

OMT-101

ASSIGNMENT BOOKLET

(Valid from 1st January to 31st December, 2015)

**Bachelor's Preparatory Programme
(B.P.P.)**

PREPARATORY COURSE IN GENERAL MATHEMATICS



**School of Sciences
Indira Gandhi National Open University
Maidan Garhi, New Delhi-110068
(2015)**

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 31st December, 2015.

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 your programme guide.** (Assignments are also available from the IGNOU website www.ignou.ac.in. You can access them by clicking on the links “Student Zone → 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, 2015.**

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

We wish you good luck!

Assignment

Course Code: OMT-101
Assignment Code: OMT-101/2015
Maximum Marks: 100

Section – A

1.
 - a) Give two situations where you have seen Roman numerals used. (2)
 - b) Do you think mathematical ideas are easy to understand if they are expressed in symbols? Give examples in support of answer. (3)
 - c) Give two situations in your daily life where you use mathematics. (2)
 - d) Find the LCM and HCF of the numbers 420 and 693. (3)
2.
 - a) Shankar bought 4 liter milk. He distributed $\frac{2}{3}$ of the milk among his three children equally. How much milk have each child got? How much milk is left with Shankar after distribution? (3)
 - b) The length and breadth of a table glass are $1\frac{2}{3}$ meter and $1\frac{1}{4}$ meter respectively. Find the area of the table glass. Express the area as a mixed fraction. (2)
 - c) A car is running at a constant speed of 65 Km/H. How much time will it take to cover 300 Km ? Express the time taken in HH:MM:SS format. (2)
 - d) 40 students of a class appeared in an examination in which 21 students passed with first division, 14 passed with second division and 3 passed with third division. Find the number of students passed with first, second and third divisions in percentage. Also find the percentage of students failed in the examination? (3)
3.
 - a) Determine which of the following expressions are the factors of the polynomial $2x^3 + 3x^2 - 2a^2x - 3a^2$ and which are not. (4)
(i) $x - a$ (ii) $x + a$ (iii) $2x + 3$ (iv) $3x + 2$
 - b) Simplify the following expression:
 $(\sqrt{2} + \sqrt{3})^2 - 2\sqrt{6}(\sqrt{9} - 2)$ (3)
 - c) The formula for computing the nth Fibonacci number is
$$\mathcal{F}_n = \frac{1}{\sqrt{5}} \left[\left(\frac{1 + \sqrt{5}}{2} \right)^{n+1} - \left(\frac{1 - \sqrt{5}}{2} \right)^{n+1} \right].$$
Using this formula compute \mathcal{F}_n for $n = 0, 1, 2, 3, 4$. (5)
 - d) Karim has 5 pants and 6 shirts. For a trip he has to select 2 pants and 3 shirts. In how many ways he can do this? (3)
4.
 - a) Find the value of $(0.81)^{1/4}$ correct to 4 decimal places. (3)

- b) Change the following angular measurements from one system to other as indicated in each part.
- i) $43\frac{3}{4}^\circ$ to seconds ii) $433''$ to degrees (2)
- c) In Fig. 1, given below, classify the marked angles as acute, right or obtuse angle. (3)

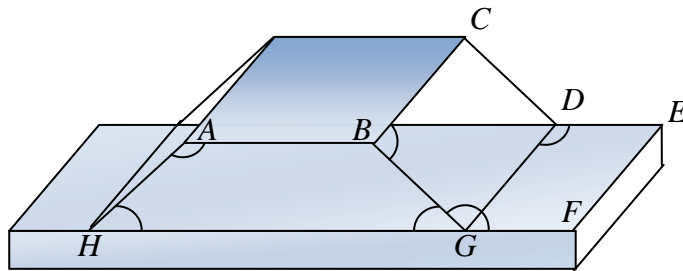


Fig. 1

- d) In the circle given in Fig. 2, if O is the centre of the circle, find the angles α and β . (2)

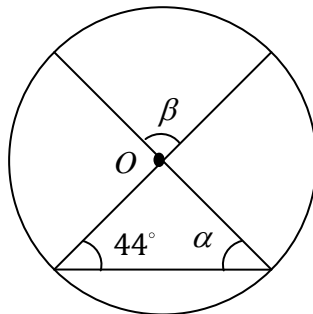


Fig. 2

5. a) What is the difference between a hyperbola and a hyperboloid? Explain with examples. (2)
- b) Give two English alphabets which have reflection symmetry. Also find two letters which are not symmetric about any line. (2)
- c) Copy the right angle triangle given in Fig. 3 on a stiff paper. Cut the shaded portions and paste them along the other sides of the triangle suitably to get a motif. Using this motif make a tessellation. (3)

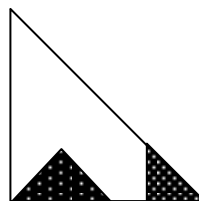


Fig. 3

(Note: Your grid should be made of the right angle triangles of the same size.)

- d) Find the relation between the number of faces (F), number of vertices (V) and the number of edges (E) of the Platonic solids. (3)

6. a) The scale of the road map of a city is $1\text{ cm} = 922\text{ m}$. If the distance between the places A and B in the map is 6.5 cm , find the actual distance between them. (2)
- b) A sphere is put inside a cube such that the sphere touches each face of the cube from inside. If the side of the cube is 6 cm , find the volume of the space between the sphere and the cube. (2)
- c) Find the equation of the line with slope $\frac{4}{3}$ and which passes through the mid-point of the line segment joining the points $(3, -1)$ and $(1, 2)$. Represent this line geometrically by taking at least three points on the line. (3)
- d) Find the cost of purchasing 240 shares of a company, each of par value ₹ 120 quoted at ₹ 150 each in the market, from the shareholder. Also find the gain to the new shareholder if he sells each share at a premium of ₹ 200. (3)
7. a) Puneet purchased 36 bananas for ₹150. He found 6 of them bad and threw away. He sold $\frac{3}{5}$ of the remaining bananas at a profit of 15% and the rest at a loss of 3%. Find his profit or loss in percent. (4)
- b) The following data represents the number of vehicles of 24 households in a colony.

2	4	6	5	7	0	3	2
5	5	7	4	5	3	4	0
2	6	4	4	3	3	2	1

Answer the following questions on the basis of the data given above.

- i) What is the maximum and minimum number of vehicles in a household?
- ii) Using the classes $0 - 2, 2 - 4, 4 - 6, 6 - 8$ draw up the frequency distribution of the number of vehicles.
- iii) How many households have vehicles more than 6?
- iv) How many households have vehicles between 4 and 6? (4)
- c) The table shows the number of endangered and threatened species surveyed in a year. Find the probability that
- i) a randomly chosen species from the table is a reptile
- ii) a randomly chosen species from the table among the endangered species is a reptile. (4)

	Mammals	Reptiles	Birds	Ambipians	Others
Endangered	60	79	19	12	150
Threatened	9	11	25	7	78

- d) Identify which pairs of events A and B are mutually exclusive and which ones are not mutually exclusive.
- i) A : Getting an ace in picking one card from a deck.
 B : Getting a club in picking one card from a deck.
- ii) A : Getting an even number up on a die.
 B : Getting an odd number up on a die.
- iii) A : Getting a number between 2 and 10 in picking a number from the set $\{1, 2, 3, \dots, 100\}$.
 B : Getting a number divisible by 11 in picking a number from the set $\{1, 2, 3, \dots, 100\}$ (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.**)

- Which one of the following statements is **false**?
 - Square of an integer is a natural number.
 - Product of two odd numbers is odd.
 - A number not divisible by 2 or 3 is a prime number.
 - Product of two rational numbers is a rational number.
- The number $\frac{462}{4095}$ is equivalent to the number:
 - $\frac{154}{195}$
 - $\frac{154}{65}$
 - $\frac{22}{195}$
 - $\frac{77}{455}$
- A shopkeeper charges ₹ x for 3 eggs. If he charges ₹ 90 for 20 eggs, then the value of x is
 - 15
 - 4.5
 - 10
 - 13.5
- Which one of the following is **not a solution** of the equation $2x - 7y - 4 = 0$?
 - $\left(\frac{4}{3}, -\frac{4}{3}\right)$
 - $\left(\frac{7}{2}, \frac{3}{7}\right)$
 - $\left(\frac{61}{6}, \frac{7}{3}\right)$
 - $\left(\frac{21}{4}, \frac{3}{2}\right)$
- If the 19th term of an A.P. is 238 and the common difference is 13, then its first term is
 - 43
 - 4
 - 5
 - 30
- If $C(n, 3) = 2C(n, 4)$, then n is
 - 4
 - 6
 - 5
 - 8
- Dimension of a tetrahedron is
 - 4
 - 5
 - 3
 - 2
- Which one of the following is not a postulate for geometry?
 - For any two points there is exactly one line that contains them.
 - For any three non-collinear points there is exactly one plane that contains them.

**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 NUMBER., 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.

ENROLMENT NUMBER								
0	7	1	6	4	5	4	9	8
●	○	○	○	○	○	○	○	○
①	①	●	①	①	①	①	①	①
②	②	②	②	②	②	②	②	②
③	③	③	③	③	③	③	③	③
④	④	④	④	●	④	④	④	④
⑤	⑤	⑤	⑤	⑤	●	⑤	⑤	⑤
⑥	⑥	⑥	●	⑥	⑥	⑥	⑥	⑥
⑦	●	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	●
⑨	⑨	⑨	⑨	⑨	⑨	⑨	●	⑨

COURSE CODE			
1	1	1	4
○	○	○	○
●	●	●	①
②	②	②	②
③	③	③	③
④	④	④	●
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

YEAR			
2	0	0	7
○	●	●	○
①	①	①	①
●	②	②	②
③	③	③	③
④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	●
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

EXAMINATION CENTRE CODE			
1	2	4	6
○	○	○	○
●	①	①	①
②	●	②	②
③	③	③	③
④	④	●	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	●
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

MONTH	
0	6
●	○
①	①
	②
	③
	④
	⑤
	●
	⑦
	⑧
	⑨

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

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

$(4) \quad 0$

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	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
1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9

COURSE CODE			
0	0	0	0
1	1	1	1
2	2	2	2
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

YEAR			
0	0	0	0
1	1	1	1
2	2	2	2
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

EXAMINATION CENTRE CODE			
0	0	0	0
1	1	1	1
2	2	2	2
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	
0	0
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