# RAMAKRISHNA MISSION VIDYAMANDIRA 

Belur Math, Howrah - 711202
ADMISSION TEST - 2022
COMPUTER SCIENCE (Honours)
Full Marks : 50
Time: 01.00 p.m. -2.00 p.m.

## Instructions for the candidate

Answer all the questions given below. Each question carries $\mathbf{2}$ marks for correct answer and $\mathbf{- 1}$ mark for wrong answer. Tick $(\sqrt{ })$ the correct option on the OMR 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. For what value of a, $f(x)=2 a x+3, x \neq 2$ and $f(2)=23$ is continuous at $x=2$ ?
a) 2
b) 3
c) 4
d) 5
2. Given $\lim _{x \rightarrow 5} f(x)=2$ and $\lim _{x \rightarrow 5} g(x)=-1$ then determine $\lim _{x \rightarrow 5} 3 g[f(x)-2]$.
a) 0
b) -1
c) -3
d) Not enough information
3. Solve $\frac{d}{d x} \tan ^{-1} \frac{\cos x}{1+\sin x}$
a) $1 / 2$
b) $-1 / 2$
c) 0
d) -1
4. Evaluate the following integral: $\int_{0}^{5} \frac{x+5}{x^{2}+x-20} d x$
a) $-\ln 2$
b) $\ln 2$
c) $\ln 4$
d) $-\ln 4$
5. Find the approximate displacement of an object from $t=2$ to $t=3$ if the velocity $v$ of the object at a time $t$ is given by $v=\frac{t^{3}+1}{\left(t^{3}+3 t\right)^{2}}$
a) 0.0145
b) 1.045
c) 0.0014
d) 1.045
6. In a certain code, CONCEPT is written as TQFDOPC. Then how VICTORY is written in the same code?
a) YROTCIV
b) RYOTCIV
c) IVCTORY
d) YSPUDJV
7. How many 8's are there in the following number series which are exactly divisible by its immediately preceding and also divisible by immediately succeeding numbers?

$$
824517284842282698454832843183
$$

a) 5
b) 2
c) 3
d) 4
8. Which number will replace the question mark?

| 12 | 19 | 16 |
| :---: | :---: | :---: |
| 4 | 3 | $?$ |
| 6 | 3 | 8 |
| 8 | 19 | 4 |

a) 8
b) 16
c) 4
d) 2
9. Kiran, an eight years old boy has 27 toys. He gave 19 toys to his brother Gourav, while Gourav playing, all but 6 got destroyed. While Kiran playing, all but 3 got destroyed. Finally, how many toys left with both of them?
a) 10
b) 18
c) 9
d) 8
10. A cube is painted blue on all of its surfaces. It is then cut in to 27 smaller cubes of equal size. Find how many smaller cubes have no color?
a) 0
b) 1
c) 2
d) 3
11. A family has 2 children. What will be the probability that both are boys, if it is known that one of the children is boy.
a) $\frac{1}{2}$
b) $\frac{2}{3}$
c) $\frac{1}{3}$
d) $\frac{1}{4}$
12. If $1.3 x=0.8 y$, then the value of $\left(y^{2}-x^{2}\right) /\left(y^{2}+x^{2}\right)$ is
a) $10.5 / 23.3$
b) $5 / 11$
c) $6.1 / 6.9$
d) $1.05 / 23.3$
13. The value of $\lim _{x \rightarrow 0} \frac{\frac{\theta^{x^{2}}}{}-1}{\sin ^{2} x}$ is
a) 0
b) -1
c) 1
d) none of these
14. If $\mathrm{y}=\log \left(\operatorname{Sin}^{-1}\left(6 \operatorname{Sin}(\mathrm{x} / 2) \operatorname{Cos}(\mathrm{x} / 2)-4 \operatorname{Sin}^{3} \mathrm{x}\right)\right)$, then the value of $\frac{d y}{d x}$ is
a) $\frac{4}{x^{2}}$
b) $\frac{\sin 2 x-\cos 2 x}{\sec 2 x}$
c) $\frac{2}{3 x}$
d) $\frac{1}{x}$
15. If $\mathrm{y}=\sqrt{x+\sqrt{x+\sqrt{x+\ldots . .}}}$, then value of $\frac{\mathrm{dy}}{\mathrm{dx}}$ is
a) $\frac{1}{2 y}$
b) $\frac{1}{2 y-1}$
c) $\frac{2}{3 y}$
d) $\frac{1}{2 y^{\frac{2}{3}}}$
16. The power set of $\{\}\}$ is
a) $\{\}\}$
b) $\{\},\{ \}\}$
c) $\{\},\{\{ \}\}\}$
d) none of these
17. The value of $\int_{0}^{\pi} x \sin ^{2} x d x$ is
a) $\pi$
b) $\pi^{2} / 4$
c) $\pi^{2} / 2$
d) 0
18. The value of $\int_{-\pi}^{\pi} \frac{x x^{x^{2}}}{1+x^{2}}$ is
a) $\pi$
b) $\pi^{2}$
c) $2 \pi$
d) 0
19. If $A_{i}=[0, i], i \in Z$, where $Z$ is the set of integers. Then which of the following list contain the respective values of $A 4 \cap A 6, A 5 \cup A 10, A 10-A 6$
a) $\{4\},[5,10], A_{4}$
b) $A_{4},[5,10],[6,10]$
c) $A_{4}, A_{10},[7,10]$
d) $[0,4],[0,10], A_{4}$
20. How many non empty subsets are there of a set consisting of $n$ elements ?
a) $2^{n}$
b) $n^{2}$
c) $2^{n-1}$
d) $2^{n}-1$
21. Let $a, b, c, d$ be positive real numbers, which satisfy the two conditions that i) if $\mathrm{a}>\mathrm{b}$ then $\mathrm{c}>\mathrm{d}$ and ii) if $\mathrm{a}>\mathrm{c}$ then $\mathrm{b}<\mathrm{d}$. Then one of the statements given below is a valid conclusion. Which one is it?
a) If $\mathrm{a}<\mathrm{b}$ then $\mathrm{c}<\mathrm{d}$
b) if a < c then $\mathrm{b}>\mathrm{d}$
c) if a $>\mathrm{b}+\mathrm{c}$ then $\mathrm{c}<\mathrm{b}$
d) if $\mathrm{a}>\mathrm{b}+\mathrm{c}$ then $\mathrm{c}>\mathrm{b}$
22. The Indian Cricket team consists of 16 players. It includes 2 wicketkeepers and 5 bowlers. In how many ways can you select a cricket team of eleven players if you have to select 1 wicketkeeper and at least 4 bowlers?
a) 1024
b) 1028
c) 1092
d) 1084
23. In how many ways can 4 girls and 5 boys be arranged in a row so that all the four girls are together?
a) 568
b) 16850
c) 17280
d) 19874
24. The value of $n_{c_{\mathrm{o}}}$ and $n_{c_{n}}$ have a ratio of:
a) 1:1
b) $n: 1$
c) $1: n$
d) $1: 2$
25. $\mathrm{Q}, \mathrm{R}, \mathrm{S}$, and T are sitting on a bench. P is sitting next to $\mathrm{Q}, \mathrm{R}$ is sitting next to $\mathrm{S}, \mathrm{S}$ is not sitting with T who is on the left end of the bench. R is in the second position from the right. P is to the right of Q and T. P and R are sitting together. In which position P is sitting?
a) Between Q and S
b) Between Q and R
c) Between $T$ and $S$
d) Between R and T
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