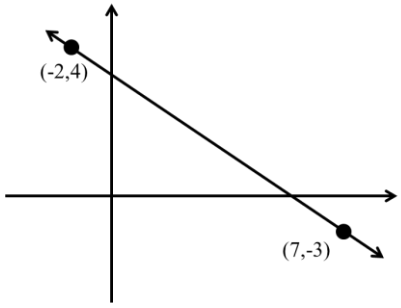
RAMAKRISHNA MISSION VIVEKANANDA CENTENARY COLLEGE, RAHARA, KOLKATA
Undergraduate Admission Test 2025: Computer Science Honours

Full Marks : 75 **Time : 1 hour**

(The symbols have their usual meanings)

1. **The equation of the given line is:**



a) 7x-9y+22=0 b) 9x+7y-10=0 c) 7x+9y-22=0 d) 9x+7y+10=0

2. **The number of bijective functions from set A to itself when A contains 106 elements is**

a) 106 b) $(106)^2$ c) 106! d) 2^{106}

3. **Find the maximum profit that a company can make, if the profit function is given by $P(x) = 41 + 24x – 18x^2$**

a) 25 b) 43 c) 62 d) 49

4. **$g(x)=3x^3+3$ and $f(x) = 5x$ then find the value of $g\{f(x)\}- f\{g(x)\}$**

a) $-300x^3+12$ b) $360x^3-12$ c) $-360x^3+12$ d) $360x^3-18$

5. **If $x=t^2$, $y=5t^2$ then find the value of $\frac{d^2y}{dx^2}$**

a) 0 b) 5 c) 2.5 d) 3

6. **$Z = 7x + y$, subject to $5x + y \geq 5$, $x + y \geq 3$, $x \geq 0$, $y \geq 0$. The minimum value of Z occurs at**

a) (3, 0) b) (1/2, 5/2) c) (7, 0) d) (0, 5)

7. **A bag contains 5 red marbles and 3 black marbles. Three marbles are drawn one by one without replacement. What is the probability that at least one of the three marbles drawn be black, if the first marble is red?**

a) 29/56 b) 25/56 c) 27/56 d) None of these

8. **If $\tan^{-1}(\cot\theta) = 2\theta$, then θ is equal to**

a) $\pi/3$ b) $\pi/4$ c) $\pi/6$ d) None of these

9. $|a \times b|^2 + |a.b|^2 = 144$ and $|a| = 4$, then $|b|$ is equal to

a) 12 b) 3 c) 8 d) 4

10. Let $\vec{a} = \hat{i} + \hat{j} + \hat{k}$, $\vec{b} = \hat{i} - \hat{j} + 2\hat{k}$ and $\vec{c} = x\hat{i} + (x - 2)\hat{j} - \hat{k}$. If the vector c lies in the plane of a and b, then x equals

a) 0 b) 1 c) -4 d) -2

11. The equation of the normal to the curve y = sin x at (0, 0) is

a) x=0 b) y=0 c) x+y=0 d) x-y=0

12. The area enclosed by the parabola $y^2 = 2x$ and tangents through the point (-2, 0) is

a) 3 sq. units b) 4 sq. units c) 4/3 sq. units d) 8/3 sq. units

13. If the second term of a G.P. is 6 and the fifth term is 48, what is the first term?

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

14. The force between two parallel wire 2×10^{-7} Nm^{-1}, placed 1 m apart to each other in vacuum. The electric current flowing through the wires is:

a) 1 A b) Zero c) 5×10^6 A d) 2×10^{-7} A

15. The electric field intensity E due to an infinite uniformly charged plane sheet at a point distant r from the sheet is

a) $E \propto$ r b) $E \propto r$-1 c) $E \propto r$-2 d) E is independent of r

16. The toque in the coil can be increased by increasing

a) Number of turns b) Current and magnetic field c) Area of coil d) All of these

17. Electromagnetic waves travelling in a medium having relative permeability $\mu_r = 1.3$ and relative permittivity $E_r = 2.14$. The speed of electromagnetic waves in medium must be

a) 1.8×10^8 ms^{-1} b) $1.8 \times 10^4 ms^1$ c) $1.8 \times 10^6 ms^1$ d) 1.8×10^2 ms^{-1}

18. A ray of light falls as a prism of $\mu=\sqrt{2}$ with angle of prism as 60° and suffers minimum deviation. The angle of incidence for the ray is

a) 90° b) 45° c) 60° d) 30°

19. Among the following particle which one will have the largest wavelength, if all have the same kinetic energy

a) Electron b) Proton c) Neutron d) Alpha particle

20. Huygen's concept of secondary wave

a) Allows us to find the focal length of a thick lens b) Is a geometrical method to find a wave front c) Is used to determine the velocity of light d) Is used to explain polarization

21. The momentum of a photon of wavelength λ is

a) hλ b) h/λ c) λ/h d) h/cλ

22. The gravitational potential energy of an object is negative. It means _____

a) Object is bounded to the system b) Object is not bounded to the system c) Negative gravitational potential energy is not possible d) Gravitational potential energy

23. Which is incorrect among the following applications of the radius of gyration?

a) It is used to estimate the strength of a body. b) It is used to enhance underwater images.

c) It is used in structural engineering. d) It is used in molecular physics to determine the dimensions of a polymer chain

24. A current passes through a resistor. If K_1 and K_2 represent the average kinetic energy of the conduction electrons and the metal ions respectively then

a) $K_1 < K_2$ b) $K_1 = K_2$ c) $K_1 > K_2$ d) Any of these three may occur

25. An astronomical refractive telescope has an objective of focal length 20 m and an eyepiece of focal length 2 cm. Then

a) The magnification is 1000 b) The length of the telescope tube is 20.02 m c) The image formed of inverted d) All of these