MAEC

MASTER OF ARTS

(ECONOMICS)

ASSIGNMENTS 2025-26

Fourth Semester Courses

(For learners appearing in term-end exams in June 2026 and December 2026 Sessions)

SCHOOL OF SOCIAL SCIENCES
INDIRA GANDHI NATIONAL OPEN UNIVERSITY
MAIDAN GARHI-110068

Master of Arts (Economics)

(TMA)

(2025-26)

Dear Student,

As explained in the programme guide for MAEC, assignments carry 30 per cent weightage in a course and it is mandatory that you must secure at least 40 per cent marks in assignments to complete a course successfully. Note that you must submit the assignments before appearing in Term End Examination of a course.

Before attempting the assignments, please read the instructions provided in the programme guide sent to you separately. In this booklet, we have included the assignments for all the courses pertaining to the **Fourth semester.** In each course there is a Tutor Marked Assignment (TMA). You must do the assignment for those courses for which you have registered. **Do remember that you must prepare and submit the assignments separately for each course.** Make sure that you submit the assignments well in time for those courses in which you plan to appear in the Term End Examination.

It is important that you write the answers to all the TMA questions in your own words. Your answers should be within the approximate range of the word-limit set for a particular section.

As mentioned in the Programme Guide, you need to submit all the assignments within the stipulated time for being eligible to appear in the term-end examination to the **coordinator of your study centre**. This assignment is valid for two admission cycles (**July 2025** and **January 2026**).

The assignments should be submitted to the Coordinator of your Study Centre:

1. **By 31st March 2026,** for the students willing to appear in **June 2026 term-end examination**.
2. **By 30th September 2026,** for the students willing to appear in **December 2026 term end examination.**

You must obtain a receipt from the Study Centre for the assignments submitted and retain it. If possible, keep a xerox copy of the assignments with you.

The Study Centre will have to return the assignments to you after they are evaluated. Please insist on this. The Study Centre has to send the marks to the Student Evaluation Division at IGNOU, New Delhi.

We expect you to answer each question as per guidelines for each category as mentioned in the assignment. You will find it useful to keep the following points in mind:

1) **Planning:** Read the assignments carefully, go through the Units on which they are based. Make some points regarding each question and then rearrange them in a logical order.

2) **Organisation:** Be a little selective and analytic before drawing up a rough outline of your answer. Give adequate attention to your introduction and conclusion.

   Make sure that your answer:
   a) is logical and coherent;
   b) has clear connections between sentences and paragraphs, and
   c) is written correctly giving adequate consideration to your expression, style and presentation.

3) **Presentation:** Once you are satisfied with your answer, you can write down the final version for submission, writing each answer neatly and underlining the points you wish to emphasize. Make sure that the answer is within the stipulated word limit.

MCS-224: Artificial Intelligence and Machine Learning
Tutor Marked Assignment

Course Code: MCS 224
Asst. Code: MCS 224 / AST/2025-2026
Total Marks: 100

Note: Answer all questions. Question no. 1-4 are of 7 marks each and question no. 5-16 are of 6 marks each. You may use illustrations and diagrams to enhance the explanations.

Q1. What is learning? Define the following ways of learning:
(I) Rote Learning **(II)** Learning by Instruction **(III)** Learning by analogy **(IV)** Learning by Induction **(V)** Learning by deduction

Q2. Define is Artificial Intelligence? What are the applications of AI in the healthcare and agricultural domains?

Q3. Find the minimum cost path for the 8-puzzle problem, where the start and goal state are given as follows:

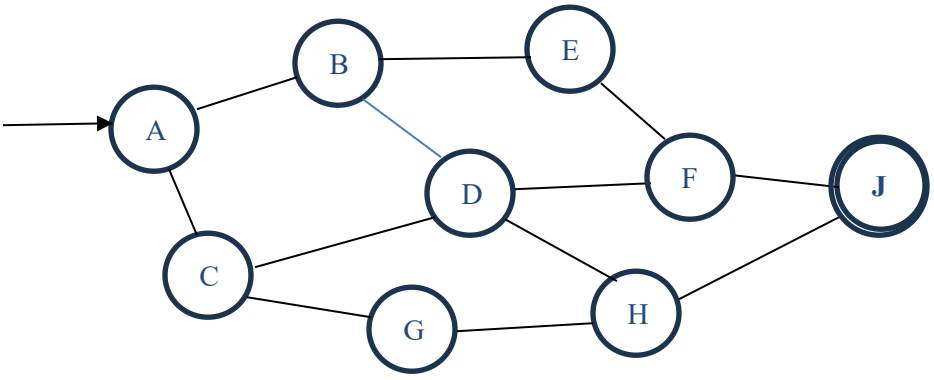
Start State

1	2	3
4	8	-
7	6	5

Goal State

1	2	3
4	5	6
-	7	8

Q4. Apply BFS algorithm on the following graph.



Q5. Draw a semantic network for the following English statement:

"Shyam owns a dog named Sheru, and Sheru likes to chase cats".

Q6. In a class, three students tossed one coin (one each) 3 times. Answer the following:

(a) Write down all the possible outcomes which can be obtained in this experiment.

(b) What is the probability of getting 2 or more than 2 heads at a time? Also, write the probability of getting three tails at a time.

(c) Calculate the Relative frequency of tail $r_n(T)$.

Q7. Explain Dempster-Shafer theory with a suitable example.

Q8. For the following fuzzy sets:

A = { a/0.6, b/0.4, c/0.5, d/0.0, e/0.8}; B = {a/0.2, b/0.8, c/0.7, d/0.3, e/0.5}
C = {a/0.1, b/0.2, c/0.8, d/0.6, e/0.2}
Find the fuzzy sets: **(i)** A ∪B ∪C **(ii)** A∩B∩C **(iii)** A' ∪B' ∪C' **(iv)** A'∩B'∩C' **(v)** (A∩B ∪C)'

Q9. What is ensemble learning? Explain three primary classes of ensemble learning methods.

Q10. Use Naive Bayes classification method for the following dataset and classify the class (Species) of X = {Color=Green, Legs=2, Height=Tall, Smelly=No}

Sl. No.	Color	Legs	Height	Smelly	Species
1	White	3	Short	Yes	M
2	Green	2	Tall	No	M
3	Green	3	Short	Yes	M
4	White	3	Short	Yes	M
5	Green	2	Short	No	H
6	White	2	Tall	No	H
7	White	2	Tall	No	H
8	White	2	Short	Yes	H

Q11. What is a Decision Tree? Use ID3 algorithm to create the decision tree for the following dataset and use it to find the class of unknown sample X = {Peter, red, short, average}

Independent Attributes / Condition Attributes					Dependent Attributes / Decision Attributes
Name	***Hair***	***Height***	***Weight***	***Lotion***	***Result***
Sarah	blonde	average	light	no	sunburned (positive)
Dana	blonde	tall	average	yes	none (negative)
Alex	brown	short	average	yes	none

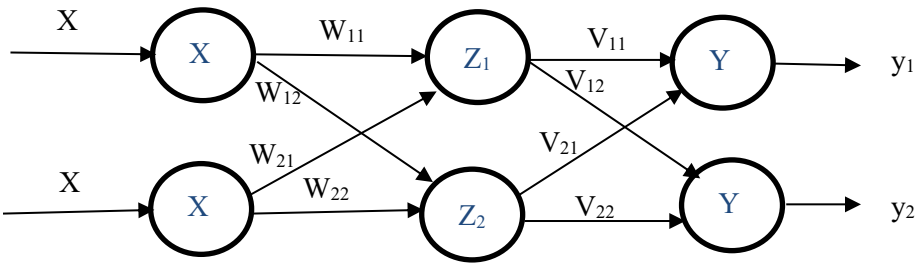
Annie	blonde	short	average	no	sunburned
Emily	red	average	heavy	no	sunburned
Pete	brown	tall	heavy	no	none
John	brown	average	heavy	no	none
Katie	blonde	short	light	yes	none

Q12. Find a quadratic regression model for the following data. Use the regression model and calculate the value of Y at X = 9.

X	3	4	5	6	7
Y	2.5	3.2	3.8	6.5	11.5

Q13. For the given points of two classes Blue and Yellow:
Blue: { (1,2), (2,3), (-1,2), (-1,4), (-1,-1)}
Yellow: { (4,2), (5,-1), (5,1), (6,1), (5,3)}
Plot a graph for the Blue and Yello categories. Find the support vectors and optimal separating line.

Q14. The following diagram represents a feed-forward neural network with one hidden layer:



For the following input patterns, calculate the output of the network (y1 and y2) if weights are initialized as: $W_{11} = -1$, $W_{12} = 2$, $W_{21} = 1$, $W_{22} = -2$, $V_{11} = 2$, $V_{12} = -1$, $V_{21} = -2$, $V_{22} = 2$. Use activation function F(Y) =1 for Y>=0 and F(Y) = 0 otherwise.

Pattern	P_1	P_2	P_3	P_4
X_1	0	1	0	1
X_2	0	0	1	1

Q15. Consider the following two-dimensional pattern. Using PCA algorithm, calculate the principal component.

X_i	2	4	5	6	6	7	9	8
Y_i	1	6	4	5	7	7	10	9

Q16. Explain Apriori algorithm with the help of a suitable example.