the metamorphosis starts from here....

Brilliant International
Olympiad of
SCIENCE

ACADEMY
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Class-11M   (Syllabus and Sample Question Paper)

PHYSICS Physical World and Measurement, Kinematics, Laws of Motion, Work, Energy and Power, Motion of System of Particles and Rigid Body, Gravitation, Properties of Bulk Matter, Thermodynamics, Behaviour of Perfect Gas and Kinetic Theory, Oscillations and Waves **CHEMISTRY** Basic Concepts of Chemistry, Structure of Atom, Classification of Elements and Periodicity in Properties, Chemical Bonding and Molecular Structure, States of Matter: Gases and Liquids, Thermodynamics, Equilibrium , Redox Reaction, Hydrogen, s-Block Elements (Alkali and Alkaline Earth Metals, Some p-Block Elements (B,C,N), Organic Chemistry – Some Basic Principles and Techniques, Hydrocarbons, Environmental Chemistry **MATHEMATICS** Sets, Relations and functions Coordinate Geometric:- Straight line, Pair of St. line, Conic section. Basic concept about 3- dimension (Solid geometry) Sequence and series, Complex Number, Quadratic Equation and expression, Binomial theorem, Permutation and Combination, Probability, Non-Verbal Reasoning (I.Q.), Central Tendency, Variance & Standard Deviation

The Actual Question Paper Contains 40 Questions. The Duration of the Test Paper is 60 Minutes

1. **The solution set of the inequation $|x - 1| + |x - 2| + |x - 3| \geq 6$ is?**
    (A) $[0, 4]$
    (B) $(\infty, 0] [4, \infty)$
    (C) $(-\infty, 2] \cup [4, \infty)$
    (D) $(\infty, 5] \cup [14, \infty)$
    (E) None of these

2. **If x is a real, the maximum value of $5 + 4x - x^2$ is?**
    (A) 5   (B) 9   (C) 1   (D) 2
    (E) None of these

3. **The sum of series $\dfrac{1}{\underline{2}} - \dfrac{1}{\underline{3}} + \dfrac{1}{\underline{4}} - \dfrac{1}{\underline{5}} + ...$ up to ∞ is?**

    (A) e^{-1} (B) $e^{-\frac{1}{2}}$ (C) $e^{\frac{1}{2}}$ (D) e^{-2}
    (E) None of these

4. **If $C_0, C_1, C_2 \text{———} C_n$ denotes the coefficients in the expansion of $(1 + x)^n$, then the value of $C_1 + 2C_2 + 3C_3 + ... + {}^nC_n$ is?**
    (A) $n\,2^{n-1}$ (B) $(n + 1)\,2^{n-1}$ (C) $(n + 1)\,2^n$ (D) $(n + 2)2^{n-1}$
    (E) None of these

5. Area bounded by the curves x = 0 and x + 2|y|=1 is?

(A) $\frac{1}{4}$ (B) $\frac{1}{2}$ (C) 1   (D) 2

(E) None of these

6. From the top of a light house, the angles of depression of two stations on opposite sides of it at distance "a" apart are α and β. The height of light house is?

(A) $\dfrac{a}{\cot\alpha + \cot\beta}$ (B) $\dfrac{a}{\cot\beta - \cot\alpha}$ (C) $\dfrac{a}{\cot\beta.\cot\alpha}$ (D) $\dfrac{a}{\tan\beta + \tan\alpha}$

(E) None of these

7. The sum s = sinθ+ sin 2θ+ sin 3θ+ ——— + sin nθ equals to?

(A) $\dfrac{\frac{\sin(n+1)\theta}{2}.\sin\frac{n\theta}{2}}{\sin\left(\frac{\theta}{2}\right)}$

(B) $\dfrac{\frac{\cos(n+1)\theta}{2}.\sin\frac{n\theta}{2}}{\sin\left(\frac{\theta}{2}\right)}$

(C) $\dfrac{\cos\left(\frac{n\theta}{2}\right).\sin\frac{n\theta}{2}}{\sin\left(\frac{\theta}{2}\right)}$

(D) $\dfrac{\cos\frac{(n+1)\theta}{2}.\cos\frac{n\theta}{2}}{\sin\left(\frac{\theta}{2}\right)}$

(E) None of these

8. The main factor responsible for weak acidic nature of BF_3 is?
(A) Large electronegativily of F
(B) Three centre two electron bonds in BF_3
(C) Pπ -Pπ baek bonding
(D) Pπ -Pπ back bonding
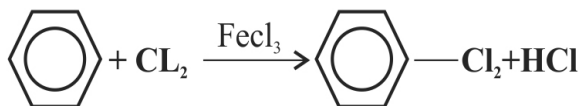(E) None of these

9. Which of the following compound (s) has least dipole moment ?
(A) 1, 2 – Dichlorobenzene   (B) 1, 3 – Dichlorobenzene
(C) 1, 4 – Dichlorobenzene   (D) All have the same dipole moment
(E) None of these

10. The compound is named in IUPAC as?

(A) 3, 4 – hexane di–one   (B) 3, 6 – haxandione
(C) Propoxy propanone   (D) Propanoic anbydrode
(E) None of these

11. In the reaction is/are

the attacking species is
(A) Cl_2 (B) Cl^+ (C) Cl^- (D) $Fe\,Cl_4^-$

(E) None of these

12. Two particles A and B moves with constant velocities V_1 and V_2 along two mutually perpendcular straight lines towards the intersection point O. At the moment t=o, the particles were to located at distances S_1 and S_2 from the point O. The line at which the distance between the particles becomes the smallest is ?

(A) $\dfrac{V_1S_1 + V_2S_2}{V_1^2 + V_2^2}$ (B) $\dfrac{V_1S_1}{V_1^2 + V_2^2}$ (C) $\dfrac{S + S_2}{V_1^2 + V_2^2}$ (D) $\dfrac{V_1 + V_2}{V_1^2 + V_2^2}$
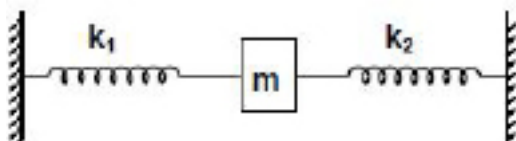
(E) None of these

13. A bullet of mass m moving with a speed u strikes a wooden block of mass M and gets embedded into the block. The final speed is

(A) $\sqrt{\dfrac{M}{M+m}}\,v$ (B) $\sqrt{\dfrac{M}{M+m}}\,v$ (C) $\dfrac{m}{M+m}\,v$ (D) $\dfrac{V}{2}$

(E) None of these

14. A sphere, a cube and a thin circular plate, all made of the same material and having the same mass, are initially heated to a temprature of 3,000°c. Which of these will cool fastest ?

(A) Sphere   (B) Cube   (C) Plate   (D) Either cube or plate

(E) None of these

15. Two springs of force constants K_1 and K_2 are connected to a mass m as shown in the figure

The frequency of oscillation of the mass is υ. If both K_1 and K_2 are made four times their original values, the frequency of oscillation becomes?

(A) $\dfrac{\upsilon}{2}$ (B) $\dfrac{\upsilon}{4}$ (C) 4υ (D) 2υ

(E) None of these

ANSWERS

1. B	2. B	3. A	4. A	5. B
6. A	7. A	8. C	9. C	10. D
11. B	12. A	13. C	14. C	15. D