

OMT-101

ASSIGNMENT BOOKLET

(Valid from 1st January to 31st December, 2016)

**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
(2016)**

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, 2016.

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, 2016.**

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) Suppose you are playing cards. What kind of mathematics are you using there? Give two examples. (2)

b) Write the following statements using symbols.

i) There is an odd number whose square is even.

ii) The product of three nonnegative integers is greater than their sum.

Are these statements true? Justify your answers with a short proof or a counter-example. (4)

c) Evaluate the following expressions using BODMAS rule, by clearly indicating the operation you have applied in each step. (2)

i)
$$\frac{((8 \div 2) + 4) - 5}{4 - (2 + 5)}$$

ii)
$$\frac{2 \times 4 - 5 + 2}{2 - 2 \times 2} - \frac{3 \times 6 - 8 - 5}{3 - 1}$$

d) Find the LCM of 12, 18, 21, 34. (2)

2. a) Arrange the following numbers in ascending order. (3)

$$\frac{3}{2}, \frac{4}{9}, \frac{2}{5}, \frac{5}{2}, \frac{16}{9}, \frac{15}{18}, 1, \frac{3}{4}, \frac{12}{16}, 2, \frac{7}{8}$$

b) John bought $3\frac{4}{5}$ Kg. of vegetables and Radhika bought $4\frac{3}{5}$ Kg. of vegetables. Who bought more vegetables and how much? (2)

c) Uma completes a work in 2.65 days. How much work she does in 1.05 days? (2)

d) In a year fuel prices decreased from Rs. 78 to Rs. 59. Find the percentage of decrease for the year. (3)

3. a) Prove or disprove that $m^n \times n^m = (mn)^{n+m}$, for all $m, n \in \mathbb{N}$. (2)

b) Simplify the following expression. (2)

$$(\sqrt{4} + \sqrt{3})(\sqrt{4} - \sqrt{2})(\sqrt{3} - \sqrt{6})$$

c) Find the following sum. (3)

$$\sum_{k=2}^{100} (k-1)(k+1)$$

- d) In how many ways can you arrange the letters of the word 'RANDOM' if the two vowels should not be together? (3)
4. a) Show that $\left(x^2 + \frac{1}{3}x - \frac{11}{9}\right) + \frac{\left(-\frac{2}{9}\right)}{3x-1} = 3x^3 - 4x - 1$. (3)
- b) Find the coefficient of x^5y^{11} in the expansion of $(2x - y)^{16}$. (2)
- c) How much useful do you find the concept of angle in real life situations? Give any three such situations in support of your answer. (3)
- d) Consider Fig. 1. How many points are there between A and B , between B and C ? How many points are inside, outside and on the boundary of $\triangle ABC$? (2)

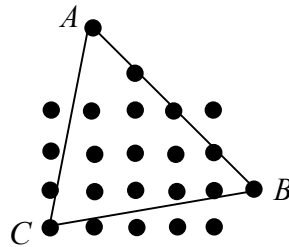


Fig. 1

5. a) Find the number of polygons in Fig. 2. (3)

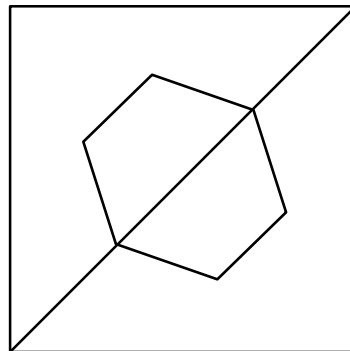


Fig. 2

- b) What do you understand by a conic section? Give three real life examples of conic sections. (3)

- c) List all the symmetries in the following: (3)
 (i) 8 (ii) S
- d) Give one example each of a tessellation whose basic motif has
 (i) reflection symmetry (ii) rotation symmetry. (3)
- e) 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)
6. a) What are the major reasons which make reading a map difficult? (2)
- b) Find the volume of the cylinder with height 6 cm and diameter 3 cm. (3)
- c) A room has length 8m, width 5m and height 5m with a door of size 2m × 4m and a window of size 2m × 1m (see Fig. 3). Find the total cost of painting the four walls and the ceiling if the cost of painting 1m² area is ₹ 12/-. (3)

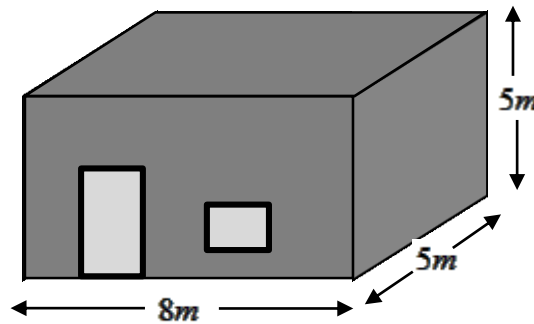


Fig. 3

- d) Represent the points (1, -1), (1, 0) and (-2, -4) in the Cartesian coordinate system. Do they lie on a line? Justify your answer. (2)
7. a) Plot the equations $x + y = 0$ and $2x + y = 1$ on a plane. Do these equations have any point in common? If yes, represent the point on the plane. If not, give reasons why not. (4)
- b) If an investment is made for ₹ 12,000/- for 2 years, then find
 (i) the simple interest at an annual 10% rate of interest.
 (ii) the interest, compounded semi-annually at an annual 8% rate of interest. (5)
- c) A cellphone is sold for ₹ 5500/- including sales tax. If the rate of sales tax is 10% find the list price for the cellphone. (3)
- d) Find the standard deviation of the following data. (3)

| | | | | | | | |
|----|----|----|----|----|----|----|----|
| 22 | 32 | 23 | 54 | 32 | 25 | 23 | 11 |
| 66 | 54 | 87 | 88 | 11 | 33 | 65 | 90 |
| 36 | 28 | 78 | 67 | 56 | 45 | 24 | 13 |

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.)**

- Three fourth of a number x is written as
 - 1) $\frac{4x}{3}$
 - 2) $4x^3$
 - 3) $3x^4$
 - 4) $\frac{3x}{4}$
- The number 4.3987654321 rounded off to 3 decimal places is :
 - 1) 4.3987654
 - 2) 4.39
 - 3) 4.398
 - 4) 4.399
- The coefficient of r in $\pi r^2 l$ is
 - 1) π
 - 2) $\pi r l$
 - 3) πl
 - 4) l
- Sum of the cubes of first n natural numbers is
 - 1) $C(n, 2). C(n, 2)$
 - 2) $C(n, 2). C(n + 1, 2)$
 - 3) $C(n - 1, 2). C(n, 2)$
 - 4) $C(n + 1, 2). C(n + 1, 2)$
- The number of terms in the expansion of $(1 - x)^{-3}$ are
 - 1) 3
 - 2) 4
 - 3) 2
 - 4) infinite
- $P(16, 4) =$
 - 1) 4
 - 2) $\frac{16!}{12!}$
 - 3) $\frac{16!}{4!}$
 - 4) $\frac{16!}{4!12!}$
- Which one of the following is three dimensional?
 - 1) A straight line
 - 2) A rhombus
 - 3) A trapezium
 - 4) A cuboid
- Which one of the following is **not** true?
 - 1) The sum of the angles of a triangle is 180° .
 - 2) The sum of the angles of a quadrilateral is 360° .

- 3) The sum of the angles of a pentagon is 540° .
- 4) The sum of the angles of a hexagon is 900° .
9. Sum of the angles of a heptagon is:
- 1) 3560° 2) 900°
3) 1080° 4) 720°
10. Which one of the following cannot be a section of a cone with a plane?
- 1) A circle 2) A parabola
3) A hyperbola 4) A rhombus
11. Under which one of the following rotations a pentagon is not symmetric?
- 1) 90° 2) 108°
3) 216° 4) 324°
12. Which one of the following is an example of a pair of skew lines?
- 1) Two intersecting lines in a plane
2) The lines along the diagonals of a wall
3) Two lines lying in the opposite walls of a room such that one is horizontal and other is vertical.
4) The opposite sides of a rectangle.
13. If the area of a rhombus is equal to twice of the area of a triangle with base 12 cm and altitude 10 cm, then the product of the diagonals of the rhombus is
- 1) 120 cm^2 2) 240 cm^2
3) 60 cm^2 4) 360 cm^2
14. If the volume of a 3 m long cone is $\pi \text{ m}^3$, the radius of the cone is
- 1) 2 m 2) 1 m
3) $\pi \text{ m}$ 4) $\frac{1}{\pi} \text{ m}$
15. The maximum distance between any two points on circle with radius 3 cm is
- 1) 3π 2) 2π
3) 6 4) 4
16. The equation of a line at a distance of a units left to the y -axis is
- 1) $y = a$ 2) $x = a$
3) $y = -a$ 4) $x = -a$
17. What would the amount after 2 years be if ₹ 5000/- are invested at the rate of 12% per annum and the interest is compounded annually?
- 1) ₹ 2272 2) ₹ 5072

3) ₹ 6072

4) ₹ 6272

18. If the median of the data 3, x , -1, 2, 3, 7, 6, 9, 12, 15 is 5, then x is

1) 2

2) 3

3) 4

4) 5

19. A die is thrown twice. The probability that a sum of 10 appears is

1) $\frac{1}{12}$

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

3) $\frac{1}{6}$

4) $\frac{1}{10}$

20. If A and B are independent events and $P(A) = p$, where $0 < p < 1$, then $P(A|B)$ is

1) $\frac{1}{p}$

2) $1 - p$

3) p

4) $1 - \frac{1}{p}$

**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 |
| 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) $\sqrt{4}$ (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 |

| | | | | |
|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 |
| 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 |

| | | | | |
|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 2 |
| 6 | 7 | 8 | 9 | 0 |
| | | | | |
| 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 |
| 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 | 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 | | | |
|-------------|---|---|---|
| | | | |
| 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 |