

MA–10**Elementary Mathematics**

Elementary Mathematics (MA–10)

Examination, 2018

Time : 3 Hours**Max. Marks : 80**

Note : This paper is of **eighty (80)** marks containing **three (03)** Sections A, B and C. Attempt the questions contained in these Sections according to the detailed instructions given therein.

Section–A**(Long Answer Type Questions)**

Note : Section ‘A’ contains four (04) long answer type questions of nineteen (19) marks each. Learners are required to answer *two* (02) questions only.

1. (a) A certain sum amounts to ₹ 72,900 in 2 years at 8% per annum compound interest, compounded annually. Find the sum. 7
- (b) On selling a table for ₹ 987, Ron loses 6%. For how much did he purchase it ? 6
- (c) A and B together can do a piece of work in 15 days, while B along can finish it 20 days. In how many days can A along finish the work ? 6

2. (a) If the sum of two numbers is 42 and their product is 437, then find the absolute differences between the numbers. 7

- (b) What is the Highest Common Factor (HCF) of 513, 1134 and 1215 ? 6

- (c) If $3^{x-y} = 27$ and $3^{x+y} = 243$, then find the value of x . 6

3. (a) If $A + B + C = 180^\circ$, then prove that : 7

$$\tan \frac{A}{2} \tan \frac{B}{2} + \tan \frac{B}{2} \tan \frac{C}{2} + \tan \frac{C}{2} \tan \frac{A}{2} = 1$$

- (b) Find the values of $\sin 180^\circ$. 6

- (c) Prove that : 6

$$\frac{1}{\tan 3A + \tan A} - \frac{1}{\cot 3A + \cot A} = \cot 4A$$

4. (a) Calculate the median of the following distribution : 7

Class	Frequency
0—10	2
10—20	18
20—30	30
30—40	45
40—50	35
50—60	20
60—70	6
70—80	3

- (b) Calculate the mode of the following distribution :

6

Class	Frequency
10—20	8
20—30	12
30—40	25
40—50	45
50—60	11
60—70	9

- (c) Three solid cubes of sides 1 cm, 6 cm and 8 cm are melted to form a new cube. Find the surface area of the cube so formed.

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Section-B

(Short Answer Type Questions)

Note : Section 'B' contains eight (08) short answer type questions of eight (8) marks each. Learners are required to answer *four* (04) questions only.

- (a) Find the simple interest on ₹ 68,000 at $16\frac{2}{3}\%$ per annum for 9 months.

(b) Find the compound interest on ₹ 10,000 in 2 years at 4% annum, the interest being compounded half yearly.
- (a) A book was sold for ₹ 27.50 with a profit of 10%. If it were sold for ₹ 25.75, then what would have been the percentage of profit or loss ?

- (b) Monika purchased a cycle at $(9/10)$ th of its selling price and sold it at 8% more than its selling price. Find her gain percentage.
3. (a) Worker A takes 8 hours to do a job. Worker B takes 10 hours to do the same job. How long should it take both A and B, working together but independently, to do the same job ?
- (b) A is twice as good as a workman as B and together they finish a piece of work in 18 days. In how many days will A alone finish the work ?
4. (a) Find the HCF of 36 and 84.
- (b) Find the LCM of 148 and 185.
5. (a) 50 is divided into two parts such that the sum of their reciprocals is $1/12$. Find the two parts.
- (b) The average of four consecutive even numbers is 27. Find the largest of them.
6. (a) If $\log_{\sqrt{8}} x = \frac{10}{3}$, find the value of x .
- (b) If $\log x + \log y = \log (x + y)$, then prove that :

$$y = \frac{x}{x - 1}$$

7. (a) Prove that :

$$\sin (A + B) \sin (A - B) = \sin^2 A - \sin^2 B$$

(b) Prove that :

$$\cos (45^{\circ} - A) - \sin (45^{\circ} + A) = 0$$

8. (a) The mean of 100 items is found to be 30. If at the time of calculation two items were wrongly taken as 32 and 12 instead of 23 and 11. Find the corrected mean.
- (b) The sum of the radius of the base and the height of a solid cylinder is 37 metres. If the total surface area of the cylinder be 1628 sq. metres, then find its volume.

Section–C

(Objective Type Questions)

Note : Section ‘C’ contains ten (10) objective type questions of one (01) mark each. All the questions of this Section are compulsory.

1. If the cost price of an item is ₹ 60 and selling price is ₹ 63, then profit is :
- (a) 4%
(b) 5%
(c) 6%
(d) 7%
2. If the principal amount is P, rate of interest is r , then after n years the compound interest is :

(a) $P \left(1 + \frac{r}{100} \right)^n$

$$(b) \quad P \left[\left(1 + \frac{r}{100} \right)^n - 1 \right]$$

$$(c) \quad P \left[\left(1 + \frac{r}{100} \right)^n + 1 \right]$$

$$(d) \quad P \left(1 + \frac{r}{100} \right)^n - 1$$

3. A and B together can do a piece of work in 8 days, but A alone can do it in 12 days. How many days would B take to do same work ?
- (a) 22 days
(b) 23 days
(c) 24 days
(d) 25 days
4. Least common multiple of 12 and 18 is :
- (a) 3
(b) 6
(c) 12
(d) 36
5. Which is the correct factorization of $x^2 - 10x - 24$?
- (a) $(x - 2)(x + 12)$
(b) $(x + 4)(x - 6)$
(c) $(x - 4)(x - 6)$
(d) $(x - 2)(x - 12)$

6. The value of $\tan 30^\circ$ is :

(a) $\frac{1}{\sqrt{3}}$

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

(c) $\sqrt{3}$

(d) $-\frac{1}{\sqrt{3}}$

7. Given that the triangle ABC is right angled at C, then $\cos (A + B) = :$

(a) 0

(b) 1

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

(d) $\sqrt{\frac{3}{2}}$

8. Perimeter of one face of a cube is 20 cm. Its total surface area is :

(a) 2400 sq cm

(b) 150 sq cm

(c) 120 sq cm

(d) 96 sq cm

9. The mean of two numbers is 12. If one number is 16, then the other number is :

(a) 14

- (b) 12
 - (c) 10
 - (d) 8
10. Choose the correct relationship among Mean, Median and Mode :
- (a) $\text{Mode} = 3 \text{ Median} - 2 \text{ Mean}$
 - (b) $\text{Median} = 3 \text{ Mode} - 2 \text{ Mean}$
 - (c) $\text{Mean} = 3 \text{ Median} - 2 \text{ Mode}$
 - (d) $\text{Mode} = 3 \text{ Mean} - 2 \text{ Median}$