

BMTSC Exam Reference Problems
Ratio, Proportion, Percentage, Divisibility

1. There are 3 kinds of books in the library: Science, Literature and History. Ratio of number of Science books to that of Literature books is 3 to 2; ratio of number of Literature books to number of History books is 4 to 3. If the total of the books is more than 1000, which one of following can be the total number of books?
(a) 1001 (b) 1009 (c) 1008 (d) 1007 (e) 1006
2. What is the value of M and N respectively if $M39048458N$ is divisible by 8 and 11, where M and N are single digit positive integers?
(a) 7, 8 (b) 8, 6 (c) 6, 4 (d) 5, 4 (e) 4, 6
3. In a NSS camp, a work can be completed by a group of students in a certain number of days. After 20 days, $\frac{2}{5}$ of the students left from the camp and it was found that the remaining students take time as long as before. What will be the time taken to complete the entire work?
4. If two fractions, each of which has a value between 0 and 1, are multiplied together, the product will be:
(a) always greater than either of the original fractions
(b) always less than either of the original fractions
(c) sometimes greater and sometimes less than either of original fractions
(d) remains the same
(e) never less than either of the original fractions
5. The monthly salaries of two persons are in the ratio of 4 : 7. If each receives an increase of Rs.2500 in the salary, the ratio is altered to 3 : 5. Find their respective salaries.
6. A , B and C enter into a partnership by investing Rs.3600, Rs.4400 and Rs.2800. A is a working partner and gets a fourth of the profit for his services and the remaining profit is divided among the three in the rate of their investments. What is the amount of profit that B gets if A gets a total of Rs. 8000?
7. A candidate who gets 20% marks fails by 10 marks but another candidate who gets 42% marks gets 12% more than the passing marks. Find the maximum marks.
(a) 50 (b) 100 (c) 150 (d) 200
8. When processing flower nectar into honeybees' extract, a considerable amount of water gets reduced. How much flower nectar must be processed to yield 1 *kg* of honey, if nectar contains 50% water, and the honey obtained from this nectar contains 15% water?
(a) 1.5 *kgs* (b) 1.7 *kgs* (c) 3.33 *kgs* (d) None of these
9. A store has number of bicycles and tricycles for sale. Johnnie counted a total of 60 wheels. How many bicycles and how many tricycles were for sale? Find 3 different solutions.

10. Bill received \$12 to feed a neighbor's cat for 3 days. At this pay rate, how many days will he have to feed the cat to earn \$40? The neighbor's family is going on vacation for 3 weeks next summer. Bill wants to earn enough money to buy a *CD* player that costs \$89. Will he have enough money?

11. "Welcome to the World of the Orient," spoke the genie to Aladdin. "You see before you diamonds, rubies, and emeralds. Two diamonds are worth as much as three rubies. Five rubies are worth as much as nine emeralds. Make a pile of diamonds, and then make a pile of emeralds. If you can do this so that the two piles have exactly the same worth, you may keep them all!" How many diamonds should be in the diamond pile, and how many emeralds should be in the emerald pile? Explain your answer.

12. List the first four whole numbers that will have a remainder of 3 when you divide by 7. Describe the pattern and explain how you found these numbers and how you would solve any similar problem.

13. Veena bought a watch costing Rs.1404 including sales tax at 8%. She asked the shopkeeper to reduce the price of the watch so that she can save the amount equal to the tax. What is the reduction of the price of the watch?

(a) Rs.108 (b) Rs.104 (c) Rs.112 (d) Rs.120 (e) None of these

14. Initially, Suresh has Rs.200 in his paytm wallet then he increased it by 20%. Once again he increased his amount by 25%. The final value of money in his wallet will be how much % greater than the initial amount?

(a) 40% (b) 50% (c) 80% (d) 60% (e) None of these

15. In an election contested by two parties *A* and *B*, party *A* secured 25 percent of the total votes more than Party *B*. If party *B* gets 15000 votes, by how much votes does party *B* loses the election?

(a) 8000 (b) 10000 (c) 12000 (d) 15000 (e) None of these

16. If *LCM* and two no.s x and y is 48, what is the *LCM* of $4x$ and $4y$?

[$LCM = 4 \times 48$]

17. Number $4 \spadesuit 4 \heartsuit 3 \clubsuit 8$ is divisible by 36. Find digits in place of $\spadesuit, \heartsuit, \clubsuit$ (they may be different). Write all possible answers.

(Use divisibility test for 4 and 9)

18. Gopal had certain number of beads with him. When he tried to make ear-rings having 3 beads each, he fell short of 2 beads for the last ear-ring. When done with 4 beads each, he fell short of 2 beads, with 5 beads each he fell short of 2 beads and with 6 beads each, he fell short of 2 beads. Find the least such number of beads with Gopal.

(Since remainder is same, $N = 2 + LCM(3, 4, 5, 6)$)

19. If we form 3-digit numbers using digits 1, 9 and 8 only once each, what % of such numbers as compared to all the numbers formed, will be divisible by 9?

20. Find *HCF* of 518 and 2331 by long division method.
21. If a natural number '*n*' is divided by 7, the remainder is 3. Which is the first number greater than '*n*' that is divisible by 7?
22. Which is the smallest 4 digit multiple of 17, 4 and 3?
23. When a number is divided by 7 the remainder is 3. What will be the remainder when 4 times that number is divided by 7?
[Remainder : $4 \times 3 = 12 - 7 = 5$]
24. Find the smallest number having seven divisors.
(Number is square of composite number.)
25. Find values of *A* and *B* in 68A8521B if the no. is divisible by 55.
[68085215, 68685210]
26. Ajay, Baban, Dinesh and Mahesh together have 46 chocolates. Ajay and Baban together have 29 chocolates. Everyone has at least 1 chocolate and Mahesh has the maximum number of chocolates. Find the number of chocolates each one has.
27. Without actually doing the calculations of multiplication, tell which of the following product is greater and by how much
 444×333 or 222×667
28. If the train crosses a pole in 5 seconds while running at a speed of 122.4 km/hr, find the length of the train in meters.
29. Amar started travelling with some amount with him.
On the first day, he spent 20% of it,
on the second day, he spent 30% of the remaining,
on the third day, he spent 25% of the remaining,
on the fourth day, he spent 12% of the remaining,
and then he was left with Rs.30 with him.
How much amount did he spend on the second day?
30. Suresh and Ramesh invested Rs.4400. At the end of the year, they earned 16% profit, which they divided in the ratio 7 : 4 respectively. What was the profit that Ramesh earned in Rs.?
31. *A* and *B* have some amount with them. Amount that *A* has is less than 3 times *B*'s amount by 10. Also the ratio of amounts of *A* and *B* is 7 : 3. Find their amounts.
(Ratio + equations)

BMTSC 2015

32. How many of the integers 1234, 3516, 2352, 1332 and 4321 are divisible by 3?
(a) 1 (b) 2 (c) 3 (d) 4.
33. Snehal had a long chocolate bar. She gave some children $\frac{1}{6}$ of the chocolate bar each. One third of the bar was left. How many children were there?

- (a) 3 (b) 6 (c) 4 (d) 8 (e) 5.

34. What is 49% of $\frac{22}{35}$?

- (a) 0.308 (b) 3.08 (c) 30.8 (d) 308.

35. Find the smallest number such that when it is divided by 3, 5, or 7, the remainder is 1 and when divided by 4, the remainder is 0.

- (a) 216 (b) 136 (c) 316 (d) 336.

36. A square is divided into 3 congruent rectangles as shown. The middle one is removed and placed touching the others vertically as shown in the figure. What is the ratio of the perimeter of the square to the perimeter of the new figure?

- (a) 3 : 5 (b) 2 : 3 (c) 5 : 8 (d) 1 : 2.

37. If $p + p = n$, and $p + n = q$ and $d = q + n$. Then what is the value of $\frac{d}{p}$?

- (a) 5 (b) 3 (c) 1.5 (d) 6

38. Given any natural number $m > 1$, find $n \neq 0, n > m$ such that m and n have a common factor greater than 1 and similarly the pairs $(m + 1), (n + 1)$; $(m + 2)$ and $(n + 2)$ have a common factor greater than 1.

Answer the following with reasons.

39. Hundred cards are placed in a row on a table in a room. Hundred people enter the room successively. First person flips all cards, second flips 2nd, 4th, 6th, \dots cards, third flips 3rd, 6th, and 9th \dots cards and all the 100 people flip cards in this manner. Which cards remain in their original position?

BMTSC January 2016

40. Four bells ring at intervals of 3, 7, 12 and 14 minutes respectively. All four bells rang together at 12 noon. When will they ring together next time?

41. 15% of students of a school were absent on a specific day. If there were 1020 students present in the school that day, find the total number of students in the school.

42. A man purchased 150 oranges at the rate of 3 oranges for Rs.20 and another 160 oranges at the rate of 4 oranges for Rs.30, and sold all of them at the rate of Rs.6 per orange. Find whether he will have profit or loss, by what amount?

- (a) Profit, Rs.120 (b) Loss, Rs.620
(c) Profit, Rs.320 (d) Loss, Rs.340

43. A fan switch is in the off mode. A boy turns it continuously to slow, medium, high, off, slow, medium, \dots in the same direction, for each operation counting 1, 2, 3, 4, 5, 6, \dots . After 210 operations, in which position will the switch be?

- (a) off (b) slow (c) medium (d) high

44. If the product $42 \times \square$ is divisible by 9, which smallest number is in place of \square ?

45. Find the remainder when the number 2016201620162018 is divided by 2016.

- (a) 2008 (b) 1 (c) 2007 (d) 2.

46. A certain natural number is divisible by 3 and also by 5. When the number is divided by 7, the remainder is 4. Which is the smallest number that satisfies these conditions?

47. A fruit seller bought 11 dozen mangoes for a certain cost. After selling 10 dozen mangoes at a certain rate he recovered the cost price. If he sold all the mangoes at the same rate, what was his percent profit?

48. $1704AB26$ is divisible by 99. Find A and B .

49. Among 7 men, 11 women and 5 boys, Rs.140 are divided such that,

- (a) A man gets thrice as much as a boy gets.
(b) One woman gets the amount equal to the sum of the amounts that a man and a boy gets.

Find how much a man, a woman and a boy gets?

50. Find the largest number so that when each of 430, 910, 1830 is divided by that number, leaves same remainder?

51. There is a fruit having weight of 120 gm., which contains 98% water. When the fruit was kept under the Sun for some time, a part of water evaporated. The water then was 95% of the fruit weight. Find the weight of the fruit at present?

BMTSC November 2016

52. If $2a3b$ is a four-digit number divisible by 33, then $a + b = \dots$

- (a) 5 (b) 4 (c) 16 (d) 11.

53. 7.5 is $\dots\%$ of 30.

- (a) 2.25 (b) 25 (c) 2.5 (d) 0.225

54. If $\frac{1}{2} = \frac{a}{16}$ and $\frac{a}{9} = \frac{b}{405}$, then $b = ?$

- (a) 240 (b) 180 (c) 270 (d) 360

55. If LCM of 48, m and 60 is n , then what is GCD of 24 and n ?

- (a) 2 (b) 24 (c) 48 (d) 240

56. Every year the value of a car depreciates by 15% of its value in the previous year. If the value of the car was Rs. 86700 in 2012, find its value in 2010.

- (a) 1,22,000 (b) 1,27,500 (c) 1,20,000 (d) 1,25,300

57. GCD and LCM of five two digit numbers are 3, 60060 respectively. If one of the numbers is 12, then find the remaining four numbers.

58. A rectangle is cut into 4 rectangles as shown. The figures indicate areas of the respective rectangles. Find the area of the fourth rectangle.

59. Sandeep gave examination in 6 subjects namely Mathematics, English, Science, Marathi, Hindi and Social Studies. Average marks obtained by Sandeep in Mathematics, English and Science are 84. Average marks in Marathi and Hindi are 60. Average marks obtained in all six subjects are 75. Find marks obtained in Social Studies.

60. Aditi chooses a natural number ' n ', multiplies it by 4 and then subtracts 30. She then multiplies her answer by 2 and finally subtracts 10. Now, her answer is 2 digit number. What is the largest possible value of ' n ' she could choose?

61. In a group of 56 children, the ratio of boys to girls is 4 : 3. How many girls should be added to the group so that the ratio of boys to girls will become 4 : 5?

62.

3

5

3

2

5

2

 are four blocks. By joining these in a row, six-digit number will be formed.

- (a) How many distinct numbers can be formed?
(b) How many of them are even?
(c) How many are divisible by 5?

63. My phone number is $A = 9922502289$. Rearrange the digits of this number in at least two ways, so that the resulting number is divisible by 44.

BMTSC December 2017

64. If $\frac{8}{10} = \frac{A}{25}$, then $A = ?$

- (a) 16 (b) 20 (c) 24 (d) N.O.T.

65. 10.5 is $\dots\%$ of 35.

- (a) 20 (b) 25 (c) 30 (d) 40

- 66.** If a three digit number $8A2$ is divisible by 9, then A is \dots
(a) 1 (b) 8 (c) 7 (d) 2.
- 67.** The GCD of 303, 33, 330, 3003 is
(a) 33 (b) 1 (c) 30 (d) 3.
- 68.** A colourless solid cube is painted blue and then cut parallel to sides to form two rectangular solids of equal volume. What percentage of surface area of each of new solids is NOT painted blue?
(a) 15% (b) 20% (c) 25% (d) $33\frac{1}{3}\%$
- 69.** Is the following statement True or False? Give Reason.
'If a number is divisible by 4 and 6, then it is divisible by 24'.
- 70.** The LCM of two numbers is 90. If one of the numbers is 15, then what is the smallest possible value of the other number?
- 71.** If I read 8 pages of a book every day, I can complete the book in a month of June. How many pages should I read every day if I have to complete it in 12 days?
- 72.** Find a number ' n ' such that LCM of ' n ' and 36 is 4 times GCD of ' n ' and 36.
- 73.** Abdul travels thrice the distance Catherine travels, which is also twice the distance that Binoy travels. Catherine's speed is $\frac{1}{3}$ of Abdul's speed, which is also $\frac{1}{2}$ of Binoy's speed. If all of them start at the same time, who reaches his/her destination first? Justify the answer.