



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)

Accredited A++ Grade by NAAC | 12B Status by UGC | Approved by AICTE
www.sathyabama.ac.in

SATHYABAMA ALL INDIA ENTRANCE EXAMINATION – SAEED 2024 SAMPLE QUESTIONS

MATHEMATICS

- The quadratic equation $x^2 - 6x + 1 = 0$ and $x^2 - cx + 6 = 0$ have one root in common. The other roots of the first and second equations are integers in the ratio 4:3 then the common root is
 - 3
 - 2
 - 1
 - 4
- Let $\cos(\alpha + \beta) = \frac{4}{5}$ and let $\sin(\alpha - \beta) = \frac{5}{13}$, where $0 \leq \alpha, \beta \leq \frac{\pi}{4}$, then $\tan 2\alpha =$
 - $\frac{56}{33}$
 - $\frac{19}{12}$
 - $\frac{13}{12}$
 - $\frac{33}{56}$
- The value of $\int_0^1 \frac{8 \log(1+x)}{1+x^2} dx$ is
 - $\frac{\pi}{8} \log 2$
 - $\frac{\pi}{2} \log 2$
 - $\log 2$
 - $\pi \log 2$
- If $X = \{4^n - 3n - 1 : n \in \mathbb{N}\}$ and $Y = \{9(n-1) : n \in \mathbb{N}\}$, Where \mathbb{N} is the set of natural numbers, then $X \cup Y$ is equal to
 - X
 - Y
 - \mathbb{N}
 - $Y - X$



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5. The area of the region described by $A = \{(x,y): x^2 + y^2 \leq 1 \text{ and } y^2 \leq 1-x\}$ is:

- (A) $\frac{\pi}{2} - \frac{2}{3}$
- (B) $\frac{\pi}{2} + \frac{2}{3}$
- (C) $\frac{\pi}{2} + \frac{4}{3}$
- (D) $\frac{\pi}{2} - \frac{4}{3}$

PHYSICS

1. An object is immersed in a fluid. In order that the object becomes invisible, it should

- (A) behave as perfect reflector
- (B) have refractive index one
- (C) absorb all light falling on it
- (D) have refractive index matching with that of the surrounding liquid

2. If the rms velocity of the hydrogen molecules at NTP is 1.84 km/s, calculate the rms velocity of the oxygen molecules at NTP. Molecular weight of hydrogen and oxygen are 2 and 32 respectively.

- (A) 1.47 km/s
- (B) 0.94 km/s
- (C) 1.84 km/s
- (D) 0.47 km/s

3. Using an AC voltmeter, the potential difference in the electrical line in a house is read to be 234V. If the line frequency is 50Hz, the equation of the line voltage is

- (A) $220 \sin 100 \pi t$
- (B) $165 \sin 100 \pi t$
- (C) $440 \sin 100 \pi t$
- (D) $331 \sin 100 \pi t$



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4. The fact that light of transverse wave derive its evidence by the support from the observation that
- (A) light wave undergo reflection
 - (B) light can be diffracted
 - (C) light travels in waves
 - (D) light shows polarizing effects
5. Refractive index of material is equal to tangent of polarizing angle. It is called
- (A) Brewster's law
 - (B) Lambert's law
 - (C) Malu's law
 - (D) Bragg's law

CHEMISTRY

1. In the standardization of $\text{Na}_2\text{S}_2\text{O}_3$ using $\text{K}_2\text{Cr}_2\text{O}_7$ by iodometry, the equivalent weight of $\text{K}_2\text{Cr}_2\text{O}_7$ is
- (A) Molecular weight / 2
 - (B) Molecular weight / 6
 - (C) Molecular weight / 3
 - (D) Same as molecular weight
2. What product are expected from the disproportionation reaction of hypochlorous acid ?
- (A) HClO_3 and Cl_2O
 - (B) HClO_2 and HClO_4
 - (C) HCl and Cl_2O
 - (D) HCl and HClO_3
3. Native silver metal forms a water soluble complex with a dilute aqueous solution of NaCN in presence of
- (A) Nitrogen
 - (B) Oxygen
 - (C) Carbon dioxide
 - (D) Argon
4. The number and types of bonds between two carbon atoms in calcium carbide are
- (A) One sigma, one pi
 - (B) One sigma, two pi
 - (C) Two sigma, one pi
 - (D) Two sigma, two pi



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5. Identify the incorrect statement among the following

- (A) Ozone reacts with SO_2 to give SO_3
- (B) Silicon reacts with $\text{NaOH}(\text{aq})$ in the presence of air to give Na_2SiO_3 and H_2O
- (C) Cl_2 reacts with excess of NH_3 to give N_2 and NH_4Cl
- (D) Br_2 reacts with hot and strong NaOH solution to give NaBr , NaBrO_4 and H_2O