

April 2025
B.A./B.Sc.
Second Semester
VALUE ADDED COURSE – 2
MATHEMATICS
Course Code: MAV 2.11
(Mathematics for Competitive Examinations)

Total Mark: 50

Pass Mark: 20

Time: 2 hours

I. Answer three questions, taking one from each unit.

UNIT-I

1. (a) A person spends $\frac{3}{8}$ th part of his salary on food, $\frac{1}{12}$ th remaining part on education and of rest $\frac{1}{4}$ th part on clothing and is now left with Rs. 550. Find his total salary. 4
- (b) The average salary of 15 teachers is Rs. 4500 per month. Three teachers left the school and the average salary of the remaining teachers dropped by Rs. 175. Find the total salary of the teachers who left the school. 4
- (c) Peter can cover a certain distance in 1 hr. 24 min by covering two-third of the distance at 4 km/hr and the rest at 5 km/hr. Find the total distance. 4
2. (a) If $2x^2 - 7xy + 3y^2 = 0$, then find $x:y$. 4
- (b) What number should be subtracted from 15, 28, 20 and 38 so that they may be proportional? 4
- (c) If the length of a rectangle is increased by 30% and its breadth is decreased by 12%, then find net percentage change in area of the rectangle. 4

UNIT-II

3. (a) A can do a piece of work in $2\frac{1}{2}$ days which B can do in $3\frac{1}{3}$ days. If A 's wages are Rs. 50 per week and B 's wages are

- Rs. 42.50 per week, what A would have charged for doing a piece of work for which B received Rs. 340? 4
- (b) Two friends A and B can do a work in 12 days and 8 days respectively. Find the amount of work done by them in 4 days. 4
- (c) A pipe can fill a cistern in 12 minutes and another pipe in 15 minutes, but a third pipe can empty it in 6 minutes. The three pipes are kept running together. Find when the cistern is emptied/filled. 4
4. (a) A and B can do a piece of work in 45 days and 40 days respectively. They began the work together but A leaves after some days and B finished the remaining work in 23 days. After how many days did A leave. 4
- (b) A person standing on a railway platform noticed that a train took 21 seconds to completely pass through the platform which was 84 meter long and it took 9 seconds in passing him. Find the speed of the train in km/hr. 4
- (c) A man can row 6 km/hr in still water. It takes him twice as long to row up as to down the river. Find the speed of stream. 4

UNIT-III

5. (a) The length of a rectangle is twice its breadth. If its length is decreased by 5 cm and breadth is increased by 5 cm, the area of the rectangle is increased by 75 sq.cm. Find the length of the rectangle. 4
- (b) The perimeters of two squares are 40 cm and 32 cm. find the perimeter of a third square whose area is equal to the difference of the areas of the two squares. 4
- (c) The diagonal of a cube is $6\sqrt{3}$ cm. Find its volume and surface area. 4
6. (a) Three spheres of radii 3 cm, 4 cm and 5 cm are melted to form a new sphere. Find the radius of the new sphere. 4
- (b) In how many different ways can the letters of the word 'DIGEST' be arranged so that the vowels are never together? 4
- (c) In how many ways, a committee of 6 members be selected from 7 men and 5 ladies, consisting of 4 men and 2 ladies. 4

II. Answer any two of the following questions.

7. (a) The simple interest accrued on an amount of Rs. 2500 at the end of 6 years is Rs. 1875. What would be the simple interest accrued on an amount of Rs. 6875 at the same rate and for the same period? 3
- (b) An owner of a cell phone charges his customer 23% more than the cost price. If a customer paid Rs. 7011 for a cell phone, then what was the cost price of the cell phone. 2
- (c) A shopkeeper allows his customer a discount of 10% and still gains 20%. Find the marked price of the article, which cost Rs. 450. 2
8. (a) A man can row 40 km upstream and 55 km downstream in 13 hours. Also, he can row 30 km upstream and 44 km downstream in 10 hours. Find the speed of the man in still water and the speed of the current. 3
- (b) A canteen requires 105 kgs of wheat for a week. How many kgs of wheat will it require for 58 days? 2
- (c) In one minute $\frac{3}{7}$ th part of a bucket is filled in. How much time is required to fill in the rest of the bucket? 2
9. (a) A square park is surrounded by a path of uniform width 2 meters all around it. The area of the path is 288 sq.m. Find the perimeter of the park. 3
- (b) Two cubes have their volumes in the ratio 1:27. Find the ratio of their surface areas. 2
- (c) In how many different ways can the letters of the word 'DESIGN' be arranged so that the vowels are at the two ends. 2
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