Roll No.

## MA-10

## Elementary Mathematics

Elementary Mathematics (MA-10)
First Semester, Examination, 2018
Time : 3 Hours
Max. Marks : 80
Note: This paper is of eighty ( $\mathbf{8 0}$ ) 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) Mr. Harish invested an amount of $₹ 15,000$ divided in two different schemes A and B at the simple interest rate of $12 \%$ per year and $10 \%$ per year respectively. If the total amount of simple interest earned in 2 years be ₹ 3,120 , what was the amount invested in Scheme B ? 7
(b) A shopkeeper forms a mixture of two different types A and B of same item by mixing 26 kg of type A at ₹ 20 per kg and 30 kg of type B at ₹ 36 per kg and sells the mixture at ₹ 30 per kg . Find the profit percent of the shopkeeper.
(B-44) P. T. 0.
(c) A and B can do a piece of work in 18 days; B and C can do it in 24 days while C and A can finish it in 36 days. If $\mathrm{A}, \mathrm{B}, \mathrm{C}$ works together, in how many days will they finish the work ?
2. (a) A invested $80 \%$ as much money as $\mathrm{B}, \mathrm{C}$ invested $60 \%$ as much money as $B$. The total of all the three is $₹ 72,000$. How much did $\mathrm{A}, \mathrm{B}$ and C invest?
(b) Find the smallest number which on adding 13 to it is exactly divisible by 28,36 and 45 . 6
(c) Show that :

$$
\begin{aligned}
\frac{1}{1+x^{(b-a)}+x^{(c-a)}}+ & \frac{1}{1}+ \\
& +\frac{x^{(a-b)}+x^{(c-b)}}{1+x^{(b-c)}+x^{(a-c)}}=1
\end{aligned}
$$

3. (a) If $\log _{10} x+\log _{10}(x-3)=\log _{10}(x+3)+1$, find the value of $x$.
(b) Prove that:

$$
\frac{1+\tan x}{1+\cot x}=\frac{\sin x+\tan x}{1+\cos x}
$$

(c) Prove that:

$$
\tan x \sin x+\cos x=\sec x
$$

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

| Class | Frequency |
| :---: | :---: |
| $100-150$ | 12 |
| $150-200$ | 13 |
| $200-250$ | 17 |
| $250-300$ | 8 |

(B-44)
(b) Calculate median for the following data:

| Class | Frequency |
| :---: | :---: |
| $200-300$ | 3 |
| $300-400$ | 5 |
| $400-500$ | 20 |
| $500-600$ | 10 |
| $600-700$ | 6 |

(c) The length and breadth of a field is in the ratio $5: 2$. If the area of the field is 250 square metre, then find the area of the second field with length triple and breadth double of the first field.

## 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.

1. (a) How much time will it take for an amount of $₹ 1,000$ to yield $₹ 75$ as simple interest if the rate of interest is $5 \%$ per annum?
(b) Find the compounded interest on ₹ 30,000 at the rate of $7 \%$ per annum for 2 years.
2. (a) If a profit of $13 \%$ is earned by selling a bulb for $₹ 226$, then what was the purchase price ?
(b) A box bought for ₹ 450 is sold at a profit of $30 \%$. Find the selling price.
(B-44) P. T. 0.
3. (a) Mohan can do a piece of work in 25 days and Ramesh can finish it in 20 days. They work together for 5 days and then Mohan leaves. In how many days will Ramesh finish the remaining work ?
(b) A number is as much greater than 36 as is less than 86 . Find the number.
4. (a) Find the least number exactly divisible by 12,15 , 20 and 27.
(b) Two numbers are in the ratio $15: 11$. If their H. C. F. is 13 , find the numbers.
5. (a) If $2^{x} \times 8^{\frac{1}{5}}=2^{\frac{1}{5}}$, then find the value of $x$.
(b) Prove that:

$$
3 \log \frac{32}{27}-2 \log \frac{64}{81}+\log \frac{9}{16}=\log \frac{3}{2}
$$

6. (a) Factorize the expression :

$$
3 x^{2}+17 x-6
$$

(b) Prove that:

$$
\cos \frac{5 \pi}{2} \cos \frac{3 \pi}{2}+\sin \frac{5 \pi}{2} \sin \frac{3 \pi}{2}=-1
$$

7. (a) Calculate the arithmetic mean of the following data :

| $x$ | $f$ |
| :---: | :---: |
| 35 | 5 |
| 38 | 3 |
| 40 | 4 |
| 45 | 2 |
| 52 | 1 |

(b) Define Mode with the help of suitable example.
8. (a) If the diagonal of a rectangle is 17 cm long and its perimeter is 46 cm , find the area of the rectangle.
(b) Find the surface are of a rectangular prism with length 8 cm , breadth 6 cm and height 4 cm .

## 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. Preeti bought a toy for ₹ 120 and sold it for $₹ 90$, then loss is :
(a) $20 \%$
(b) $25 \%$
(c) $33.3 \%$
(d) $40 \%$
2. If cost price is $₹ 20$ and selling price is $₹ 25$, then the \% gain is :
(a) $20 \%$
(b) $25 \%$
(c) $33.3 \%$
(d) $40 \%$
3. The simple interest on ₹ 1,000 for a period of 3 years at interest rate $7 \%$ per annum is :
(a) ₹ 120
(b) ₹ 150
(c) ₹ 210
(d) ₹ 70
(B-44) P. T. O.
4. Suresh can do a piece of work in 4 days, Bhuwan can do it in 6 days. How long will it take to complete the work if they both work together ?
(a) $12 / 5$ days
(b) 5/12 days
(c) 3 days
(d) 5 days
5. Highest common factor of 160 and 240 is :
(a) 8
(b) 10
(c) 40
(d) 80
6. $\cos 120^{\circ}=$
(a) $1 / 2$
(b) $-1 / 2$
(c) $\sqrt{3} / 2$
(d) $-\sqrt{3} / 2$
7. Given that $\tan x=\frac{3}{4}$, then the value of $\sin$ $x+\cos x=$
(a) $\frac{3}{5}$
(b) $\frac{4}{5}$
(c) $\frac{7}{5}$
(d) 1
8. Median of the numbers $5,3,7,6,9,4$ is :
(a) 5
(b) 5.5
(c) 6
(d) 6.5
9. Surface are of a cube with side length 3 cm is :
(a) 54 cm sq .
(b) 27 cm sq .
(c) 18 cm sq .
(d) None of these
10. Area of a triangle with height 6 cm and base 8 cm is :
(a) 48 cm sq .
(b) 64 cm sq .
(c) 36 cm sq .
(d) 24 cm sq .
