OMT-101

ASSIGNMENT BOOKLET

Bachelor's Preparatory Programme

PREPARATORY COURSE IN GENERAL MATHEMATICS

(This assignment is valit only upto: 31st December, 2011
And
Valid for both Jan 2011 cycle and July 2011 cycle)

School of Sciences
Indira Gandhi National Open University
Maidan Garhi
New Delhi-110068
(2011)

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.

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 December 31st , 2011**.

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/2011
Maximum Marks: 100

Section A

1. a) Perform the following steps listed below and check whether the answer is a multiple of 9 ? (5)

Step-1 Choose a number between 100 and 1000.

Step-2 interchange its first and last digits to make another number

Step-3 Subtract the small number from the larger number

Step-4 Repeat step-2 for the number obtained in step-3

Step-5 Now add the numbers obtained in step-3 and step-4.

Try with some other starting number between 100 and 1000 and check whether the answer is a again a multiple of 9.

b) Find a formula for the general term of the sequence by looking at the first five terms of the sequence.

i) $\left(\frac{1}{2},\frac{1}{4},\frac{1}{8},\frac{1}{16},.....\right)$

ii) $(2,7,12,17,22,.....)$

iii) $(0,2,0,2,.....)$

iv) $\left(\frac{1}{2},\frac{1}{4},\frac{1}{6},\frac{1}{8},\frac{1}{10},.....\right)$ (2)

c) Check whether (x+1) is a factor of the polynomial. (3)
$x^4+x^3+x^2-5x+1$. Justify your answer.

2. a) Draw the coordinate axes and represent the following points

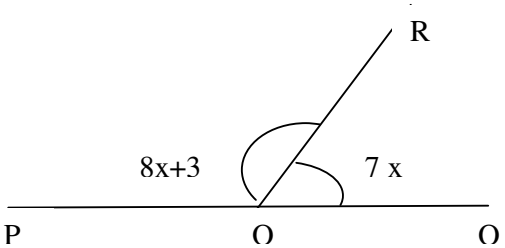
i) $(-2,4)$ ii) $(1,3)$

iii) $(5,-3)$ iv) $(-5,-4)$ (2)

b) Find the point on the x-axis which is equidistant from (3, 2) and $(-5,-20)$ (2)

c) Verify the relationship V + E − F = 0 for the five regular polyhedral, where (2)
if 1,a,b,c,d are the factors of $x5-1$, then show that $(1-a)(1-b)(1-c)(1-d)=0.$

d) Consider the following figure. What value of x would make POQ a line, if (4)



3. a) Using the result $n_{c_r} + n_{c_{r-1}} = n+1_{C_r}$, (3)
compute $10_{c_5} + 10_{C_4}$.

b) Perform the following operation (2)

i) $p(x)+q(x)$ and $p(x)-q(x)$ where $p(x)=x^3-2x^2-3$ and

$p(x)=x^4+x^3+x^2-7x.$

ii) $r(x).p\ (x)$ and where the remainder and quotient on division of $\frac{r(x)}{t(x)}$

$t(x)=u^5+u^4-u^2-u.$

c) How many words with or without dictionary meaning can be made from the letters in the word MONDAY, assuming that no letter is repeated, if 4 letters are used in time? (5)

4. a) A wire when bent into the form of a square encloses an area of 121 sq.cm. if the wire is bent in the form of a circle, then what would be the area? (4)

b) Draw three differently shaped cross sections of an ellipsoid (2)

c) A Tangram is a shape that is divided into different pieces, which can then be rearranged to make lots of shapes. The first tangram was invented in china as is given as below: (4)

Identify the quadrilaterals and triangles in the shape and name the type of each one, Create another shape using the different pieces given in the given shape following the rule: Whole side must match whole sides with edges meeting each other.

5. a) Find the variance and standard deviation for the data
35, 45, 30, 35, 40, 25 (3)

b) For 108 randomly selected college applicants, the following frequency distribution for entrance exam scores was obtained. Construct a histogram, frequency polygon, and o give for the data . (The data for this exercise will be used for Exercise 13 in this section.)
(5)

Class limits	**Frequency**
90-98	6
99-107	22
108-116	43
117-125	28
126-134	9

Applicants who score above 107 need not enroll in a summer developmental program. In this group, how many students do not have to enroll in the developmental program?

c) The following data have been arranged in ascending order (2)

24, 27, 28. 31, 34, x, 37, 40, 42, 45.

If the median of the data is 34, find x

6. a) Find the complement of each of the following events. (2)

i) Rolling a die and getting a 4

ii) Selecting a letter of the alphabet and getting a vowel

iii) Selecting a month and getting a month that begins with a J

iv) Selecting a day of the week and getting a weekday

b) In a sample of 50 people, 21 had type O blood, 22 had type A blood, 5 had type B blood, and 2 had type AB blood. Set up a frequency distribution and find the following probabilities:
(4)

i) A person has type O blood.
ii) A person has type A or type B blood.
iii) A person has neither type A nor type O blood.
iv) A person does not have type AB blood.

c) Determine which events are mutually exclusive and which are not when a single die is rolled. (2)

i) Getting an odd number and getting an even number
ii) Getting a 3 and getting an odd number
iii) Getting an odd number and getting a number less than 4
i) Getting a number greater than 4 and getting a number less than 4

d) Find the mean deviation for the data 12, 8, 7, 3 and 10. (2)

7. a) A shopkeeper gives 10 % discount on a T.V. set. If the list price of the T.V. set is Rs 16,500, find the amount which a customer has to pay for buying the T.V. set if the rate of sales tax is 10 %. (2)

b) A Page from the pass book of Rakesh is given below: (4)

Date	**Particular**	**Amount Withdrawn**	**Amount Deposited**	**Balance Rs.**
09-04-2007	B/F	----------	----------	6100.00
17-04-2007	By cash	----------	1900.00	8000.00
22-04-2007	By cash	3000.00	----------	5000.00
21-05-2007	By cheque	----------	6000.00	11000.00
06-07-2007	By cash	2000.00	----------	9000.00
05-08-2007	By cash	1000.00	----------	8000.00
18-08-2007	By cash	----------	4000.00	12000.00
11-10-2007	By cash	----------	2000.00	14000.00
18-12-2007	By cash	----------	1000.00	15000.00

Find the interest Rakesh gets for the period April 2007 to December 2007 at 5 % per Annum simple interest.

c) The annual income of Sohan (excluding HRA) is Rs. 2,10,000. He contributes Rs. 4000 per month in his provident fund account and pays on annual isurance Premimum of Rs. 22000. Calculate the income tax including surcharge sohan has Pay in the last month of the year if his earlier decuctions as income tax for the first 11 month were at the rate of Rs. 1800 per month. (2)

Assuming the following calculating income tax

a) Standard deduction: $1/3^{rd}$ of the total annual income subject to a maximum of Rs. 20,000 (Rs. 25000 in case the annual income is less Then Rupees one lakh).

b) Rates of income tax

	Slab	**Income tax**
i)	upto 50,000	No tax
ii)	From Rs. 50,001 to Rs.60,000	10% of the amount exceeding Rs. 50,000
iii)	From Rs. 60,001 to Rs.150,000	Rs. 1000+ 20% of the amount exceeding Rs 60,000
iv)	From Rs. 150,001 & onwards	Rs. 19,000 + 30% of the amount exceeding Rs. 150,000
c)	Rebate in tax	20 % of the total savings subject to a maximum of Rs. 12,000
d)	Surcharge	10 % of the total tax payable (after rebate)

d) Pardeep buys 1000 shares of par value of Rs. 10 each of a company which pays annual dividend of 15 % at such a price that he gets 5 % on his investment. Find the market value of a share. (2)

8. a) Give a counter example to disprove the statement that every counting number is greater than or equal to the sum of the proper factors. (2)

b) Give an example of the following: (3)

i) Two irrational numbers, the product of which is a rational number

ii) One rational number lying between 0 and -1.

iii) A decimal number lying between 0.003 and 0.004.

c) Calculate the following: (2)

i) $\sqrt[3]{5}\times\sqrt[3]{25}$

ii) $\left(\frac{1}{25}\right)^{2/3}\left(5^{-1/3}\right)(125)^{1/3}..$

d) Express 98 as a sum or difference of two numbers whose powers are easier to calculate and then use binomial theorem to compute 98 raised to the power 5. (3)

Section B

The following 20 questions are multiple choice types. 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. The value of $13-2\times3+14\div(2-3)$ is :

(1) -7 (2) 7

(3) 0 (4) $-\frac{47}{3}$

2. The value of $(100)^{-3/2}$ is

(1) 0.1 (2) 0.01
(3) 0.001 (4) 0.0001

3. The difference $6\frac{5}{9}-4\frac{2}{9}$ is:

(1) $2\frac{1}{9}$ (2) $2\frac{1}{3}$
(3) $\frac{3}{7}$ (4) $10\frac{1}{3}$

4. 7.5 % of 20 is

(1) 15 (2) 1.5
(3) 150 (4) $\frac{80}{3}$

5. Which of the following is not true?

(1) 1 is a multiple of every number (2) Every number is a multiple of itself
(3) Every number is a factor of itself (4) 1 is a factor of every number

6. The Roman numeral for 40 is:

(1) XL (2) XXX
(3) LX (4) XC

7. The LCM of numbers 15, 70, 105 is :

(1) 5 (2) 105
(3) 210 (4) 15

8. The sequence

1,1,2,3,5,8,……. is :

(1) an A.P (2) a G.P.
(3) Fibonacci sequence (4) sequence of perfect numbers

9. The value of $3^1+1^3+3^0+0^3$ is :

(1) 5 (2) 6
(3) 4 (4) 2

10. The number ways to select 4 dishes out of 6 different dishes is :

(1) 30 (2) 24
(3) 4 (4) 15

11. $\left(\sqrt{9}-\sqrt{5}\right)\left(\sqrt{9}+\sqrt{5}\right)=$

(1) 2 (2) 4
(3) 56 (4) -4

12. Which of the following conditions cannot be used for checking that two triangle are congruent?

(1) two corresponding angles and corresponding sides are equal
(2) two corresponding sides and the corresponding included angles are equal
(3) three corresponding angles are equal
(4) three corresponding sides are equal

13 Two angles of a triangle are of the measure 71^0 and 69^0. The measure of the third angle is :

(1) 40^0 (2) 50^0
(3) 60^0 4) 90^0

14. The angle of rotational symmetry for the English letter S is :

1) 90^0 (2) 60^0
(3) 120^0 (4) 180^0

15 The slope of x-axis is :

(1) 1 (2) 0
(3) not-defined (4) $\frac{1}{2}$

16. The mode of the data 2, 18, 12, 10, 99, 10, 11, 7, 9, 5, 2 is :

(1) 2 (2) 10
(3) 5 (4) 9

17. At what rate of interest will simple interest be half the principle in 10 years?

(1) 2 % p. a. (2) 3 % p.a.
(3) 5 % p. a. (4) 10 % p.a.

18. The mean deviation of the first six even natural numbers is :

(1) 8 (2) 7
(3) 3 (4) 4

19. The side of an equilateral triangle is 4 cm. Its area is :

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

20. Which of the following statements is false for two perpendicular lines?

(1) The lines are at right angle
(2) The lines are always at same distance from each other
(3) One of the angles formed at their meeting point is 90^0
(4) If one of the line is a horizontal, the other will be vertical

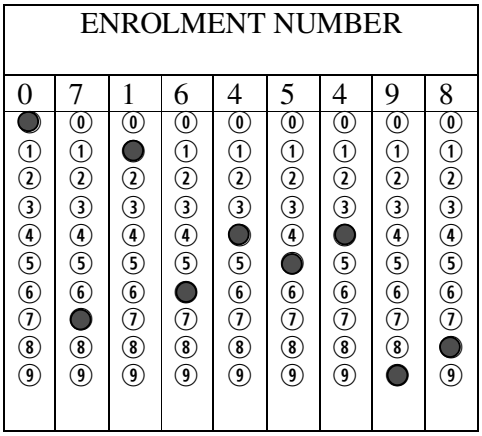
INSTRUCTIONS FOR MARKING
IN THE
OMR RESPONSE SHEET

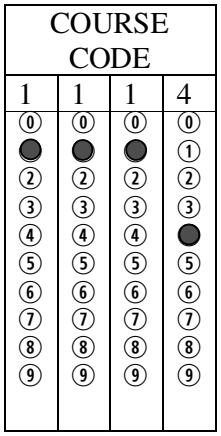
1. Use only H.B. pencil for filling the response sheet

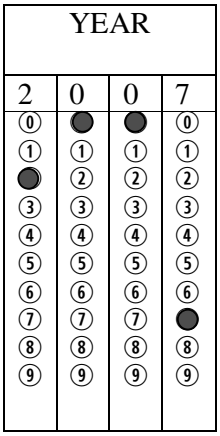
2. Mark your answers in the proper column

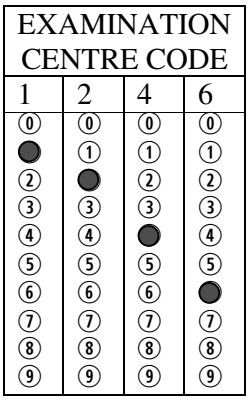
3. Enter your Enrolment no., year, month, course code and examination code in the respective boxes given for that as shown below. For example if your enrolment number is 071645498, then you need to first write the enrolment number as shown in the box titled enrolment no., given below. Then you have to 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.

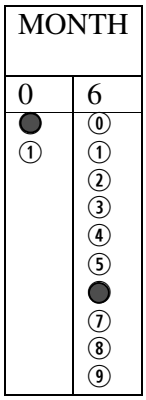
   Note that the **Course Code** you have to fill in the OMR sheet is the **computer code** for this course which is **1114.** This is different from the course code given in the programme guide or blocks for this course.











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

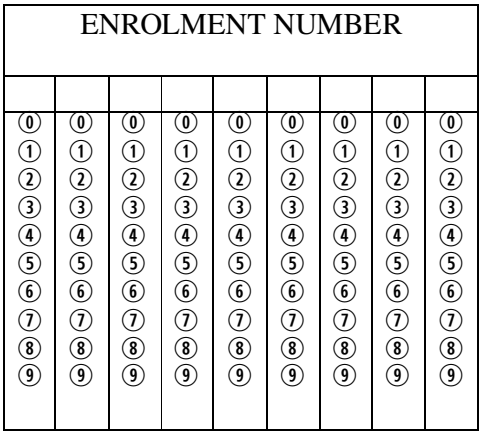
11	12	13	14	15
⓪	⓪	⓪	⓪	⓪
①	①	①	①	①
②	②	②	②	②
③	③	●	③	③
④	④	④	④	④

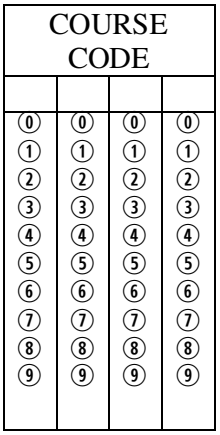
16	17	18	19	20
⓪	⓪	⓪	⓪	⓪
①	①	①	①	①
②	②	②	②	②
③	③	③	③	③
④	④	④	④	④

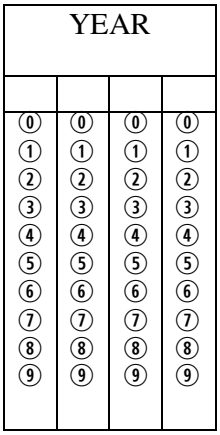
OMR Response Sheet

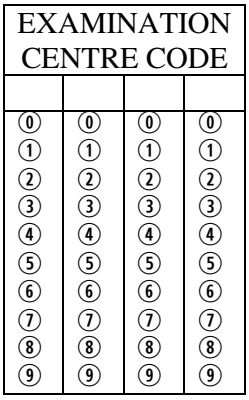
(For writing answers to multiple choice questions)

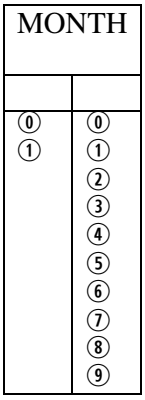
This page is to be torn off and after filling the relevant boxes attach it along with your answers to other questions in the assignment. **This is to be submitted at the study centre for evaluation**.











ANSWERS TO MULTIPLE CHOICE QUESTIONS