RAMAKRISHNA MISSION VIDYAMANDIRA

Belur Math, Howrah – 711 202

UG ADMISSION TEST – 2024

COMPUTER SCIENCE

Date : 20-06-2024 **Full Marks : 50** Time: 1·00 p.m. – 2·00 p.m.

Instructions for the candidates

*Answer all the questions given below. Each question carries **2 marks** for correct answer and **–1 mark** for wrong answer. Tick (✓) the correct option on the **ANSWER SHEET**. The Tick must be very clear — if it is smudgy or not clear, no marks will be awarded. Unanswered questions will not be awarded. Multiple answers will be considered as wrong answer. **Calculator is not allowed.***

1. Value of $\lim_{x\to 0} \frac{\tan x - x}{x^2 \tan x}$ is

   a) 1 b) $\frac{1}{3}$ c) $\frac{1}{2}$ d) ∞

2. $\lim_{n\to\infty}\left[\frac{1}{1.2}+\frac{1}{2.2^2}+\frac{1}{3.2^3}+\ldots+\frac{1}{n.2^n}\right]$ is equal to

   a) $\frac{1}{2}\log_e 2$ b) $-\frac{1}{2}\log_e 2$ c) $\log_e 2$ d) $-\log_e 2$

3. If the term independent of x in the expression of $(\frac{k}{3}x^2 - \frac{3}{2x})^9$ be 2268, then value of k will be

   a) 6 b) 4 c) 2 d) $\frac{16}{27}$

4. If p + q + r = 0, then simplified value of $\frac{p^2}{p^2-qr} + \frac{q^2}{q^2-pr} + \frac{r^2}{r^2-pq}$ is

   a) 1 b) -1 c) 2 d) 0

5. If $y = sin^{-1}\sqrt{\left(1 - \frac{1}{1+tan^2(\frac{1-x^2}{1+x^2})}\right)}$, then $\frac{dy}{dx}$ =

   a) $\frac{-4x}{(1+x^2)^2}$ b) $\frac{-2x}{(1+x^2)^2}$ c) $\frac{-2x^3}{(1+x^2)^2}$ d) $\sqrt{\left(\frac{1-x^2}{1+x^2}\right)}$

6. For any function (x), $\int_{-a}^{a} f(x)\,dx$ is equal to

   a) $\int_0^a [f(x)+f(-x)]\,dx$ b) $2\int_0^a f(x)\,dx$ c) 0 d) none of these

7. A motorcycle travelling at the rate of 30km/hour is stopped by its breaks in 5 seconds. How long will it go from the point at which the brakes are first applied?

   a) $22\frac{2}{9}$ b) $20\frac{5}{6}$ c) $20\frac{5}{9}$ d) $22\frac{5}{6}$

8. If A, B, C are mutually exclusive events such that P(A) = $\frac{3x+1}{3}$, P(B) = $\frac{1-x}{4}$ and P(C) = $\frac{1-2x}{2}$; then the set of possible values of x are in the interval –

   a) $[\frac{1}{3}, \frac{2}{3}]$ b) $[\frac{1}{3}, \frac{1}{2}]$ c) $[\frac{1}{3}, \frac{13}{3}]$ d) [0 , 1]

9. A bag contains 6 red and 5 blue balls and another bag contains 5 red and 8 blue balls. A ball is drawn from the first bag and without noticing its colour is put in the second bag. A ball is then drawn from the second bag. The probability that the ball drawn from the second bag is blue should be

   a) $\frac{47}{77}$ b) $\frac{63}{123}$ c) $\frac{93}{154}$ d) $\frac{3}{7}$

10. The perimeters of five squares are 24 cm, 32 cm, 40 cm, 76 cm and 80 cm respectively. The perimeter of another square equal in area to the sum of the areas of these squares is

    a) 31 cm b) 62 cm c) 124 cm d) 961 cm

11. How many numbers from 1 to 100 are there each of which is not only exactly divisible by 4 but also has 4 as a digit?

    a) 7 b) 10 c) 9 d) 8

12. A bag contains 2 red, 3 green and 2 blue balls. Two balls are drawn at random. What is the probability that none of the balls drawn is blue?

a) $\frac{10}{21}$ b) $\frac{11}{21}$ c) $\frac{2}{7}$ d) $\frac{5}{7}$

13. The difference between simple interest and compound interest compounded annually on a certain sum of money for 2 years at 4% per annum is 1 rupee. The sum in rupees is:

a) 625 b) 630 c) 640 d) 650

14. Today is Wednesday. After 96 days, it will be

a) Friday b) Saturday c) Sunday d) Monday

15. A man travelled 30% of his journey at a speed of 85 kmph and the rest of his journey at a speed of 33 kmph. Find his average speed in kmph throughout the journey.

a) 46.6 b) 48.6 c) 42.6 d) 44.6

16. There are 14 boys and 6 girls giving interview for a job. If three of them are selected, then what is the probability that one of the three is a girl and the other two are the boys?

a) 79/190 b) 111/280 c) 91/170 d) 91/190

17. What is the unit digit of 1! + 2! + 3! + 4! + …… + 1000!?

a) 4 b) 8 c) 3 d) 6

18. Find the largest number which when subtracted from 5000, the remainder is divisible by 28, 44 and 84.

a) 4480 b) 4256 c) 4128 d) 4076

19. (x+y) α (x-y), then complete the following: (x^2+y^2) α ____

a) x^2y b) xy^2 c) $\frac{x}{y}$ d) xy

20. The number of coins of Rs. 1, Rs. 5, and Rs. 10 denominations that a person has are in the ratio 5:3:13. The percentage of money in Rs. 5 coins of the total amount is

a) 21% b) $14\frac{2}{7}$ % c) 10% d) 30 %

21.

Items	Cost	Profit%	Marked Price(Rs.)
P	5400	---	5860
Q	---	25	10,000

Details of prices of two items P and Q are presented in the above table. The ratio of cost of item P to cost of item Q is 3:4. Discount is calculated as the difference between the marked price and the selling price. The profit percentage is calculated as the ratio of the difference between selling price and cost, to the cost ($Profit\ \% = \frac{Selling\ Price - Cost}{Cost} \times 100$). The discount on item Q, as a percentage of its marked price, is _____

a) 25 b) 15.10 c) 10 d) 25.5

22. There are five bags each containing identical sets of ten distinct chocolates. One chocolate is picked from each bag. The probability that at least two chocolates are identical is ___.

a) 0.3024 b) 0.4235 c) 0.6976 d) 0.8125

23. Two straight lines are drawn perpendicular to each other in X-Y plane. If α and β are the acute angles the straight lines make with the X-axis, then α+β is ___.

a) 60^o b) 120^o c) 90^o d) 75^o

24. A family consists of 6 members P, Q , R, X, Y, Z. Q is the son of R but R is not mother of Q. P and R are married couple. Y is the brother of R, X is the daughter of P. Z is the brother of P. How many female members are there in the family?

a) 1 b) 2 c) 3 d) 4

25. A jar contains 5 red marbles, 4 blue marbles, and 6 green marbles. Two marbles are drawn at random without replacement. What is the probability that both marbles drawn are of different colors?

a) $\frac{7}{15}$ b) $\frac{14}{30}$ c) $\frac{23}{45}$ d) $\frac{29}{35}$

———— × ————