MASTER OF ARTS

(ECONOMICS)

(MAEC)

ASSIGNMENT 2026-27

For July 2026 and January 2027 Admission cycle

COURSE CODE: MEC 203

QUANTITATIVE METHODS

SCHOOL OF SOCIAL SCIENCES

INDIRAGANDHINATIONALOPENUNIVERSITY

MAIDAN GARHI, NEW DELHI-68

Dear Student,

As explained in the Programme Guide, evaluation at IGNOU consists of two parts: i) continuous evaluation through assignments, and ii) term-endexamination. In the final result, assignments of a course carry 30% weightage while 70% weightage is given for term-end examination. This Assignment booklet has TMAs for the core course **MEC 203 QUANTITATIVE METHODS** which is a six-credit course.

Before you attempt the assignments, please read the instructions carefully provided in the Programme Guide. 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**. **The assignments should be submitted to the Coordinator of your Study Centre as per the following schedule:**

1. **By 31st March, 2027 by the students who took admission in the Academic Cycle July, 2026**.

2. **By 30th September, 2027 by the students who took admission in the Academic Cycle January, 2027**.

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. This 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:

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.

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

1)

2) 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.

MEC 203: QUANTITATIVE METHODS
Tutor Marked Assignments

Course Code: MEC- 203
Assignment Code: Asst /TMA /2026-27
Total Marks: 100

PART I

Answer the following questions. Each question carries 20 marks

$2 \times 20 = 40$

1. Consider an investor who at time t = 0 is endowed with initial capital of $x(0)=x_0 > 0$. At any time $t \in [0,T]$ where $T > 0$ is given he decides about his rate of consumption $c(t) \in [0, \bar{c}]$ where $\bar{c} > 0$ is a large maximum allowable rate of consumption thus his capital stock evolves according to $\dot{x}=\alpha x - c(t)$ where $\alpha>0$ is a given rate of return the investor's time-t utility for consuming at rate c(t) is u(c(t)) where $u=P_+ \rightarrow P$ is his increasing strictly concave utility function. The investor's problem is to find a consumption plan $c(t)$, $t \in [0,T]$ so as to maximize his discounted utility.

$$J(c) = \int_0^T e^{-rt} u\big(c(t)\big) dt$$

$$u(ct) = \ln(ct)$$

$$x(0) = x_0$$

$$x_t = 0$$

where $r \geq 0$ is a given discount rate subject to the solvency constraint that the capital stock x(t) must be positive for all $t \in [0,T)$.

2. a) Explain Taylor's theorem to polynomial expansion.
   b) Using Taylor's approach, find Taylor's series expansion for the function: $f(x,y,z)=x,y,z$ around the point (1,1,1)

PART II

Answer the following questions. Each question carries 12 marks.

5 X 12=60

3. a) What is a standard error and why is it important?

   b) In a random sample of 400 students of the university teaching departments, it was found that 300 students failed in the examination. In another random sample of 500 students of the affiliated colleges, the number of failures in the same examination was found to be 300. Find out the S.E of the difference between proportion of failures (i) in the university teaching departments and (ii) in the university teaching departments and affiliated colleges taken together.

4. a) Discuss the features of chi square, t and f test?

   b) $x_1, x_2 \ldots x_n$ is a random sample from a Normal population N(μ,1). Show that

   $\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i^2$ is an unbiased estimator of μ^2+1

5. a) For the function f(x)= cos(x), find (i) linear and quadratic approximations, and (ii) Maclaurin's series expansion of the function.
   b) Let f: $R^2 \rightarrow R^2$ be defined as $\boldsymbol{f(x, y) = (e^{2xy}, 2x^2 + 3y^2)}$, *find the Jacobian* J_f at the point (2, 1).
6. a) Discuss the nature of the following time path: $y_t = 3^t + 1$

   b) Solve equation: $y_{t+1} - \frac{1}{3}y_t = 6 \; for \; y_0 = 1$
7. Write short notes on following:
   a) Homeogeneous and Homothetic functions
   b) L'Hopital's rule
   c) Chi square test of goodness of fit
   d) Riemann Sum