

DEPARTMENT OF MATHEMATICS  
C.S.J.M. UNIVERSITY, KANPUR.

Mathematics-II (MTH-S102)

Branch: Computer Science & Engineering-(Artificial Intelligence) (CSE-AI)

Year: 1st Year

Semester: 2022-23(Even Sem)

MID SEMESTER EXAMINATION

Maximum marks: 30

Time: 1.5 h

All questions are compulsory

Section A

1. Attempt all questions and each question contain 1 marks:

- Define the rank of a matrix.
- State the Caylay-Hamilton Theorem.
- Give a non-trivial example of a normal matrix.
- If a square matrix of order  $n$  has the determinant zero then rank of the matrix must be .....
- Define similar matrix.
- Write the general form of Cauchy-Euler equation.
- Find the particular integral of the equation  $(D^4 + 4)y = e^x + x^2$ .
- Prove that trace of a skew-symmetric matrix is zero..
- Prove that  $A^2 = I$  if and only if  $(I + A)(I - A) = 0$ , where  $A$  is a square matrix of order  $n$ .

Section B

2. Attempt all questions and each question contain 3 marks:

- Write the definition of idempotent matrix with a non-trivial example. Also prove that idempotent matrix always has eigen values either 1 or 0.
- Examine the consistency of system of equations  $2x + y = -11$ ,  $6x + 20y - 6z = -3$  and  $6y - 18z = 1$ .
- Solve  $(y'' + y) \cot x + 2(y' + y \tan x) = \sec x$ .

Section C

3. Attempt all questions and each question contain 6 marks:

- If  $A = \begin{bmatrix} 0 & -2 & -3 \\ -1 & 1 & -1 \\ 2 & 2 & 5 \end{bmatrix}$  then check whether  $A$  is diagonalizable or not. If it is diagonalizable the determine an invertible matrix  $Q$  and a diagonal matrix  $D$  such that  $Q^{-1}AQ = D$ .
- Solve the following differential equation  $\{x^2 D^2 - (2m - 1)x D + (m^2 + n^2)\}y = n^2 x^m \log x$ , where  $D \equiv \frac{d}{dx}$ .



Richa Malam

UIET, CSJMU Kanpur

Mid Semester Exam 1- 2023

HSS- 101, Professional Communication

Branches CS/AI, ~~MEE~~ 1st yr.

Max marks 20

Time 1:30 hrs.

Q1. Fill in the Blanks: 4 marks

- a. Write synonyms of (i) Vigilant - \_\_\_\_\_ (ii) Lethargic - \_\_\_\_\_  
 b. Write antonyms for (i) Abundance - \_\_\_\_\_ (ii) Blunt - \_\_\_\_\_  
 c. Make nouns from the following words (i) Clear - \_\_\_\_\_, (ii) Wise - \_\_\_\_\_  
 d. Add suffixes to the words (i) Office - \_\_\_\_\_ (ii) Dictate - \_\_\_\_\_

Q2. Do as Directed: 4 marks

- a. Write the **meaning** of the given homophones and make **sentences**:

(i) Dyeing and Dying,

(ii) Colonel and Kernel

## Short Answers

Attempt any two (3x2=6 marks)

Q3. "The lateral flow of communication is useful in network of communication". How?

Q4. What is the difference between intrapersonal and interpersonal communication?

Q5. Explain Language and Semantic barriers.

## Long Answer

Attempt any one (6 marks)

Q6. What do you understand by technical communication? Explain how the features of General communication is different from Technical communication.

Q7. Describe the process of communication with the help of a diagram.

state.



**DEPARTMENT OF MECHANICAL ENGINEERING CS-AI**  
**UNIVERSITY INSTITUTE OF ENGINEERING AND TECHNOLOGY, CSJM UNIVERSITY, KANPUR**  
**Subject Name: Physics II (Subject Code: PHY-S102)**

Semester: 2022-23 (Even Semester)

Year: 1st Year (2K22)

**Mid Semester Examination**

Time: 1.5 h

Maximum marks: 20

Note: All questions are compulsory

**Section A**

[6 x 1 = 6]

1. Define interference of light.
2. What do you understand by division of amplitude?
3. Why Newton's rings are circular?
4. What are coherent sources of light? Is it possible to obtain coherent sources from two separate sources?
5. What do you mean by diffraction of light?
6. What is biprism?

**Section B**

[3 x 2 = 6]

1. A biprism is placed 10 cm away from a slit and the wavelength of monochromatic light used is  $5500 \text{ \AA}$ . The fringe width found on screen at 90 cms away from biprism is  $8.526 \times 10^{-2} \text{ cms}$ . Calculate the distance between two coherent sources.
2. A parallel beam of light of wavelength  $5500 \text{ \AA}$ , falls on a thin mica plate of refractive index 1.60. If the angle of refraction is  $60^\circ$ , calculate the minimum thickness of the plate that will appear dark in the reflection pattern.
3. In Fraunhofer single slit diffraction pattern, the slit of width  $15 \times 10^{-5} \text{ cm}$  is illuminated by light of wavelength  $6000 \text{ \AA}$ . Calculate angular width of central bright.

**Section C**

[2 x 4 = 8]

1. (a) Derive an expression for diameter of bright ring observed in Newton's rings experiment.  
 (b) How can Newton's ring experiment be used to find out the wavelength of the unknown light?
2. (a) Find an expression for intensity distribution arising from Fraunhofer diffraction at a single slit.  
 (b) Draw a diffraction pattern due to single slit Fraunhofer diffraction.

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## For CSE-AI / MEE

Year: 1<sup>st</sup> Year (2k22)

Time: 1.5 h

**Maximum marks: 30**

All questions are compulsory

**9 marks (9 Questions of 1 mark each)**

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### Section B

9 marks (3 Questions of 3 mark each)

10. Differentiate between primary memory and secondary memory?
11. What are basic data types in C?
12. Write a program to find the sum of the digits of a given number.

### Section C

12 marks (2 Questions of 6 mark each)

13. Explain the evolution of computers. Also state how computers in one generation are better than their predecessors.
14. An electric power distribution company charges its domestic consumers as follows:

<u>Consumption Units</u>	<u>Rate of charge</u>
0 - 200	Rs. 0.50 per unit
201 - 400	Rs. 100 plus Rs.0.65 per unit excess of 200
401 - 600	Rs. 230 plus Rs.0.80 per unit excess of 400
6001 and above	Rs. 390 plus Rs.1.00 per unit excess of 600

Write a program that reads the customer number and power consumed and prints the amount to be paid by the customer.

\*\*\*\*\*All the Best\*\*\*\*\*



**UNIVERSITY INSTITUTE OF ENGINEERING & TECHNOLOGY,**  
**1<sup>st</sup> Mid Semester EXAMINATION-2023**  
**Computer Science Engineering I<sup>st</sup> YEAR**  
**Engineering Drawing (TCA S101)**

**TIME: 1:30 hr**

**M.M:30**

- Q.1 The distance between two stations by road is 200 km and it is represented on a certain map by a 5cm long line. Find the R.F. and construct a diagonal scale showing a single kilometre and long enough to measure up to 600km. Show a distance of 467km on this scale. 6
- Q.2 Construct a regular pentagon of 40 mm side with horizontal. 6
- Q.3 Draw the projections of the following points. 6
1. Point A, 40 mm above HP and 55 mm in front of VP.
  2. Point B, 10 mm above HP and 25 mm behind VP.
  3. Point C, 35 mm below HP and 20 mm behind VP.
  4. Point D, 10 mm below HP and 40 mm in front of VP.
  5. Point E, on HP and 50 mm in front of VP.
  6. Point F, on VP and 30 mm above the HP.
- Q.4 Construct a plain scale of 1:7 to read in centimetres and decimetres and long enough to measure 13.5 decimetres. Mark the following distances on the scale: 6
- a) 10.5 decimetres, b) 6 decimetres and 3cm
- Q.5 To draw an arc of a 10mm radius that touches two given straight lines that are inclined at a) a right angle, b) an acute angle  $30^\circ$  and c) an obtuse angle  $120^\circ$  to each other. 6