

PURBANCHAL UNIVERSITY

2025

M. Sc. in Information System Engineering / First Semester / Final

Time: 03:00 hrs.

Full Marks: 60 / Pass Marks: 30

MIE111: Software Engineering (New Course)

Candidates are required to give their answers in their own words as far as practicable.

All questions carry equal marks.

Answer FIVE questions.

5×12=60

1. Differentiate between software and software process model. Discuss the process model you would adapt for driving license software development project of Nepal Government and justify your choice with its advantages and disadvantages. 12
2. Differentiate between function and non-function requirements. What are the three various types of non-function and function requirement which may be placed on the system? Explain with example. 4+8
3. Differentiate between verification and validation? Explain clean room software development approach in detail? 4+8
4. What do you mean by software quality? Describe software Tributes? Explain software quality assurance process in detail. 2+4+6
5. What do you mean by prototyping? Explain different prototyping approaches with help of suitable diagram? 2+10
6. Write short notes on: 2×6=12
 - (a) COCOMO Model
 - (b) Forward engineering

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Time: 03:00 hrs.

Full Marks: 45 /Pass Marks: 22.5

MIE115: Research Methodology (New Course)

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer ALL questions.

5×9=45

1. What is the role of research in the field of Information Technology? It is said that "once the topic is selected, half research is done". Justify this statement. 5+4
2. Why research design is important in a research? What is meant by 'Pilot Testing' in a research? When do we carryout pilot testing? 3+3+3
3. What is the role of Research Manager in a University? How a doctor collects data for problem identification? What is the role of a patient in providing data to the doctor? 3+3+3
4. Why research proposal and report are important in any research? List the major components of a research report. 4+5
5. What are the importance of socio-ethical issues in information technology research? Write the research function governing with example. 4+5



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MIE114: Information Security (New Course)

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer FIVE questions.

5×9=45

1. Define the terms threats and attacks in terms of information security. Explain different types of security threats in detail. 2+7
2. Explain about (PKI) Public Key-Infrastructure? Pamela creates a pair of keys for herself. She chooses $p = 397$ and $q = 401$. She calculates $n = 159197$. She then calculates $\Phi(n) = 158400$. She then chooses $e = 343$ and $d = 12007$. Show how Tom can send a message to Pamela if he knows e and n ? 4+5
3. What is security audit? What is its importance? Explain security auditing architecture in detail. 2+2+5
4. Explain about Centralized Access Control (RADIUS, TACAS and Diameter). Explain about tunneling. 5+4
5. What are the major components of BCP? Why Business Continuity planning (BCP) and Disaster Recovery Planning is gaining much importance in present global communication scenario? 9
6. Write short notes on (Any THREE): 3×3=9
 - (a) Digital Signature
 - (b) IDS and IPS
 - (c) Firewall
 - (d) Code of Ethics

interview

PURBANCHAL UNIVERSITY

2024

M. Sc. in Information System Engineering /First Semester/Final

Time: 03:00 hrs.

Full Marks: 60 /Pass Marks: 30

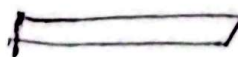



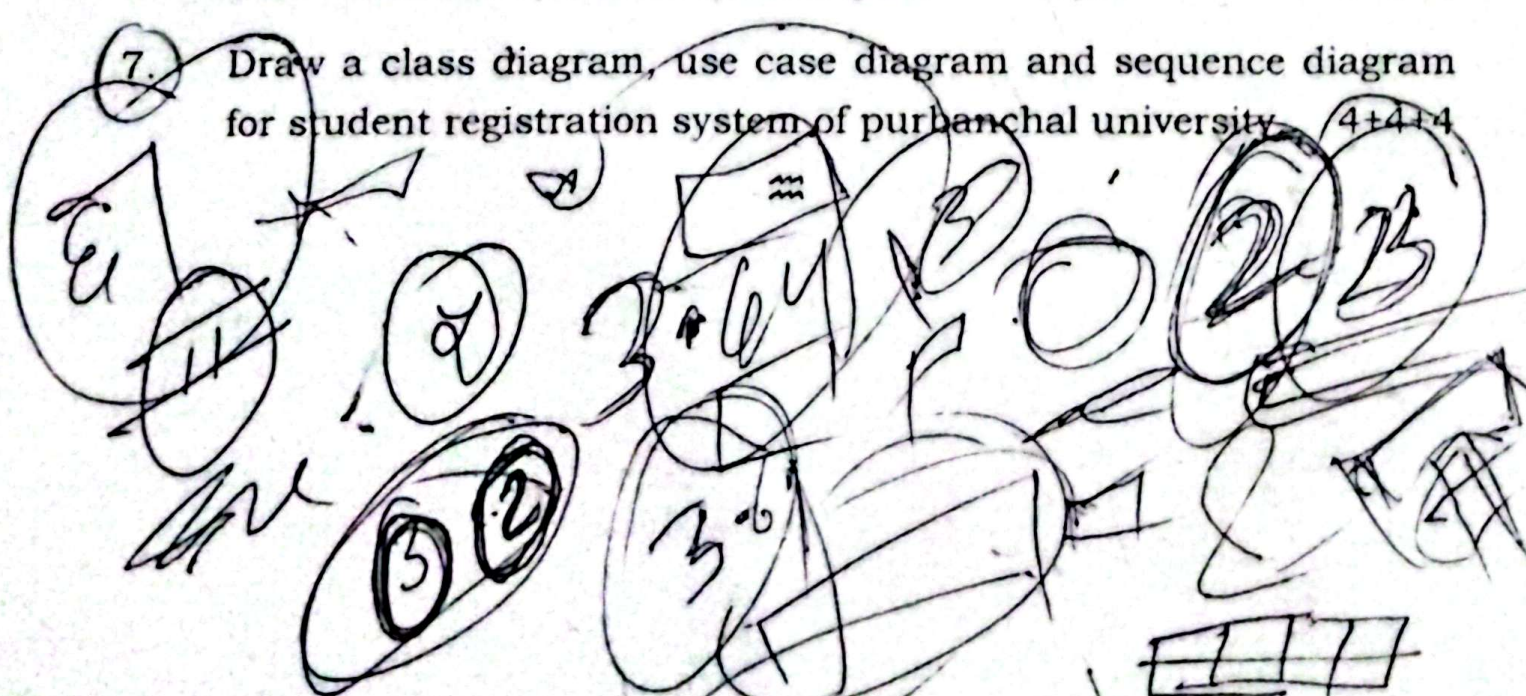
MIE112: Object Oriented System (New Course)

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer FIVE questions.

5×12=60

- ✓ 1 Why do we need object oriented system? Explain in your own words. Explain complex system with various attributes. 4+8
- 2 Differentiate between OOA and OOD. What are different types of UML diagram used? Explain any two along with examples. 4+2+6
- 3 Define Domain Analysis. Explain the activities of domain class analysis along with example.  4+8
- ✓ 4 Define Agent. Explain the framework for Agent Oriented programming. Compare AOP and OOP.  2+5+5
5. What are the factors that needs to be considered while building high quality software? Explain about system testing, verification and validation.   3+9
- ✓ 6. What are the principle of object oriented design. Explain the object oriented system development life cycle and also compare with traditional (structure) development life cycle. 3+5+4
7. Draw a class diagram, use case diagram and sequence diagram for student registration system of purbanchal university.  4+4+4

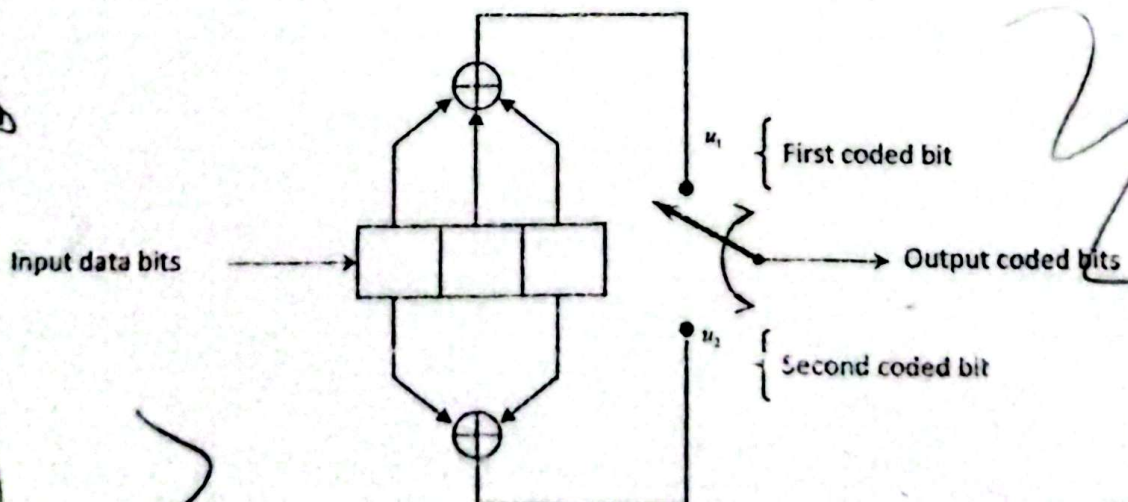
Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Answer FIVE questions.

5×12=60

- 1(a) Explain the role of communication system in relation to current pandemic. Draw the block diagram of digital communication system and highlight the importance of each block. 6
- (b) What is modulation? Why has FM Radio broadcasting been very popular in Nepal compared to AM Radio broadcasting? 6
- 2(a) What are the desirable characteristics of line codes? Draw the line code based on HDB3 for the binary sequence 100001000001. 4+2
- (b) For the digital bit stream 101011, draw the baseband waveforms using the following line coding techniques and compare them: 6
 - (i) NRZ (ii) RZ (iii) Manchester (iv) Differential Manchester (v) AMI
- 3(a) The six symbols from a source and their probabilities are shown in the table below. By using the Huffman algorithm, find the source code for these symbols: 6

$S_1=0.06, S_2=0.4, S_3=0.3, S_4=0.1, S_5=0.1, S_6=0.4$
- (b) What do you mean by Optical Fiber Communication? What are their types? Discuss its advantages & disadvantages. 2+4
- 4(a) For the convolution encoder shown in the diagram below



Contd. ...

(2)

Draw the state diagram. Hence calculate the output for the input sequence 101. What is its code rate and Constraint length? 8

(b) Evaluate the maximum bit rate for a channel having bandwidth 3100 Hz and S/N ratio of 20 dB. 4

5(a) Compare microwave communication and satellite communication. Also discuss with an example how these two are related. 6

(b) The parity check matrix of a particular (7, 4) linear block code is expressed as: 6

$$[H] = \begin{bmatrix} 1011100 \\ 1101010 \\ 0111001 \end{bmatrix}$$

(i) Obtain the generator matrix.

(ii) List all the code vectors.

6. Write short notes on: 3×4=12

a. Digital Modulation Techniques

b. Multiplexing

c. DPCM

