

Institute of Mathematics and Applications, Bhubaneswar
M.A. / M.Sc Computational Finance
Entrance Examination-2008

Time-2hours

Full marks-80

Follow the Instructions carefully before start answering

(Instruction : Indicate your answer by putting a cross (×) mark against your choice.
Questions numbered 1-30 carry 2 marks each and questions numbered from 31-35 carry 4 marks each. For a wrong answers -0.5 for questions numbered 1-30 and -1.0 for questions numbered 31-35 will be awarded.)

1. What is the probability of rolling a 7 with a single roll of two fair dice ?
 - (a) $\frac{1}{2}$
 - (b) $\frac{1}{6}$
 - (c) $\frac{1}{3}$
 - (d) $\frac{7}{12}$

2. If A and B and C are positive , and $A * B = \frac{A+B}{B}$, and $C \oplus = C + 3$, what is the value of $(9 \oplus) * 3$?
 - (a) 3
 - (b) 5
 - (c) 9
 - (d) 15
 - (e) 16

3. If the average test score of 4 students is 85 , what will the 5th student need to score in order to have the new average be 86 ?
 - (a) 90
 - (b) 88
 - (c) 87
 - (d) 86
 - (e) 85

4. If it takes 3 days for 10 workers to finish building one house, how long will it take 15 workers to finish 4 houses ?
- (a) 11
 - (b) 10
 - (c) 8
 - (d) 7
 - (e) 5
5. Deepa is twice as old as Mihir , but three years ago, she was 2 years older than Mihir is now. How old is Mihir now ?
- (a) 11
 - (b) 10
 - (c) 8
 - (d) 7
 - (e) 5
6. If $xy \neq 0$, $\frac{1-x}{xy} =$
- (a) $\frac{1}{xy} - \frac{1}{y}$
 - (b) $\frac{x}{y} - \frac{1}{x}$
 - (c) $\frac{1}{xy} - 1$
 - (d) $\frac{1}{xy} - \frac{x^2}{y}$
 - (e) $\frac{1}{x} - \frac{1}{y}$
7. The cost , in Rupees, of manufacturing x crayons is $570 + 0.5x$. The crayons sell for 10 rupees each. What is the minimum number of crayons that would need to be sold. So that the revenue received is at least equal to the manufacturing cost ?
- (a) 50
 - (b) 57
 - (c) 60
 - (d) 61
 - (e) 1140

8. $\left(\frac{1}{4} - 1\right)\left(\frac{1}{5} - 1\right) =$

- (a) $\frac{3}{5}$
- (b) 120
- (c) $-\frac{1}{20}$
- (d) $-\frac{3}{5}$
- (e) -1

9. If a printing press can print 11 complete pages in 30 seconds, how many complete pages can it print in 155 seconds ?

- (a) 37
- (b) 46
- (c) 54
- (d) 56
- (e) 65

10. How many odd integers are between $\frac{10}{3}$ and $\frac{62}{3}$?

- (a) 19
- (b) 18
- (c) 10
- (d) 9
- (e) 8

11. A prize recipe gives the quantities of each ingredient used to make a round prize 12 inches in diameter. If Trupti wants to use the recipe to make a prize 24 inches in diameter that has the same thickness as the pizza that is 12 inches in diameter, by what factor should she multiply the amounts of each ingredient ?

- (a) 2
- (b) 3
- (c) 3.5
- (d) 4
- (e) 5

12. If $d = \frac{c-b}{a-b}$, then $b =$
- (a) $\frac{c-d}{a-d}$
 - (b) $\frac{c+d}{a+d}$
 - (c) $\frac{ca-d}{ca+d}$
 - (d) $\frac{c-ad}{1-d}$
 - (e) $\frac{c+ad}{d-1}$
13. In one class in a school, 30 percent of the students are boys. In a second class that is half the size of the first, 40 percent of the students are boys. What percent of both classes are boys ?
- (a) 20 %
 - (b) 25%
 - (c) 28 %
 - (d) 30 %
 - (e) $33\frac{1}{3}\%$
14. If $n = 14 \times 22 \times 39$, which of the following is not an integer ?
- (a) $\frac{n}{21}$
 - (b) $\frac{n}{24}$
 - (c) $\frac{n}{26}$
 - (d) $\frac{n}{42}$
 - (e) $\frac{n}{77}$
15. If $x > 0$, then $(4^x)(8^x) =$
- (a) 2^{9x}
 - (b) 2^{8x}
 - (c) 2^{6x}
 - (d) 2^{5x}
 - (e) 2^{4x}
16. Corporation X splits up into 5 separate, smaller companies : Company A, company B , company C , company D and company E . Company A gets $\frac{3}{5}$ of corporation X's offices and the rest of the companies divide the remaining offices equally among

themselves . If company A and B together have 70 offices between them, how many offices did corporation X originally have ?

- (a) 49
- (b) 50
- (c) 90
- (d) 100
- (e) 140

17. If $\frac{p - q}{p} = \frac{2}{7}$, then $\frac{q}{P} =$

- (a) $\frac{2}{5}$
- (b) $\frac{5}{7}$
- (c) 1
- (d) $\frac{5}{7}$
- (e) $\frac{7}{2}$

18. Smita must select three different items for each dinner she will serve. The times are to be chosen from among 5 different vegetarian and 4 different meat selections. If at least one of the selection be vegetarian , how many different dinners could Smita create ?

- (a) 30
- (b) 40
- (c) 60
- (d) 70
- (e) 80

19. Which of the following is the greatest ?

- (a) $\frac{0.00003}{0.0007}$
- (b) $\frac{0.00008}{0.0005}$
- (c) $\frac{0.00007}{0.0008}$
- (d) $\frac{0.00006}{0.0005}$
- (e) $\frac{0.01}{0.008}$

20. Rahul has four ties, 12 shirts and 3 belts. If each day he wears exactly one tie, one shirt and one belt, what is the maximum number of days he can go without repeating a particular combination ?
- (a) 12
 - (b) 21
 - (c) 84
 - (d) 108
 - (e) 144
21. $|3| + |-4| + |3 - 4| =$
- (a) 14
 - (b) 8
 - (c) 7
 - (d) 2
 - (e) 0
22. A computer can perform 30 identical tasks in six hours. At that rate, what is the minimum number of computers that should be assigned to complete 80 of the tasks within three hours ?
- (a) 6
 - (b) 7
 - (c) 8
 - (d) 12
 - (e) 16
23. Which of the following is 850 percent greater than 8×10^3 ?
- (a) 8.5×10^3
 - (b) 6.4×10^4
 - (c) 6.8×10^4
 - (d) 7.6×10^4
 - (e) 6.8×10^4
24. If $4 + y = 14 - 4y$, then $y =$
- (a) -4
 - (b) 0
 - (c) $\frac{5}{8}$
 - (d) $\frac{4}{5}$
 - (e) 2

25. If $3^m = 81$, then $m^3 =$
- (a) 9
 - (b) 16
 - (c) 27
 - (d) 54
 - (e) 64
26. $\frac{4}{5} + \frac{5}{4} =$
- (a) 1
 - (b) $\frac{9}{8}$
 - (c) $\frac{6}{5}$
 - (d) $\frac{41}{20}$
 - (e) $\frac{23}{10}$
27. In a certain history class, all except 23 students scored under 85 on a test . If 18 students scored over 85 on this test, how many students are there in this history class ?
- (a) 33
 - (b) 37
 - (c) 39
 - (d) 41
 - (e) It cannot be determined from the information given
28. If the average of two numbers is $3y$ and one of the numbers is $y - z$, what is the other number , in terms of y and z ?
- (a) $y + z$
 - (b) $3y + z$
 - (c) $4y - z$
 - (d) $5y - z$
 - (e) $5y + z$

29. If the ratio of $2a$ to b is 8 times the ratio of b to a then $\frac{b}{a}$ could be
- 4
 - 2
 - 1
 - $\frac{1}{2}$
 - $\frac{1}{4}$
30. A certain dentist earns a rupees for each filling she puts in , plus x rupees for every 15 minutes she works . If in a certain week she works 14 hours and puts in 21 fillings, how much does she earn for the week, in rupees ?
- $\frac{7}{2}x + 21x$
 - $7x + 14x$
 - $14x + 21x$
 - $56x + 21x$
 - $56x + \frac{21}{4}x$
31. A jury reaches a verdict when all of its members have come to a unanimous agreement. In one recent well-publicized trial the judge thought that the jury had reached a verdict. Eventually , it was learned that one juror had never been able to agree with the others . The proceeding was ultimately declared a mistrial by the judge . Based only on the information above, which of the following statements is a valid conclusion ?
- The jury never actually reached a verdict.
 - The jury had reached a verdict but had been disrupted by a single juror.
 - There have been other trials in which the jury failed to reach a verdict .
 - Only trials in which the jury fails to reach a verdict are declared mistrials.
 - The judge's role is not as important as that of the individual jurors.
32. Three statements are given below followed by four conclusions.Considering the given statements to be true , write down which of the given conclusions logically follows from the three statements. Statements :
- Some bananas are apples
 All apples are tomatoes
 Some potatoes are tomatoes
- Conclusions :
- Some bananas are tomatoes
 - Some potatoes are bananas
 - Some apples are potatoes
 - Some apples are bananas

33. Cars are safer than planes. Fifty percent of plane accident result in death, while only one percent of car accidents result in death . Which of the following, if true, would most seriously weaken the argument above ?
- (a) Planes are inspected more of ten than cars
 - (b) The number of car accidents is several hundred thousand times higher than the number of plane accidents .
 - (c) Pilots never fly under the influence of alcohol, while car drivers often do
 - (d) Plane accidents are usually the fault of air traffic controllers, not pilots .
 - (e) Planes carry more passengers then cars do .
34. The body of anyone infected by virus X will, after a week , produce antibodies to fight the virus; the antibodies will increase in number for the next year or so . There is now a test that reliably indicates how many antibodies are present in a person's body. If positive , this test can be used during the first year of infection to estimate to within a month how long that person has had the virus. Which one of the following conclusions is best supported by the statements above ?
- (a) Antibodies increase in number only until they have defeated the virus.
 - (b) Without the test for antibodies , there is no way of establishing whether a person has virus X .
 - (c) Antibodies are produced only to viral infections that cannot be fought by any other body defenses.
 - (d) If a person remains infected by virus X indefinitely , there is no limit to the number of antibodies that can be present in the person's body .
 - (e) Anyone infected by virus X will for a time fail to exhibit infection if tested by the antibody test.
35. Beautiful beaches attract people, no doubt about it . Just look at this city's beautiful beaches, which are among the most over crowded beaches in the state. Which of the following exhibits a pattern of reasoning most similar to the one exhibited in the argument above ?
- (a) Moose and Bear usually appear at the same drinking hole at the time of day. Therefore Moose and Bear must grow thirsty at about the same time.
 - (b) Children who are scolded severely tend to misbehave more often than other children . Hence, if a child is not scolded severely that child is less likely to misbehave.
 - (c) The software programme helps to increase the work efficiency of its users. As a result, these users have more free time for other activities.
 - (d) During warm weather my dog suffers from fleas more so than during cooler weather. Therefore , fleas must thrive in a warm environment.
 - (e) Pesticides are known to cause anemia in some people. However , most anemic people live in regions where pesticides are not commonly used.