BITSAT 2025 June 22 Shift 2 Question Paper

Time Allowed :3 Hours	**Maximum Marks :**390	**Total questions :**130

1. A radio wave travels in a medium with refractive index 1.5. What is the speed of light in this medium if the speed of light in vacuum is 3×10^8 m/s?

(A) 2×10^8 m/s

(B) 1.5×10^8 m/s

(C) 2.5×10^8 m/s

(D) 1.6×10^8 m/s

2. A concave mirror produces an image that is real, inverted, and diminished. What is the position of the object in relation to the mirror?

(A) At the focal point

(B) Between the focus and the mirror

(C) Beyond twice the focal length

(D) Between the focus and twice the focal length

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3. In an isobaric process, 200 J of heat is supplied to a gas. The gas does 50 J of work. What is the change in internal energy?

(A) 150 J

(B) 250 J

(C) 100 J

(D) 200 J

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4. The rate of a reaction doubles when the temperature is increased by $10°C$. What is the approximate value of the activation energy?

(A) 60 kJ/mol

(B) 100 kJ/mol

(C) 120 kJ/mol

(D) 150 kJ/mol

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5. What is the major product when 1-bromopropane undergoes nucleophilic substitution with OH^-?

(A) Propan-1-ol

(B) Propan-2-ol

(C) 1,2-Propanediol

(D) Propene

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6. What is the dot product of the vectors $\mathrm{a} = (2, 3, 1)$ and $\mathrm{b} = (1, -1, 4)$?

(A) 5

(B) 4

(C) 7

(D) 10

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7. Find the value of the integral:

$$\int_0^\pi \sin^2(x)\, dx.$$

(A) 0

(B) $\frac{\pi}{2}$

(C) $\frac{\pi}{4}$

(D) π

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8. A box contains 5 red balls and 3 blue balls. If two balls are drawn randomly without replacement, what is the probability that one of the balls is red and the other is blue?

(A) $\frac{5}{8}$

(B) $\frac{15}{28}$

(C) $\frac{3}{8}$

(D) $\frac{1}{2}$

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9. Find the angle between the vectors a $= (2, 3, 1)$ and b $= (1, -1, 4)$.

(A) $45°$

(B) $60°$

(C) $90°$

(D) $120°$

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10. Find the determinant of the matrix $A = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$.

(A) 0

(B) 4

(C) 9

(D) 25