OMT-101

ASSIGNMENT BOOKLET

Bachelor's Preparatory Programme

PREPARATORY COURSE IN GENERAL MATHEMATICS

(Valid from July 01, 2009 to June 30, 2010)

School of Sciences
Indira Gandhi National Open University
Maidan Garhi
New Delhi-110068

OMT-101 – ASSIGNMENT COMPONENT

Dear Student,

This assignment booklet consists of certain questions related to the printed study material that has been sent to you. It is necessary to do this assignment as it constitutes the continuous evaluation component of this course.

The main purpose of this assignment is to help you assess your grasp of the learning material. The information given in the printed course material should be sufficient for answering the assignment.

You have to complete the assignment in time. You will not be allowed to appear for the term-end examination if you do not submit the assignment in time. If you appear in the term-end examination without submitting the assignment, then the result of the term-end examination is liable to be cancelled.

Please submit your assignment before June 30th, 2010.

The counselor attached to your study centre will be evaluating your assignment as well as OMR sheet and will give the comments on them within a month after submission. These comments will give you some feedback regarding your understanding of the subject.

For your own record, **retain a copy** of all the assignment responses which you submit to the Coordinator of your study centre. If you do not get back your evaluated assignments along with the comments on them within a month after submission, please ask your study centre coordinator for them.

In case you are unable to submit the assignment responses then you have to wait for the assignments meant for the next batch of students. **The request for the new assignment may be addressed to the Assistant Registrar, Material Production & Distribution Division, Indira Gandhi National Open University, Maidan Garhi, New Delhi-110068, in the month of January/February in the prescribed form printed in this programme guide.** (Assignments are also available from the IGNOU website www.ignou.ac.in. You could access them by clicking on the links "for student ⟶ download ⟶ assignments ⟶ BPP".)

Instructions for Formating Your Assignments

Before attempting the assignment please read the following instructions carefully.

1) On top of the first page of your answer sheet, please write the details exactly in the following format:

ROLL NO :……

NAME :……

ADDRESS :……

……

……

COURSE CODE: ……..

COURSE TITLE : …….

ASSIGNMENT NO. ……..…

STUDY CENTRE: ……..….. DATE: …….……...

PLEASE FOLLOW THE ABOVE FORMAT STRICTLY TO FACILITATE EVALUATION AND TO AVOID DELAY.

2) Use only foolscap size writing paper (but not of very thin variety) for writing your answers.

3) Leave 4 cm margin on the left, top and bottom of your answer sheet.

4) Your answers should be precise.

5) While solving problems, clearly indicate which part of which question is being solved.

6) **This assignment (along with the filled OMR sheet) is to be submitted to the Study Centre**.

7) This assignment is valid only upto June 30, 2010.

We strongly suggest that you retain a copy of your answer sheets.

We wish you good luck.

Assignment

(To be done **after** studying the course material)

Course Code: OMT-101
Assignment Code: OMT-101/TMA/2010
Maximum Marks: 100

Section A

1. a) Identify the basic operations, addition, subtraction, multiplication or division, involved in solving the following problem and hence find the solution.

   i) Meena and Jaya ran a 100-metre race. It took Meena $18\frac{3}{5}$ seconds and Jaya $18\frac{3}{10}$ second to complete the race. Who won the race? Verify your answer.

   ii) A motor covered a distance of 50 km 570 m in the first hour and 42 km 500 m in the second hour. What distance did he cover in two hours?

   iii) How many $4\frac{3}{5}$ metre long pieces can be cut from a rope which is 110.4 metre long. (6)

   b) Expand the following using binomial theorem.

   i) $(x-2y)^3$

   ii) $(2x+3)^4$ (4)

2. a) Simplify the following

   i) $\dfrac{2^5}{2^3\,2^{-4}}$

   ii) $\left(-\dfrac{2}{3}\times 1\dfrac{1}{2}\right)\div\dfrac{1}{9}$ (3)

   b) Write the following statements in the language of algebra

   i) c is 10 more than the square of the quotient of the sum of x and y by the product of x and y.

   ii) The distance covered D by a free falling object in t second is half of the product of the gravitational constant g and square of the time taken t. (2)

   c) Solve the following equation

   i) $2x+3=5x-8$

   ii) $\dfrac{1}{x}+\dfrac{2}{x}=5$ (3)

   d) How many different passwords of 8 characters are possible if you are allowed to use characters from the English alphabet and digits are allowed and the upper and lower case characters are treated as distinct and the characters $-$, @ and & are also allowed. (2)

3. a) In which quadrant or on which axis do each of the points $(-1,3),(4,-2),(-1,0),(2,1)$ and $(-5,-3)$ lie? Verify your answer by locating them on the Cartesian plane. (2)

b) There are number of ways by which we can visualise a portion of a line. State whether the following represent a portion of a line or not

i) A piece of elastic stretched to the breaking point

ii) Wire between two electrical points

iii) The fine thread by which a spider lower itself. (3)

c) Draw the figure of a cuboid ABCDEFGH. If it is so placed that the face EFGH is horizontal, then which of its faces are vertical and which are horizontal? Which edges represent vertical and horizontal line? (3)

d) Draw one acute angle and one obtuse angle without using a protractor. Estimate the size of the angles in degrees. Then measure the angles with a protractor and find the difference between and angles. (2)

4. a) A tank in the shape of a cuboid contains 5760 cubic metres of oil. If its internal length and breadth are 30 m and 12 m respectively find its depth. (3)

b) Give examples of the following. Justify your choice of examples.

i) Write 2 letters of the alphabet which are symmetric with respect to rotation through $180°$ about an axis passing through its centre.

ii) A figure which has 3 reflexion symmetries. (3)

c) What is the difference between ellipse and ellipsoid? (2)

d) Plot the points (2, 3) and $(-1,-3)$ on a graph paper. Draw the line joining (2, 3) and $(-1,-3)$ and obtain the points where the line cuts x-axis and y-axis. (2)

5. a) A table is sold at Rs. 1320, including sales tax. If the rate of sales tax is 10%, find the list price of the table. (2)

b) A machine costs Rs. 1,50,000/-. It is sold for Rs. 50,000 after 5 years. Find the depreciation by the straight line method, and by the written down value method. Also find the book value after 3 years by both the methods. (5)

c) A machine costing 30,000 depreciates by 15% each year. Calculate the value of the machine after 5 years. (3)

6. (a) If an investment is made for Rs. 20,000/- for 3 years, then find

(i) the simple interest at an annual 15% rate of interest.
(ii) the interest, compounded semi-annually at an annual 8% rate of interest. (5)

(b) Suppose you buy a book for Rs. 500 after getting a 20% discount. What would be the amount that is to be paid for the same book if the discount is 25%. (2)

(c) An amount of Rs. 10,000/- is invested in a company's share. If the total dividend declared by the company is Rs. 500/- then find the rate of dividend paid by the company. (3)

7. a) The weight of new born babies (in kg) in a hospital on a particular day are as follows:

2.3, 2.2, 2.1, 2.7, 2.6, 3.0, 2.5, 2.9, 2.8, 3.1, 2.5, 2.8, 2.7, 2.9, 2.4
Prepare a frequency table for the above data and determine the following:
i) Number of babies weighing below 2.8 kg.
ii) The range of the data.
Also, draw a histogram to represent the above data. (5)

b) The manager of a shoe store sells from 0 to x pair of shoes of a recently introduced design every day. Based on experience, the following probabilities are assigned to daily sales of 0, 1, 2, 3 or 4.
p(0) = 0.08
p(1) = 0.18
p(2) = 0.32
p(3) = 0.30
p(4) = 0.12

Are these valid probabilities? Justify your answer. (2)

c) The daily earning, in rupees, of 30 workers in a locality are as given below:
143, 162, 151, 152, 176, 150, 181, 154, 190, 160, 151, 150, 145, 144, 151, 121, 187, 165, 163, 158, 134, 152, 149, 160, 160, 132, 154, 121, 157, 188.
Make a frequency table for the data and use the table to find the number of workers with earning between Rs. 151 – 160. (3)

8. Which of the following statements are true? Give reasons for your answer.
i) 33 has only two factors 1 and 33.
ii) All even numbers are composite.
iii) 0.56 = 0.560.
iv) There exists only one line which passes through one given point.
v) An equilateral triangle is isosceles.
vi) If an unbiased coin is tossed four times, then the total number of possible outcomes is 8.
vii) Any algebraic expression is a polynomial.
viii) If (a, b) is a solution of $4x + 3y = 11$ then (b, a) is also a solution.
ix) For any natural number m and n, $n!+m! = (n + m)!$
x) A set of data can have 3 modes. (10)

Section B

The following 20 questions are multiple choice type. Only one of the four alternatives given in each is correct. You have to identify the correct answer. Each question is worth **1 mark**. You have to give the answers in the **OMR sheet attached with this** and submit it along with your answers to the other questions, for evaluation. Please read the instructions given for filling the OMR sheet, carefully before you start filling your answers. (Please note that this is the format appearing in your Term End Examination.)

1. Which one of the following statements is ambiguous?

(1) The distance between Madras and Patna is 1000 km.
(2) The flowers in the garden are beautiful.
(3) The Sun rises in the West.
(4) One lac candidates appeared in the Preliminary Civil Services Examination in 2007.

2. $(\sqrt{5} - \sqrt{3}) \times (\sqrt{5} + \sqrt{3}) =$

(1) 2 (2) 16
(3) 0 (4) 8

3. $3 + 4$ of $(6 - 4) \div 2 \times 5 =$

(1) 23 (2) 35

(3) $\frac{11}{10}$ (4) $\frac{14}{10}$

4. If the remainder on division of x by 7 is 6, then the remainder on division of $x + 2$ by 7 is

(1) 8 (2) 5

(3) 1 (4) 13

5. Two successive discounts of first 40% and then 50% are given on a shirt of Rs. 500. I can buy the shirt at

(1) Rs. 100 (2) Rs. 150

(3) Rs. 50 (4) Rs. 30

6. Which one of the following statements is **never** true?

(1) Sum of a rational number and an irrational number is a rational number
(2) Sum of two irrational numbers is a rational number
(3) Difference of two irrational numbers is a rational number
(4) Product of two irrational numbers is a rational number

7. A factory employs 300 workers of which 140 are females. The ratio of female workers to male workers in the factory is

(1) 8 : 7 (2) 7 : 8

(3) 7 : 15 (4) 15 : 7

8. If 8% of x is 56, then 13% of x is

(1) 93 (2) 91

(3) 90 (4) 65

9. The sixth and seventh terms of an A.P. are 23 and 28 respectively. The fourth term of this A.P. is

(1) 13 (2) 18

(3) 5 (4) 20

10. The degree of the polynomial which is a product of two polynomials f(x) and g(x) is

(1) smaller of their degrees
(2) larger of their degrees
(3) product of their degrees
(4) sum of their degrees

11. The probability that a number selected from the number 1, 2, 3, 4, …, 20 is an even number is

(1) $\frac{1}{3}$ (2) $\frac{1}{2}$

(3) $\frac{1}{5}$ (4) $\frac{1}{10}$

12. The number of ways of distributing 3 presents out of 5, to 3 brothers is

(1) 10 (2) 125
(3) 27 (4) 60

13. Which of the following statements is true?

(1) Every trapezium is a parallelogram
(2) Every parallelogram is a rectangle
(3) Every equilateral triangle is an isosceles triangle
(4) Every rhombus is a rectangle

14. The area of an equilateral triangle of side 4 cm is

(1) $8\sqrt{3}\ \text{cm}^2$ (2) $4\sqrt{3}\ \text{cm}^2$
(3) $6\ \text{cm}^2$ (4) $16\sqrt{3}\ \text{cm}^2$

15. The volume of a cylinder with base area $2.5\ \text{cm}^2$ and height 8 cm is

(1) $20\ \text{cm}^3$ (2) $16\ \text{cm}^3$
(3) $10\ \text{cm}^3$ (4) $50\ \text{cm}^3$

16. How many axes of reflection symmetry does a square have?

(1) 4 (2) 3
(3) 2 (4) 1

17. Which one of the following is three-dimensional

(1) Straight line (2) Rhombus
(3) Cube (4) Triangle

18. A dealer buys a computer for Rs. 20,000 and sells it for Rs. 25,000. His gain percent is

(1) 50 (2) 25
(3) 20 (4) 40

19. A shirt is sold at Rs. 1,320, including sales tax. If the rate of sales tax is 10%, the list price of the shirt is

(1) Rs. 1,220 (2) Rs. 1,452
(3) Rs. 1,200 (4) Rs. 1,188

20. The mode of the data 18, 13, 21, 21, 52, 54, 32, 52, 54, 21 is

(1) 18 (2) 38
(3) 21 (4) 52

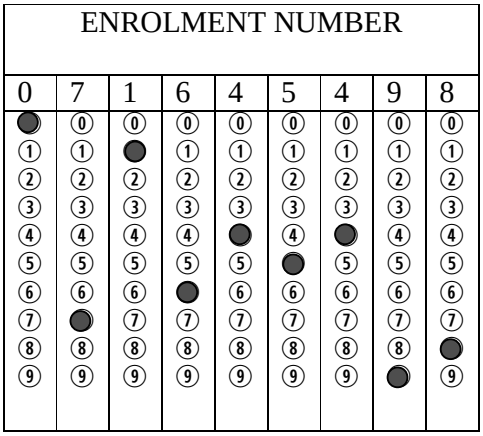
INSTRUCTIONS FOR MARKING
IN THE
OMR RESPONSE SHEET

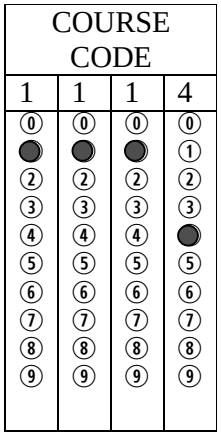
1. Use only H.B. pencil for filling the response sheet

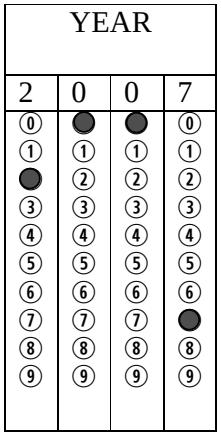
2. Mark your answers in the proper column

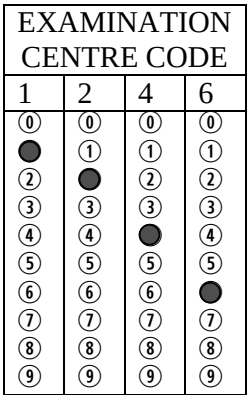
3. Enter your Enrolment no., year, month, course code and examination code in the respective boxes given for that as shown below. For example if your enrolment number is 071645498, then you need to first write the enrolment number as shown in the box titled enrolment no., given below. Then you have to dark each circle corresponding to each digit appearing in the enrolment number. Suppose, for example, the leftmost digit is 0. So we darken the first 0 in the box. Next digit is 7. Then we select the row containing 7 and darken the '7' in the second column. Similarly you can fill the other digits.

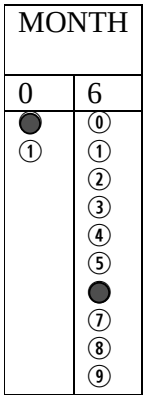
   Note that the **Course Code** you have to fill in the OMR sheet is the **computer code** for this course which is **1114.** This is different from the course code given in the programme guide or blocks for this course.











4. For filling the correct choice for the multiple choice questions, do as illustrated in the following example.

Suppose Question 13 is as given below:

Q.No. 13.: Which one of the following is **not** an integer.

(1) -1 (2) 0.5

(3) $\sqrt{4}$ (4) 0

Suppose your answer to the question is "$\sqrt{4}$" which is given in option no. "3". Then you have to select the column against no. 13 in the boxes given below and write 3 in the box below "13" and shade the circle numbered 3 in that as shown below. If your answer is such that none of the 4 options are correct, then select 0.

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

6	7	8	9	10
⓪	⓪	⓪	⓪	⓪
①	①	①	①	①
②	②	②	②	②
③	③	③	③	③
④	④	④	④	④

11	12	13	14	15
⓪	⓪	⓪	⓪	⓪
①	①	①	①	①
②	②	②	②	②
③	③	●	③	③
④	④	④	④	④

16	17	18	19	20
⓪	⓪	⓪	⓪	⓪
①	①	①	①	①
②	②	②	②	②
③	③	③	③	③
④	④	④	④	④

OMR Response Sheet
(For writing answers to multiple choice questions)

This page is to be torn off and after filling the relevant boxes attach it along with your answers to other questions in the assignment. **This is to be submitted at the study centre for evaluation**.

ENROLMENT NUMBER								
⓪	⓪	⓪	⓪	⓪	⓪	⓪	⓪	⓪
①	①	①	①	①	①	①	①	①
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③	③	③	③	③	③	③	③	③
④	④	④	④	④	④	④	④	④
⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨

COURSE CODE			
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④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

YEAR			
⓪	⓪	⓪	⓪
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④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
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⑨	⑨	⑨	⑨

EXAMINATION CENTRE CODE			
⓪	⓪	⓪	⓪
①	①	①	①
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③	③	③	③
④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

MONTH	
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①	①
	②
	③
	④
	⑤
	⑥
	⑦
	⑧
	⑨

ANSWERS TO MULTIPLE CHOICE QUESTIONS

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

6	7	8	9	10
⓪	⓪	⓪	⓪	⓪
①	①	①	①	①
②	②	②	②	②
③	③	③	③	③
④	④	④	④	④

11	12	13	14	15
⓪	⓪	⓪	⓪	⓪
①	①	①	①	①
②	②	②	②	②
③	③	③	③	③
④	④	④	④	④

16	17	18	19	20
⓪	⓪	⓪	⓪	⓪
①	①	①	①	①
②	②	②	②	②
③	③	③	③	③
④	④	④	④	④