

OMT-101

ASSIGNMENT BOOKLET

(Valid from 1st January 2018 to 31st December, 2018)

**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
(2018)**

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, 2018.

The counsellor 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 Formatting 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, 2018.**

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-101/2018
Maximum Marks: 100

Section – A

1. a) Girija has a gold coin of 150 gms. She distributed $\frac{1}{6}, \frac{3}{5}, \frac{1}{5}$ of the coin to her daughters. Now how much gold is left with Girija? (2)
- b) Arrange the following numbers in ascending order. (2)
- $$\frac{1}{9}, \frac{2}{7}, \frac{6}{5}, \frac{11}{12}, \frac{7}{3}, \frac{1}{3}, \frac{4}{7}, \frac{8}{5}$$
- c) Simplify the following
- i) $\frac{\sqrt{2700} \times \sqrt{30}}{\sqrt{40}}$ ii) $\frac{2^4 \times 3^4}{5^2} \div \frac{6^2}{5}$
- iii) $\frac{4^{-2} \times (-10)^3}{(-5)^3}$ iv) $\sqrt{(7^2 + 8^2)^{1/2} \times 113^{1/2} + 2^3}$ (4)
- d) The scale of a map is given as 1: 200000. Two cities are 3 cm apart on the map. Calculate the actual distance between them. (2)
2. a) In how many ways can the letters of MAHABHARAT be arranged so that
- i) B and T are never together
- ii) M, A, T, H occurs at first four places. (4)
- b) The ratio of number of male workers and female workers in a company is 5:1. If the company has 250 male workers, how many female workers are there in the company? How many more female workers are need to be recruited so that the ratio becomes 1:1? (3)
- c) Using the result $C(n, r) + C(n, r - 1) = C(n + 1, r)$, compute $C(8, 5) + C(8, 4)$. (3)
3. a) What are the binary representations of the following decimal numbers? (3)
- 18, 27, 42
- b) How will you represent the following numbers in Roman numerals? (2)
- 210, 450, 530, 345
- c) Use number line to evaluate the following

i) $-5 + (-3)$

ii) $4 - (-4)$ (2)

- d) Assume that the population of India is 120 million. If 40.25% of the population has height below 5 ft. and 30.76% of the population has height between 5 and 5.5 ft. Find how many people have height greater than 5.5 ft., rounding off your result to 2 decimal places. (3)

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

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 largest 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. (5)

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

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

ii) $(2, 7, 12, 17, 22, \dots)$

iii) $(0, 2, 0, 2, \dots)$

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

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

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

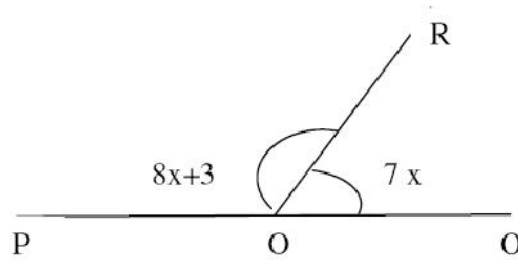
i) $(-2, 4)$ ii) $(1, 3)$

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 polyhedra, where V is the number of vertices, E is the number of edges and F is the number of faces. (2)

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



6. 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 and is as given below:



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. (4)

7. 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 ogive for the data.

| <u>Class limits</u> | <u>Frequency</u> |
|---------------------|------------------|
| 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 programme. In this group, how many students do not have to enroll in the development programme? (5)

- c) The following data have been arranged in ascending order
24, 27, 28, 31, 34, x, 37, 40, 42, 45.

If the median of the data is 34, find x (2)

8. a) A shopkeeper gives 10% discount on a T.V. set. If the list price of the T.V. sets is Rs. 16,500, find the amount which is 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:

| 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. (4)

- 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 insurance Premium of Rs. 22000. Calculate the income tax including surcharge sohan has to pay in the last month of the year if his earlier deductions as income tax for the first 11 month were at the rate of Rs. 1800 per month. (2)

Assuming the following while calculating income tax

- a) Standard deduction: $\frac{1}{3}^{\text{rd}}$ 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 |

**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 |

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 |