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BANGLADESH UNIVERSITY OF PROFESSIONALS
Military Institute of Science and Technology
B.Sc. in Computer Science and Engineering, Term Final (Spring) Examination 2025: Oct - Nov 2025

Student Group: Earned Credit Hours > 108

Subject: CSE 405, Computer Interfacing

Time: 3.00 hours

Full Marks: 180

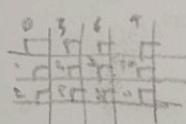
INSTRUCTIONS:

- a. Use **SEPARATE** answer scripts for each section.
- b. **Question-1** in **Section-A** and **Question-5** in **Section-B** are compulsory.
- c. Answer any other **TWO** out of the remaining **THREE** questions from each section.
- d. Figures in the margin indicate full **marks**.
- e. Assume reasonable data if necessary.
- f. **Symbols and abbreviations** used have their usual meanings.

SECTION-A

Question 1 (Compulsory)

- a. Suppose, in a system, data is taken from a keyboard, processed by the computer, an LED is turned ON if a specific condition is met, and the final result is sent to a printer. Explain how this communication between computer, keyboard, LED and printer can be achieved and why this is necessary. 5
- b. During a university lab session, students are asked to send a file from the computer to a parallel printer. The printer can only handle one character at a time, so the computer must wait until the printer is ready before sending the next character. Give a detailed explanation of this data transfer mechanism, including how the printer uses it to print and which parallel port pins are used. Support your answer with necessary timing diagram. 10
- c. A 3×4 keyboard matrix is to be interfaced with an 8088 microprocessor using intel 82C55 PPI. A 74ALS138 decoder is used to generate chip select signals so that 82C55 occupies I/O address from C0H to C6H. 3x5= 15
- i) Show how the address lines are used to decode the I/O address range C0H – C6H.
 - ii) Draw the interfacing diagram showing the connection of 82C55 with the 8086 through the 74ALS138 decoder and 3×4 keyboard matrix.
 - iii) Describe step by step how data is taken from the keyboard using the 82C55. With necessary flow diagram.



Scans
deband h/w w/

Question 2

- a. A small automated weather station uses 8086 microprocessor to monitor temperature, humidity and wind speed sensors. Whenever a sensor reading exceeds a threshold, the CPU immediately fetches a 4-byte value from the beginning of memory and jumps to the corresponding routine to handle the event. Identify the memory structure being accessed by the CPU when it fetches 4-byte value, explain how it is organized in memory and illustrate how it helps the CPU to jump to the correct routine. 8
- b. In a control system with multiple peripherals, the CPU must decide which devices' interrupt to process first when several device request service at the same time. The CPU responds in order of importance. 10

Lower priority device only get service when no higher priority device are requesting. Describe the mechanism used by the CPU to manage multiple interrupt request and ensure correct priority handing.

LIN1 47
B20 50
n1D 51
INIT PERI MEM

A+ []

LIN2, AL

AL, 120

LGS, AL

AL, 0

MSA, AL

Question 3

BL, 0

LIN3, AL

AL, FIFO commun

BL, FIFO

LST

ST1, 0000

offset in LST

Step 3

As an ST, offset

DX, Port

Loc:

AX, #13

DX, AX

INC SI

cmp cl, STP,

STP = 1

JB loop

loop end

15-

Step

Question 4

and STP end loop

After INIT SFR

NAME

when S/P DEVICE REG FOR
GAIN

in out with software

to S/P DATA REG G

Data 0.1.2.3.4.5.6.7.8

from S/P Receiver out. out end

Initiator	Target	Arbitration time of Initiator (Sec)	Task Time of Target given by initiator
3	3	4	6
1	3	9	8
2	1	15	8
2	2	19	12
3	2	24	5

12

Suppose, 3 computers are sharing a common SCSI bus among them. 2 SCSI controllers are connected with the same bus. Now solve the following scenario and find out the value of t at which all controllers and bus will become free after executing all task given by all the computers.

$$\text{data transfer rate} = 23 \quad A + S = 25$$

- a. Explain the rationale behind the term "Start-Stop" transmission for asynchronous transmission. Apply the appropriate technique to ensure that data does not generate the pattern of closing flag (01111110) during synchronous data transmission.

6

- b. A laboratory automation system needs to send real-time measurement data from a Computer (DTE) to a modem (DCE) using RS-232 Serial Communication. The system uses a 16550 UART to handle Serial transmission.

12

The communication requirements are: 8 data bits, odd parity, one stop bit and a baud rate of 2400 using a 18.432 MHz clock. Write the initialization routine for the 16550 UART to configure it for these communication using ports F0H to F3H.

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WT
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- c. Suppose, you are designing an automatic book dispenser for the MIST Central Library. The dispenser issues reserved books by rotating a tray using a stepper motor, aligning the correct book slot with the pickup window. The stepper motor is connected to Port A (40H) of an 82C55 PPI, configured in Mode 0 (output mode). To ensure precise alignment, the motor must run in full-step mode for maximum torque and accurate step positioning.

9+3= 12

Write an assembly language procedure to control the stepper motor in full step operation using port A (40H) of the 82C55. Also explain the difference between full step and half step mode in stepper motors.

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WT
315

- a. Suppose, you are designing a USB-based campus library system, where multiple devices such as card readers, printers and scanners need to connect to a single computer. Explain the USB tiered-star topology.

6

- b. Suppose your USB-based system communicates via control transfers; which internally use token packets, data packets, and handshake packets. Occasionally, data packets or acknowledgements may be lost due to noise in USB cable.

6+8= 14

- Identify the types of token packets, and handshake packets used in USB communication and how they are used to ensure reliable delivery of data.
- Describe how the system detects and recovers from a loss of data packet and Acknowledgement packet.

- c. Suppose your "Computer Interfacing" text book has the following EAN-13 barcode number:

9780123456472

Generate the full EAN-13 binary sequence and verify the checksum.

10

Table 4(c) 1&2
4(c) 1 4(c) 2

Digit	Left-Hand A Encoding	Left-Hand B Encoding	Right-Hand Encoding
0	0001101	0100111	1110010
1	0011001	0110011	1100110
2	0010011	0011011	1101100
3	0111101	0100001	1000010
4	0100011	0011101	1011100
5	0110001	0111001	1001110
6	0101111	0000101	1010000
7	0111011	0010001	1000100
8	0110111	0001001	1001000
9	0001011	0010111	1110100

Number	Prefix 2	Code for the first prefix character in EAN13				
		Data 1	Data 2	Data 3	Data 4	Data 5
0	A	A	A	A	A	A
1	A	A	B	A	B	B
2	A	A	B	B	A	B
3	A	A	B	B	B	A
4	A	B	A	A	B	B
5	A	B	B	A	A	B
6	A	B	B	B	A	A
7	A	B	A	B	A	B
8	A	B	A	B	B	A
9	A	B	B	A	B	A

SECTION-B

Question 5 (Compulsory)

- a. The MIST Computer Interfacing Lab is designing a high-speed data acquisition system to monitor multiple environmental sensor in real time. The system must transfer sensor data to memory without slowing down the CPU, as the processor also needs to handle other control task simultaneously. Explain how the system achieves fast data transfer using a specialized controller using necessary block diagram showing how the relevant pins of the controller and microprocessor are used during the operation. 10
- b. Describe the steps required to program the 8237 DMA controller. Explain the contents of the mode register and the command register. 6
- c. Suppose, you are designing a flicker-free graphics system. The VRAM is located at the memory location 2000H-20FFH (256 bytes) and the display buffer is at 3000H-30FFH. To refresh the screen continuously, you want to automate the transfer from VRAM to the display buffer using the Intel 8237 DMA Controller, with channel 0 as the source and channel 1 as the destination. Write a procedure to perform a block data transfer from VRAM to the display buffer using the 8237 DMA Controller. 14

Question 6

- a. Suppose, you want to design an embedded system for a smart home that automatically controls the heating and cooling based on room temperature. Explain the main components and the basic structure of the embedded system, describing how they interact to perform the control task. 6

- b. Suppose you are working with a microcontroller system that interface to a 5 bit D/A converter ($V_{ref} = -8.0V$). After an operation, the digital output presented to the converter is 10110 (MSB \rightarrow LSB) $4+4+2+2 = 12$

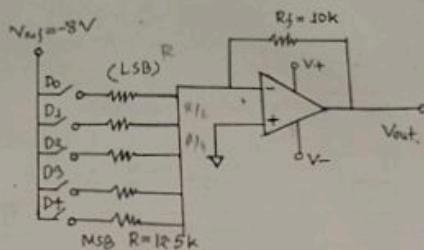


Figure 6(b)

- Explain how this digital data is converted into analog voltage.
- Convert the digital output to its proportional analog voltage using an appropriate DAC formula.
- Find the resolution and actual full scale voltage.
- If the converter accuracy is $\pm 0.3\%$ of full-scale, calculate the maximum absolute error (in volts).

- Tanmoy is working on a project to monitor the health of a bridge beam. The project requires two types of measurements: mechanical stress and surface temperature. For this purpose, Tanmoy decides to use a strain gauge bonded to the beam surface and a thermocouple attached near the strain gauge.

Explain the working procedure of the strain gauge and thermocouple. What possible problems can occur with these sensors during real-world use and how can they be overcome.

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Question 7

- Explain the working principle of Successive-approximation ADC.
- Construct a 4-bit SAR ADC conversion with input voltage $V_{in} = 13V$ and reference voltage $V_{ref} = 16.0V$. Display each stage of the SAR algorithm and determine the 4-bit digital output at the end. Assume that, the binary weighted DAC feedback resistor $R_f = R$ and the branches are $2R, 4R, \dots$ so on.
- In an electric vehicle, a DC motor drives the wheels. To ensure smooth acceleration and maintain the desired vehicle speed, the motor's speed must be precisely controlled.
 - Explain the process of controlling the speed of the DC motor in this application.
 - How can a PID controller mitigate issues like residual error and undershoot while enhancing system performance.

8

10

8+4=12

Question 8

- A multimedia player uses an optical disk to store music and videos. Explain how read and write operations are performed on an optical disk.
- When reading data from disk, what are the two most important factors in laser beam positioning and how are they managed?
- Define "block", "section" and "track" in a magnetic disk with necessary figures. Explain how interleaving eliminates the latency of magnetic disk.
- An office needs a high speed printer capable of producing professional quality document. To meet this requirement, they decide to use a laser printer. Explain the working procedure of a laser printer with necessary diagram.

8

8

6

8

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B.Sc. in Computer Science and Engineering, Term Final (Spring) Examination 2025:
Oct - Nov 2025

Student Group: Earned Credit Hours >108

Subject: CSE 415, Human-Computer Interaction

Time: 3.00 hours

Full Marks: 180

INSTRUCTIONS:

- a. Use SEPARATE answer scripts for each section.
- b. Question-1 in Section-A and Question-5 in Section-B are compulsory.
- c. Answer any other TWO out of the remaining THREE questions from each section.
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SECTION-A

Question 1 (Compulsory)

- a. Justify the necessity of conducting a heuristic evaluation by 3-5 evaluators. 05
- b. "You have been asked to develop a system to show and manage the exam results of MIST students, and you would like to test two different designs prior to implementation on prototyping." 25
For the above situation, choose an appropriate evaluation method and identify the following with justification:
(i) Participants
(ii) Representative tasks to be examined
(iii) Evaluation technique used
(iv) Measurement (data collection/analysis perspectives) that would be appropriate *Interview based survey*
(v) An outline plan to carrying out the evaluation. 16
ew

Question 2

- a. Briefly explain the central message of interaction design: 'Put the user first, keep the user in the center, and remember the user at the end.' *user spec* *prototype* *design* 10
- b. Define the 'Persona' and 'Scenaria'. Explain the significance of both concepts in the development of software artifacts. 10
- c. Explain the following principals of Robustness in Interaction design with examples:
(i) Commensurate effort (ii) Task adequacy 10

Question 3

- a. Define Information Architecture (IA). Illustrate the IA of a hospital website by applying the steps of the Card Sorting technique. Ensure that at least 20 concepts are considered in designing the IA. *sort method* 16
- b. Briefly discuss Norman's principle of 'Design for Error' with example. 07
- c. "The addition of audio confirmation of modes, in the form of changes in key-clicks, reduces errors"- Explain the reasons behind reducing the errors. 07

Question 4

- a. Evaluate the Education Management System(UNIPLEX) of MIST based on the principles of Universal design. Identify any missing 14

considerations and suggest ways to improve the system through design.

- b. Briefly differentiate with examples between: 10
(i) Auditory Icons vs. Earcons
(ii) Guidelines vs. Principles
- c. Justify the uses of Miller's 7±2 rule when designing navigation menus in HCI. 06

SECTION-B

UNIPLEX is an integrated education management system used at the Military Institute of Science and Technology (MIST) to streamline both academic and administrative processes. It supports a wide range of functions including course registration, exam result publication, attendance marking and access to assessments.

Considering the functionality of UNIPLEX, answer the following questions. (Question 5, 6, 7 and 8)

Question 5 (Compulsory)

- a. Analyse the exam result publication work-flow in UNIPLEX using status-event analysis by performing the followings: 20
i. Identify the key statuses and events that occur throughout the workflow.
ii. Illustrate the status-event diagram for 5(a)(i).
iii. Evaluate how the choice between polling and event notification influences the workflow's effectiveness, efficiency and user satisfaction.
- b. Illustrate how the interaction design can be applied to improve UNIPLEX in handling timing mismatches in exam related events such as exam schedule announcements, result publishing and grade release. 10

Question 6

- a. Organize a task decomposition tree for "Viewing Exam Results in UNIPLEX" using Hierarchical Task Analysis (HTA), identifying-subtasks, plans and stopping rules. Explain how this analysis can improve the interface design. 20
- b. Analyse how knowledge-based task analysis can improve usability for novice users in UNIPLEX when accessing exam results and assessments. 10

Question 7

- a. Formulate a structured user observation study for the Exams & Assessment module in UNIPLEX by addressing the following aspects: 20
(i) Specify observation techniques.
(ii) Define both qualitative and quantitative data need to be collected.
(iii) Explain how the findings can guide usability improvements.
- b. Compare the advantages and limitations of lab based usability testing versus real world field observation in the context of the Exams & Assessment module in UNIPLEX. 10

Question 8

- a. As a usability engineer, you are tasked to redesign the Exams & Assessment module in UNIPLEX using iterative design and prototyping. Now- 20
(i) Propose a usability specification (attributes, measurement methods, current versus planned levels).
(ii) Select and justify one prototyping technique to test your redesign.
- b. Evaluate how design rationale can help in justifying your prototyping decisions for the Exams & Assessment module in UNIPLEX. 10

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Student Group: Earned Credit Hours > 108

Subject: CSE 427, Digital Image Processing

Time: 3.00 hours

Full Marks: 180

INSTRUCTIONS:

- a. Use **SEPARATE** answer scripts for each section.
- b. **Question-1 in Section-A and Question-5 in Section-B** are compulsory.
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SECTION-A

Question 1 (Compulsory)

- a. What makes digital image processing significant in today's world? Why does sampling play a vital role in digital image processing? **3+5=8**
- b. What are the fundamental differences between sampling and quantization in image digitization? Suppose you want to create an image of size 1024x512 with 72 distinct intensity values. What will be the size of the image in bytes? **5+5=10**
- c. Explain interpolation. Between zooming and shrinking which one poses more challenges and why? **7+5=12**

Question 2

- a. How are pixel neighbors and adjacency related to each other? Give an example with a figure showing 4-adjacency, 8-adjacency and m-adjacency occurring in the same binary images. **4+5=9**
- b. Do you think the bit-plane slicing technique can be used for contrast enhancement? Justify your answer. **5**
- c. Apply convolution operation to the given image block using the specified kernel as given in Fig 2(c), and draw the final result. **16**

12	85	34	60
45	22	91	18
77	66	29	53
10	95	38	72

Image Block

2	-1
0	3

Mask

Fig: 2(c)

Question 3

- a. Under what conditions local histogram processing is preferred over global histogram processing and vice-versa? **5**
- b. Why is the Cumulative Distribution Function (CDF) important in histogram processing? **5**

$$h(x) = \frac{CDF(x) - CDF_{low}}{(CDF_{high} - CDF_{low})} \times (L-1)$$

- c. Given the following 4×4 8-bit grayscale image block in Fig 3(c) perform histogram equalization and compute the resulting pixel values using the full intensity range.

1	11	11	11
30	45	89	120
30	45	89	120
45	89	120	60

45	89	120	60
200	45	89	150
75	120	30	45
89	60	200	30

30	45	89	120
30	45	89	120
45	89	120	60
60	150	200	30

Fig: 3 (c)

Question 4

- a. Why are sharpening and blurring considered as spatial filters? Explain the $4+6=10$ properties of first-order and second-order derivatives in image processing.
- b. For the following image strip in Fig 4(b) perform 1st and 2nd order derivatives and show the final result in graph. 20

5	5	4	3	2	1	0	0	0	6	0	0	0	0	0	1	3	1	0	0	0	7	7	7	7	0	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Fig: 4(b)

img	img	Unsharp	Sharp
channel	edge	mask	mask
vertical	edge	↓	↓
morph	fill	overshoot	difference
seg	seed	pixel wise	spatial diff
obj. mea	threshold	noise value	isotropic filter
Repre	decision		
	Report		

SECTION-B

Question 5 (Compulsory)

- a. In the context of Isotropic derivative operators, what is the effect of using negative values at the borders of a filter mask compared to using positive values? 7
- b. Using the enhanced Laplacian filter given in Fig 5(b), compute the response at the center pixel of the given image block. 16

8	5	4
0	6	2
1	3	7

1	1	1
1	-8	1
1	1	1

1	1	1
1	-9	1
1	1	1

Image Block

Filter

Fig: 5(b)

- c. What are the fundamental similarities between top-hat and bottom-hat filtering operations? 7

top-hat / opening / closing / erosion followed by dilation
 bottom-hat / closing / opening / dilation followed by erosion

Question 6

- a. Write short notes on the following: 5x5=25
- Tint
 - Shade
 - Pigment
 - Erosion
 - Dilation
- b. What is double thresholding in the context of threshold operations? 5

Question 7

- a. Perform morphological closing operation on the given image block $f(x,y)$ in Fig 7(a) using the structuring element S_1 . Show the final result

- b. If you have an image block containing 3 small holes each sized 3×3 pixels and you want to fill these holes using image processing with a given 3×3 structuring element; which operation would you use and why? 6

1	2	3	4	5	6
0	1	1	0	1	1
0	1	0	1	0	0
1	1	1	1	1	0
1	1	1	1	1	0
1	1	1	0	0	0
0	0	0	0	0	0

Image block $f(x,y)$

1	1	1
1	1	1
1	1	1

Structuring element (S_1)

*enhance image of
missing parts.*

Fig: 7(a)

Question 8

- a. Can you perform Region Growing and Region Merging in a specific image block? Justify your answer. 6

- b. Perform Region splitting and merging for the following image block in Fig 8(b), using Threshold $T=20$. Note: Do not crop the image. 24

1	44	100	37	102	11	30	31	21
2	21	24	166	179	181	168	9	5
3	23	180	213	48	40	230	190	3
4	170	51	33	210	215	39	42	171
5	5	180	220	42	37	225	182	21
6	2	3	185	173	165	177	20	16
7	1	100	18	109	8	7	19	15

Fig 8(b)

BANGLADESH UNIVERSITY OF PROFESSIONALS
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B.Sc. in Computer Science and Engineering, Term Final (Spring) Examination 2025: Oct - Nov 2025

Student Group: Earned Credit Hours > 108

Subject: CSE 429, Computer Security

Time: 3.00 hours

Full Marks: 180

INSTRUCTIONS:

- a. Use SEPARATE answer scripts for each section.
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SECTION-A

Question 1 (Compulsory)

- a. One major challenge in security design is balancing security with usability and cost. Analyze this trade-off in the context of online banking authentication. Propose a framework for deciding when stronger security measures are justified despite usability concerns. 11
- b. Analyze and explain how different types of threats can be seen in the following real-world incidents: 9
 - (i) DDOS attacks
 - (ii) Phishing schemes
 - (iii) Large-scale data breaches
- c. Authentication and access control are essential components of system security. Analyze how they complement each other and discuss the potential risks if one is implemented without the other. 10

Question 2

- a. Compare and contrast the security vulnerabilities of the Caesar cipher, mono-alphabetic substitution cipher and the Vigenere cipher. Discuss how frequency analysis can be used to break each type of cipher. 9
- b. Consider a scenario where an attacker has access to both the plaintext and its cipher text encrypted using a substitution cipher. Explain how a known-plaintext attack could compromise the cipher. Demonstrate with a simple example and discuss measures to mitigate such attacks. 9
- c. A cipher text 'CRYPTO' was encrypted using an affine cipher with the encryption formula $E(x) = (7x + 3) \text{ mod } 26$, where x is the numerical equivalent of the plaintext letter ($A=0, B=1, \dots, Z=25$) 12
 - (i) Determine the decryption function
 - (ii) Decrypt the cipher text
 - (iii) Discuss why the multiplicative key must be co-prime with 26 and what happens if it is not.

$$\begin{aligned} & [P \times k_2 + k_1] \\ & [P - k_2 - k_1] \end{aligned}$$

- Question 3**
- Explain the structure of the Data Encryption Standard (DES). Describe the roles of each component of the cipher in brief. 10
 - Discuss the concept of key scheduling in DES. How does the generation of 16 subkeys from the main key enhance the security of DES? 10
 - Evaluate the security of DES in the modern context. Consider advances in computational power and cryptanalytic techniques. 10

- Question 4**
- Compare and contrast public key cryptography with symmetric key cryptography in terms of key distribution, computational efficiency and security. 10
 - Analyze the role of digital signatures in ensuring authentication, integrity and non-repudiation. 10
 - Analyze the mathematical properties of RSA that can be exploited in a known-ciphertext attack. Discuss how cryptographic countermeasures can be used to protect RSA against known ciphertext attacks. 10

SECTION-B

- Question 5 (Compulsory)**
- According to the concept of CIA triad, explain how a breach of Confidentiality can impact the 'Integrity' of data? Give an example. Which attack directly violates the 'Availability' principle and how? 5
 - Differentiate among virus, worm and trojan. What is rootkit? Why rootkit is considered one of the most dangerous types of malware? 8
 - Distinguish between DoS attack and DDoS attack. What are the common symptoms that a system is under DoS/DDoS attack? 7
 - What do you mean by phishing attack? What are some common techniques used by attackers to make their phishing attack more convincing? What steps should you take if you suspect that you have been a victim of phishing attack? 10
- Question 6**
- What do you mean by zero trust in cyber security? Explain the main principles of zero trust model. Describe the steps of zero trust model in details. How does zero trust model minimize risks? 11
 - What is zero day attack? Why is it so much vulnerable for a system? 5
 - Explain the concepts of email spoofing, ARP spoofing and DNS spoofing. How can ARP spoofing be used to conduct a man-in-the-middle attack? 10
 - Distinguish among white hat hacker, black hat hacker and gray hat 4

Question 7

- a. What is SQL injection attack? How does it work? If you have a login form with username and password fields encompassing a SQL query:
SELECT * FROM users WHERE username = 'user-input' AND password = 'password-input';
How can an attacker utilize this query to make a SQL injection attack? 7
- b. Explain Cross Site Scripting (XSS) and Cross Site Request Forgery (CSRF) in details with examples. 5
- c. Define flaws and bugs. How can flaws create security vulnerabilities? 6
- d. Explain the phases of risk management. Why risk management is important in cyber security? What are the challenges of risk management? 12

Question 8

- a. What do you mean by Identity and Access Management (IAM)? Describe the key components of IAM with examples. Explain the steps to implement the IAM architecture. 12
- b. Describe the four types of digital authentication with examples. Also mention the advantages and disadvantages of each of the types of digital authentication. 8
- c. What do you mean by least privilege? What are the advantages of implementing least privilege? 6
- d. Differentiate among surface web, deep web and dark web along with examples. 4

1d
Rea
Am
Wk
Dbr
Dr
Lr
Dlt
-v-

PPOFNM

PISATM

HTP

SPP 1P4M 554

M SFCI

BMPD

HnM A Lw.

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B.Sc. in Computer Science and Engineering, Term Final (Spring) Examination 2025:
Oct - Nov 2025

Student Group: Earned Credit Hours >108

Subject: GEEM 433, Engineering Ethics and Moral Philosophy

Time: 3.00 hours

Full Marks: 120

INSTRUCTIONS:

- a. Use **SEPARATE** answer scripts for each section.
- b. **Question-1** in **Section-A** and **Question-5** in **Section-B** are compulsory.
- c. Answer any other **TWO** out of the remaining **THREE** questions from each section.
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SECTION-A

Question 1 (Compulsory)

- a. List and briefly illustrate the different forms of unethical behavior that violate students' code of ethics. *pecmos* 10
- b. Illustrate the role of students' code of ethics in building professional responsibility. *DAK CER* 10

Question 2

- a. Define common morality. Describe the four types of moral judgements from the standpoint of common morality. *PIOS* 10
- b. Explain the approaches to moral thinking proposed by "Michael Davis" and discuss how they help in making ethical decisions. *UPDRVPCO* 10

Question 3

- Fidelity
tolerance
reciprocity*
- a. Define the Capabilities Approach (CA). Explain the communicative virtues identified by 'Shannon Vallor' (excluding honesty, patience and empathy), and discuss their necessity in building strong interpersonal relationships. *Patience honesty equality* 10
 - b. Explain the concept of Profession. Considering engineering as a profession, explain the key characteristics of a profession. 10

Question 4

- ET SAKHAWA*
- a. "The social context and technology comprises a two-way causal relationship"- Justify the statement with proper explanation. 10
 - b. Explain the importance of using tools for analyzing moral problems in professional decision-making, and describe the three main components of moral problems. 10

operate std info dishonesty power illegal	conflict of interest pay bribe govt by legal	mistake fail outside June personal team treat	community unsafe design guarantee sustain team serve	share plagiarism opposing maintain confidential
SECTION-B				

Question 5 (Compulsory)

- a. List the "Fundamental Canons" of the NSPE Code of Ethics. How can "Professional Obligations" listed in the NSPE Code of Ethics shape your professional career as an Engineer? 10
- b. What are the five concepts of Engineering Philosophy? Explain Axiology and its relationship with Philosophy. 10

Question 6

- a. List three approaches to Utilitarian Model. Explain the fundamental principle of utilitarian model. 10
- b. Compare "Utility of the consequences of a single action" against "Utility of the consequences of a general practice" of the Rules and Practices Test. 10

Question 7

- a. The fundamental principle of the RP model of common morality is "to Act so that you respect all humans as free and equal moral agents"- Elaborate your answer with a suitable example. 10
- b. Write shorts notes on the following: (Any two)
 i) The Golden Rule Test
 ii) Gewirth's Hierarchy of Rights
 iii) Virtue Ethics 10

Question 8

- a. John is employed as a design engineer at a small company that uses values. In recommending product designs for his company's clients, he usually specifies values made by his relative, even when values made by other companies might be more appropriate. Should his company's client discover this, they might well complain that John is involved in a conflict of interest.
 i) Is there really a conflict of interest?
 ii) If so, justify the conflict of interest after reviewing the above mentioned scenario. 10
- b. Write short notes on the following.
 i) Cyber Crime
 ii) Copyright
 iii) Whistleblowing 10

Prioritize
 know
 honest & clean
 loyal & trust
 cheating
 honesty, responsibility

M E R & GTHFE
 AF K LWS
 ST RWT GHT
 LU R GV
 AT V & AS BIF

cost benefit test
 test of maxim goods concept
 rules & practices
 we should act in a way that
 maximize overall welfare
 existing practice
 produce most utility
 best long term results
 follow justified practice
 * which action produces
 most good overall
 (Follow established rules)

protect original work
 old giving
 multiple
 implementation