of digital certificate. **8**

## Unit IV

8. Explain various network security issues. Discuss denial of service in detail. **16**
9. What is Kerberos authentication ? Discuss various access control mechanisms.

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## B. Tech. (CSE) EXAMINATION, Dec. 2023

(Fifth Semester)

### SECURITY OF INFORMATION SYSTEM

CSL-305

*Time : 3 Hours*

*Maximum Marks : 80*

**Note :** Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

1. Explain any *four* of the following : **4×4=16**
- (a) Confusion and Diffusion
- (b) Clipper
- (c) Trade secrets
- (d) Firewalls
- (e) Cryptography.

## Unit I

2. What is a cipher ? Explain various types of ciphers with suitable examples. Discuss the term cryptanalysis. **16**
3. Explain characteristics of Good ciphers. Discuss the terms encryption and decryption. **16**