Reliable INSTITUTE
(A Unit of ALLEN Career Institute)

R-NET(2020)

(Reliable National Entrance Test)

ACADEMIC SESSION : 2020-21

SAMPLE TEST PAPER (For XII to XIII Moving, Main Pattern)

Duration : 18 Min. **Max. Marks : 96**

Name : _____ **Application Form Number** _____

Reg. Number : | 2 | 0 | | | | | | | | | | |

GENERAL INSTRUCTIONS

1. There are **06** pages in the booklet containing 24 questions of **Physics (1 to 8), Chemistry (9 to 16), Mathematics(17 to 24)** each question carries 4 mark.
2. Blank papers, clip boards, log tables, slide rule, calculators, mobile or any other electronic gadgets in any form is not allowed.
3. Write your Name and Roll No. in the space provided at the top of this booklet.
4. Before answering the paper, fill up the required details in the blank space provided in the answer sheet.
5. Do not forget to mention your roll number neatly and clearly in the blank space provided in the answer sheet.
6. No rough sheets will be provided by the invigilators. All the rough work is to be done in the blank space provided in the question paper.
7. In case of any dispute, the answer filled in the OMR sheet available with the institute shall be final.

DO NOT BREAK THE SEALS WITHOUT BEING INSTRUCTED TO DO SO BY THE INVIGILATOR

MARKING CRITERIA

No. of Questions	Type	Marks		
		Correct	Incorrect	Blank
1-24	Only one correct	Q.No. 1 to 24 (4 Mark each)	–1 negative marks	0

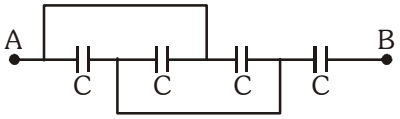
PHYSICS

This section contains 8 multiple choice questions. Each question has four choices (1), (2), (3) and (4) out of which only one is correct

1. A 10m long potentiometer wire has a potential gradient of 0.0025 V/cm. Calculate the distance of null point when the wire is connected to a 1.025V standard cell :-

(1) 4.1 m (2) 0.25 m (3) 1.0 m (4) 2.0 m

2. The equivalent capacitance of circuit as shown in figure is–



(1) Zero (2) C (3) $\frac{3C}{4}$ (4) $\frac{4C}{3}$

3. A square frame is made from four identical rods each having mass m and length ℓ. Moment of inertia of the frame about one side will be equal to–

(1) $\frac{3}{2}m\ell^2$ (2) $\frac{2}{3}m\ell^2$ (3) $\frac{5}{3}m\ell^2$ (4) $\frac{11}{3}m\ell^2$

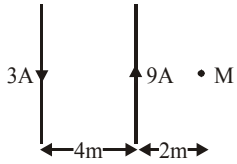
4. The length of a given cylindrical wire is increased by 100%. Due to the consequent decrease in diameter the change in the resistance of the wire will be–

(1) 300% (2) 200% (3) 100% (4) 50%

5. Orbital velocity of a satellite moving in orbit of radius 4R from centre will be–

(1) $\sqrt{\frac{GM}{3R}}$ (2) $\sqrt{\frac{GM}{2R}}$ (3) $\sqrt{\frac{GM}{4R}}$ (4) $\sqrt{\frac{3GM}{R}}$

6. Magnetic field at point 'M' of given current distribution :-



(1) $\frac{3\mu_0}{\pi}\otimes$ (2) $\frac{5\mu_0}{2\pi}\otimes$ (3) $\frac{2\mu_0}{\pi}\otimes$ (4) $\frac{\mu_0}{2\pi}\otimes$

7. A train of 150 m length is going towards east with speed 10 m/s. A bird flies at a speed of 5 m/s towards west. The time taken by the bird to cross the train is–

(1) 12 s (2) 8 s (3) 10 s (4) 15 s

8. Stationary wave is represented by y = A sin(100 t) cos(0.01x) where y and A are in mm, t in sec and x in m. The velocity of the wave–

(1) 1 m/s (2) 10^2 m/s (3) 10^4 m/s (4) Not derivable

CHEMISTRY

This section contains 8 multiple choice questions. Each question has four choices (1), (2), (3) and (4) out of which only one is correct

9. The reaction $2X \rightarrow B$ is a zeroth order reaction. If the initial concentration of X is 0.2 M, the half-life is 6 h. When the initial concentration of X is 0.5 M, the time required to reach its final concentration of 0.2 M will be :-

(1) 18.0 h (2) 7.2 h (3) 9.0 h (4) 12.0 h

10. The standard reaction Gibbs energy for a chemical reaction at an absolute temperature T is given by

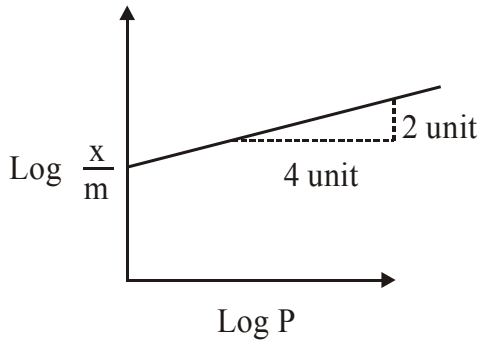
$$\Delta_r G^\circ = A - BT$$

Where A and B are non-zero constants. Which of the following is TRUE about this reaction ?

(1) Exothermic if $B < 0$ (2) Exothermic if $A > 0$ and $B < 0$

(3) Endothermic if $A < 0$ and $B > 0$ (4) Endothermic if $A > 0$

11. Adsorption of a gas follows Freundlich adsorption isotherm. In the given plot, x is the mass of the gas adsorbed on mass m of the adsorbent at pressure p. $\frac{x}{m}$ is proportional to



(1) $P^{1/4}$ (2) P^2 (3) P (4) $P^{1/2}$

12. An organic compound is estimated through Dumas method and was found to evolve 6 moles of CO_2. 4 moles of H_2O and 1 mole of nitrogen gas. The formula of the compound is

(1) $C_{12}H_8N$ (2) $C_{12}H_8N_2$ (3) C_6H_8N (4) $C_6H_8N_2$

13. The coordination number of Th in $K_4\,[Th(C_2O_4]_4\,(OH_2)_2]$ is :-

$\left(C_2O_4^{2-} = \text{Oxalato}\right)$

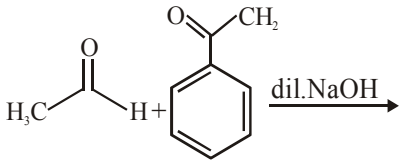
(1) 6 (2) 10 (3) 14 (4) 8

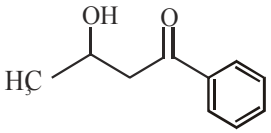
14. The relative stability of +1 oxidation state of group 13 elements follows the order :-

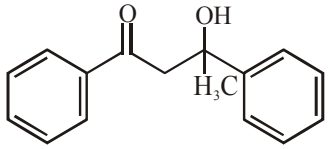
(1) Al < Ga < Tl < In (2) Tl < In < Ga < Al

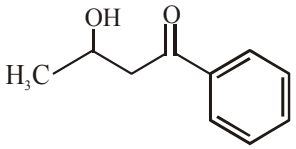
(3) Al < Ga < In < Tl (4) Ga < Al < In < Tl

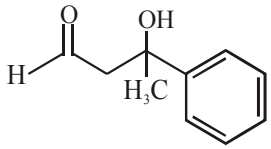
15. The major product formed in the following reaction is:



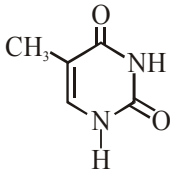
(1) 

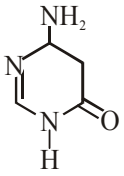
(2) 

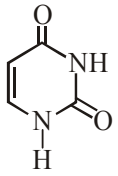
(3) 

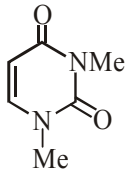
(4) 

16. Among the following compound which one is found in RNA ?

(1) 

(2) 

(3) 

(4) 

MATHEMATICS

This section contains 8 multiple choice questions. Each question has four choices (1), (2), (3) and (4) out of which only one is correct

17. The reflection of the complex number (3 + 2i) in the straight line $z = -i\bar{z}$ is-

(1) (–2 – 3i) (2) (2 – 3i) (3) (2 + 3i) (4) (i + 5)

18. The number of common tangents of the circles $(x + 2)^2 + (y - 2)^2 = 49$ and $(x - 2)^2 + (y + 1)^2 = 4$ is

(1) 0 (2) 1 (3) 2 (4) 3

19. The number of values of 'k' for which $(16x^2 + 12x + 39) + k(9x^2 - 2x + 11)$ is a perfect square with rational coefficients-

(1) 2 (2) 0 (3) 1 (4) infinite

20. If $\omega \neq 1$ is imaginery cube root of unity and $x + y + z \neq 0$, then $\begin{vmatrix} \frac{x}{1+\omega} & \frac{y}{\omega+\omega^2} & \frac{z}{\omega^2+1} \\ \frac{y}{\omega+\omega^2} & \frac{z}{\omega^2+1} & \frac{x}{1+\omega} \\ \frac{z}{\omega^2+1} & \frac{x}{1+\omega} & \frac{y}{\omega+\omega^2} \end{vmatrix}$ is

equal to zero if

(1) $x^2 + y^2 + z^2 = 0$ (2) $x\omega + y + z\omega^2 = 0$ or $x = y = z$

(3) $x \neq y \neq z \neq 0$ (4) $x = 2y = 3z$

21. If $l_n = \int_0^{\pi/4} \tan^n x dx$ and $\frac{1}{l_2+l_4}, \frac{1}{l_3+l_5}, \frac{1}{l_4+l_6}, \frac{1}{l_5+l_7}$ form an A.P., then the common difference of the A.P. is

(1) 1 (2) 2 (3) 3 (4) none of these

22. One of the foci of the hyperbola is at origin and the corresponding directrix is $3x + 4y + 1 = 0$. The eccentricity of the hyperbola is $\sqrt{5}$. The equation of the hyperbola is

(1) $8x^2 + 9y^2 + 24xy + 6x + 6y + 1 = 0$

(2) $4x^2 + 11y^2 + 24xy + 6x + 8y + 1 = 0$

(3) $4x^2 + 9y^2 + 27xy + 4x + 9y + 7 = 0$

(4) $8x^2 + 11y^2 + 27xy + 4x + 9y + 7 = 0$

23. Evaluate

$$\int e^{x\sin x+\cos x}\left[\frac{x^2.\cos^2 x-(x\sin x+\cos x)}{x^2}\right]dx \ ?$$

(1) $e^{x.\sin x+\cos x}.\sin x + c$ (2) $e^{x.\sin x+\cos x}.\frac{\cos x}{x} + c$

(3) $e^{x.\sin x+\cos x}.\frac{\sin x}{x} + c$ (4) $e^{x.\sin x+\cos x}.\frac{\cos x}{x^2} + c$

24. The area of the region in which the point satisfies the inequalities $4 < x^2 + y^2 < 16$ and $3x^2 - y^2 > 0$ is:

(1) π (2) 2π (3) 4π (4) 8π

Space for rough work

R-NET (SAMPLE PAPER) (XII to XIII moving students)

ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	1	3	3	1	3	3	3	3	1	4	4	4	2	3	1	3	1	2	2	2
Que.	21	22	23	24																
Ans.	1	2	2	4																