



ASPIRE TALENT HUNT EXAM FOR

CLASS 12th - QUESTION PAPER

Time: 120 Minutes

Maximum Marks: 400

INSTRUCTIONS:

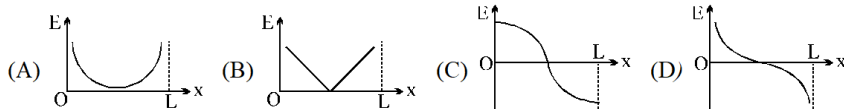
Read the instructions carefully. 5 minutes are allowed specifically for this purpose.

1. Answer all questions
2. This booklet is your question paper containing **100** questions
3. The question paper consist of **5 sections** I, II, III, IV, V.
4. Section-I **Physics** (Questions -1 to 30), Section-II **Chemistry** (31-60), Section- VIII **Mental ability** (60-100).
5. Each question has **only one correct** answer. Once you have marked an option you can't mark a fresh option
6. For each **correct** answer **+4** marks will be awarded. For **wrong** answer **-1** mark will be deduced.
7. Fill your **OMR** sheet carefully.
8. All the Notations used in this paper are standard.
9. No use of electronic gadgets, calculators, mobile phones etc are allowed.
10. **In case of any discrepancy do not ask anyone one including your invigilator. Try to attempt question and mark the best possible answer.**

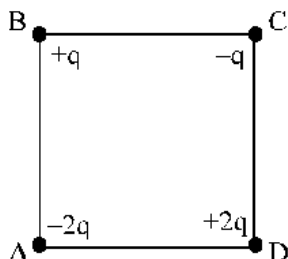
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Section-I (Physics)

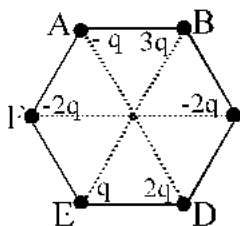
1. Two identical point charges are placed at a separation of l . P is a point on the line joining the charges, at a distance x from any one charge. The field at P is E . E is plotted against x for values of x from close to zero to slightly less than l . Which of the following best represents the resulting curve?



2. Four charges are arranged at the corners of a square ABCD, as shown. The force on a +ve charge kept at the centre of the square is
- (A) zero
(B) along diagonal AC
(C) along diagonal BD
(D) perpendicular to the side AB



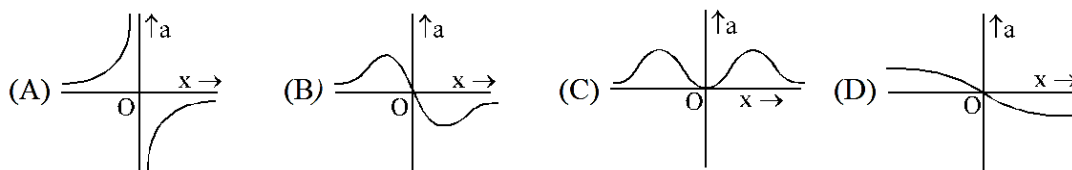
3. Six charges are placed at the corner of a regular hexagon as shown. If an electron is placed at its centre O, force on it will be:



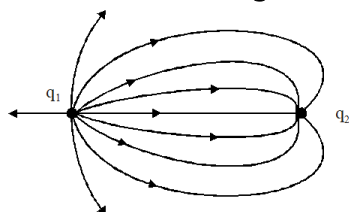
- (A) Zero
(B) Along OF
(C) Along OC
(D) None of these

Rough work

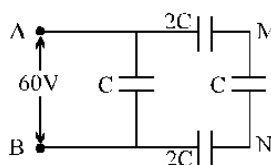
4. Two identical positive charges are fixed on the y-axis, at equal distances from the origin O. A particle with a negative charge starts on the x-axis at a large distance from O, moves along the + x-axis, passes through O and moves far away from O. Its acceleration a is taken as positive along its direction of motion. The particle's acceleration a is plotted against its x -coordinate. Which of the following best represents the plot?



5. The figure shows the electric field lines in the vicinity of two-point charges. Which one of the following statements concerning this situation is true?



- (A) q_1 is negative and q_2 is positive
 (B) The magnitude of the ratio (q_2/q_1) is less than one
 (C) Both q_1 and q_2 have the same sign of charge
 (D) The electric field is strongest midway between the charges.
6. When a negative charge is released and moves in electric field, it moves toward a position of
 (A) lower electric potential and lower potential energy
 (B) lower electric potential and higher potential energy
 (C) higher electric potential and lower potential energy
 (D) higher electric potential and higher potential energy
7. A capacitor of capacitance C is charged to a potential difference V from a cell and then disconnected from it. A charge $+Q$ is now given to its positive plate. The potential difference across the capacitor is now
 (A) V
 (B) $V + \frac{Q}{C}$
 (C) $V + \frac{Q}{2C}$
 (D) $V - \frac{Q}{C}$, if $V < CV$
8. In the circuit shown, a potential difference of 60 V is applied across AB. The potential difference between the point M and N is
 (A) 10 V
 (B) 15 V
 (C) 20 V
 (D) 30 V

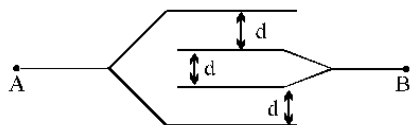


Rough work

9. The minimum number of capacitors each of $3\mu\text{F}$ required to make a circuit with an equivalent capacitance $2.25\mu\text{F}$ is
- (A) 3 (B) 4
(C) 5 (D) 6

10. Three long concentric conducting cylindrical shells have radii R , $2R$ and $2\sqrt{2}R$. Inner and outer shells are connected to each other. The capacitance across middle and inner shells per unit length is:
- (A) $\frac{\epsilon_0}{3\ln 2}$ (B) $\frac{6\pi\epsilon_0}{\ln 2}$
(C) $\frac{\pi\epsilon_0}{2\ln 2}$ (D) None

11. Four metallic plates are arranged as shown in the figure. If the distance between each plate then capacitance of the given system between points A and B is (Given $d \ll A$)

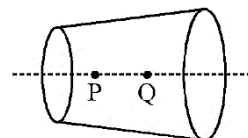


- (A) $\frac{\epsilon_0 A}{d}$ (B) $\frac{2\epsilon_0 A}{d}$
(C) $\frac{3\epsilon_0 A}{d}$ (D) $\frac{4\epsilon_0 A}{d}$
12. **Statement-1** : The electrostatic force between the plates of a charged isolated capacitor decreases when dielectric fills whole space between plates.
Statement-2 : The electric field between the plates of a charged isolated capacitance decreases when dielectric fills whole space between plates.
- (A) Statement-1 is true, statement-2 is true and statement- 2 is correct explanation for statement-1.
(B) Statement-1 is true, statement- 2 is true and statement- 2 is NOT the correct explanation for statement-1.
(C) Statement-1 is true, statement- 2 is false.
(D) Statement-1 is false, statement- 2 is true.

13. In a wire of cross-section radius r , free electrons travel with drift velocity v when a current I flows through the wire. What is the current in another wire of half the radius and of the same material when the drift velocity is $2v$?
- (A) $2I$ (B) I
(C) $I/2$ (D) $I/4$

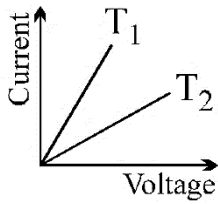
14. A wire has a non-uniform cross-section as shown in figure. A steady current flow through it. The drift speed of electrons at points P and Q is v_P and v_Q

- (A) $v_P = v_Q$ (B) $v_P < v_Q$
(C) $v_P > v_Q$ (D) Data insufficient

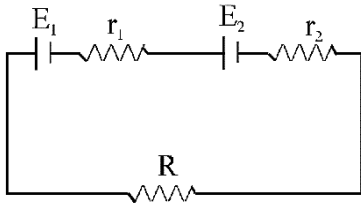


Rough work

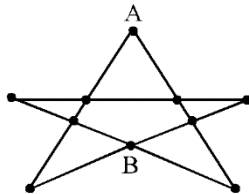
15. The current in a metallic conductor is plotted against voltage at two different temperatures T_1 and T_2 . Which is correct



- (A) $T_1 > T_2$ (B) $T_1 < T_2$
 (C) $T_1 = T_2$ (D) none
16. Under what condition current passing through the resistance R can be increased by short circuiting the battery of emf_2 . The internal resistances of the two batteries are r_1 and r_2 respectively.



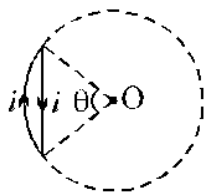
- (A) $E_2 r_1 > E_1 (R + r_2)$
 (B) $E_1 r_2 > E_2 (R + r_1)$
 (C) $E_2 r_2 > E_1 (R + r_2)$
 (D) $E_1 r_1 > E_2 (R + r_1)$
17. The resistance of all the wires between any two adjacent dots is R . Then equivalent resistance between A and B as shown in figure is :



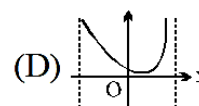
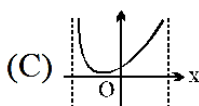
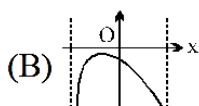
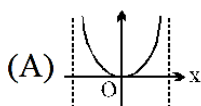
- (A) $7/3R$ (B) $7/6R$
 (C) $14/8R$ (D) None of these
18. A uniform copper wire carries a current i amperes and has p carriers per metre^3 . The length of the wire is ℓ metres and its cross-section area is metre^2 . If the charge on a carrier is q coulombs, the drift velocity in ms^{-1} is given by
- (A) i/sq^s (B) i/psq
 (C) psq/l (D) $i/ps\ell q$

Rough work

19. Net magnetic field at the centre of the circle O due to a current carrying loop as shown in figure is ($\theta < 180^\circ$)



- (A) zero
 (B) perpendicular to paper inwards
 (C) perpendicular to paper outwards
 (D) is perpendicular to paper inwards if $\theta \leq 90^\circ$ and perpendicular to paper outwards if $90^\circ \leq \theta < 180^\circ$
20. Two very long straight parallel wires, parallel to y-axis, carry currents $4I$ and I , along + y direction and - y direction, respectively. The wires pass through the x-axis at the points $(d, 0, 0)$ and $(-d, 0, 0)$ respectively. The graph of magnetic field z-component as one moves along the x-axis from $x = -d$ to $x = +d$, is best given by



21. An electron having kinetic energy T is moving in a circular orbit of radius R perpendicular to a uniform magnetic induction $\vec{B}$. If kinetic energy is doubled and magnetic induction tripled, the radius will become

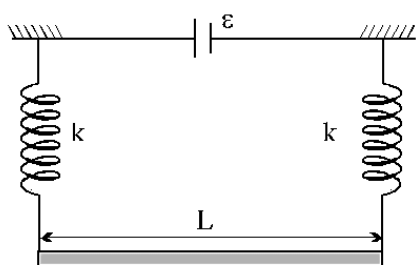
(A) $\frac{3R}{2}$

(B) $\sqrt{\frac{3}{2}} R$

(C) $\sqrt{\frac{2}{9}} R$

(D) $\sqrt{\frac{4}{3}} R$

22. A straight rod of mass m and length L is suspended from the identical spring as shown in the figure. The spring stretched by a distance of x_0 due to the weight of the wire. The circuit has total resistance $R\Omega$. When the magnetic field perpendicular to the plane of the paper is switched on, springs are observed to extend further by the same distance. The magnetic field strength is

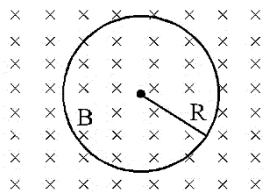


Rough work

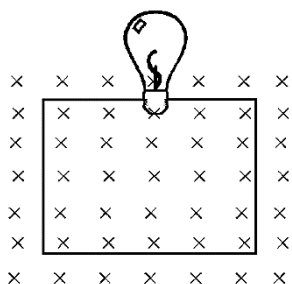
- (A) $\frac{mgR}{\epsilon L}$; directed outward from the plane of the paper
 (B) $\frac{mgR}{2\epsilon x_0}$; directed outward from the plane of the paper
 (C) $\frac{mgR}{\epsilon L}$; directed into the plane of the paper
 (D) $\frac{mgR}{\epsilon x_0}$; directed into the plane of the paper
23. **Statement-1** : It is not possible for a charged particle to move in a circular path around a long straight uncharged conductor carrying current under the influence of its magnetic field alone.
Statement-2 : The magnetic force (if nonzero) on a moving charged particle is normal to its velocity.
 (A) Statement-1 is true, statement- 2 is true and statement- 2 is correct explanation for statement-1.
 (B) Statement- 1 is true, statement- 2 is true and statement- 2 is NOT the correct explanation for statement-1.
 (C) Statement-1 is true, statement- 2 is false.
 (D) Statement-1 is false, statement-2 is true.
24. **Statement-1** : For a charged particle to pass through a uniform electro-magnetic field without change in velocity, its velocity vector must be perpendicular to the magnetic field.
Statement-2 : Net Lorentz force on the particle is given by $\vec{F} = q[\vec{E} + \vec{v} \times \vec{B}]$
 (A) Statement- 1 is true, statement- 2 is true and statement- 2 is correct explanation for statement-1.
 (B) Statement- 1 is true, statement- 2 is true and statement- 2 is NOT the correct explanation for statement-1.
 (C) Statement-1 is true, statement- 2 is false.
 (D) Statement-1 is false, statement-2 is true.
25. **A circular loop of radius R , carrying current I , lies in $x - y$ plane with its centre at origin. The total magnetic flux through $x - y$ plane is**
 (A) directly proportional to I
 (B) directly proportional to R
 (C) directly proportional to R^2
 (D) zero
26. **An electron is moving in a circular orbit of radius R with an angular acceleration α . At the centre of the orbit is kept a conducting loop of radius r , ($r \ll R$). The e.m.f induced in the smaller loop due to the motion of the electron is**
 (A) zero, since charge on electron is constant
 (B) $\frac{\mu_0 e r^2}{4R} \alpha$
 (C) $\frac{\mu_0 e r^2}{4\pi R} \alpha$
 (D) none of these

Rough work

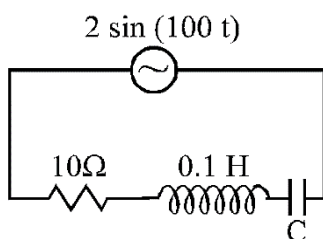
27. A conducting loop of radius R is present in a uniform magnetic field B perpendicular the plane of the ring. If radius R varies as a function of time ' t ', as $R = R_0 + t$. The e.m.f induced in the loop is



- (A) $2\pi(R_0 + t)B$ clockwise
 (B) $\pi(R_0 + t)B$ clockwise
 (C) $2\pi(R_0 + t)B$ anticlockwise
 (D) zero
28. A square wire loop of 10.0 cm side lies at right angles to a uniform magnetic field of 20T. A 10 V light bulb is in a series with the loop as shown in the fig. The magnetic field is decreasing steadily to zero over a time interval Δt . The bulb will shine with full brightness if Δt is equal to



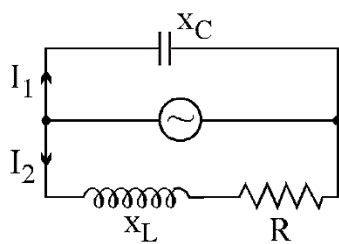
- (A) 20 ms
 (B) 0.02 ms
 (C) 2 ms
 (D) 0.2 ms
29. The power factor of the circuit is $1/\sqrt{2}$. The capacitance of the circuit is equal to



- (A) $400\mu\text{F}$
 (B) $300\mu\text{F}$
 (C) $500\mu\text{F}$
 (D) $200\mu\text{F}$

Rough work

30. In the shown AC circuit phase difference between currents I_1 and I_2 is



(A) $\frac{\pi}{2} - \tan^{-1} \frac{x_L}{R}$

(B) $\tan^{-1} \frac{x_L - x_C}{R}$

(C) $\frac{\pi}{2} + \tan^{-1} \frac{x_L}{R}$

(D) $\frac{\pi}{2} + \tan^{-1} \frac{x_L - x_C}{R}$

Rough work

Section-II (Chemistry)

31. For a chemical reaction $A + B \rightarrow \text{Product}$, the order is 1 with respect to each of A and B find x and y from the given data.

Rate (moles/L/s)	[A]	[B]
0.10	0.1M	0.1M
0.80	xM	0.1M
0.40	0.2M	yM

- (A) $x = 8y = .2$
 (B) $x = .8y = .2$
 (C) $x = .4y = .2$
 (D) $x = .4y = .8$

32. The bromination of acetone that occurs in acid solution is represented by $\text{CH}_3\text{COCH}_3(\text{aq}) + \text{Br}_2(\text{aq}) \rightarrow \text{CH}_3\text{COCH}_2\text{Br}(\text{aq}) + \text{HBr}(\text{aq})$

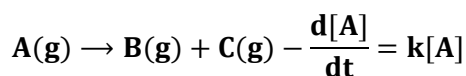
Given :

Initial concentrations			Initial rate of disappearance of Br_2 , Ms^{-1}
Br_2	$[\text{CH}_3\text{COCH}_3]$	$\text{M}[\text{H}^+]$	
0.050	0.30	0.050	5.7×10^{-5}
0.10	0.30	0.050	5.7×10^{-5}
0.10	0.30.	0.10	1.2×10^{-4}
0.050	0.40	0.20	3.1×10^{-4}

Based on the above data, rate law is :

- (A) $\left(\frac{dx}{dt}\right) = k[\text{CH}_3\text{COCH}_3][\text{Br}_2][\text{H}^+]$
 (B) $\left(\frac{dx}{dt}\right) = k[\text{CH}_3\text{COCH}_3][\text{H}^+]$
 (C) $\left(\frac{dx}{dt}\right) = k[\text{CH}_3\text{COCH}_3][\text{Br}_2]$
 (D) $\left(\frac{dx}{dt}\right) = k[\text{CH}_3\text{COCH}_3][\text{Br}_2][\text{H}^+]^2$

- 33.

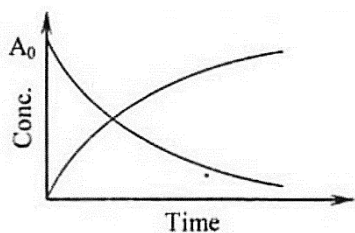


At the start pressure is 100 mm and after 10 min, pressure is 120 mm. Hence, rate constant (min^{-1}) is -

- (A) $\frac{2.303}{10} \log \frac{120}{100}$ (B) $\frac{2.303}{10} \log \frac{100}{20}$ (C) $\frac{2.303}{10} \log \frac{100}{80}$ (D) $\frac{2.303}{10} \log \frac{100}{120}$

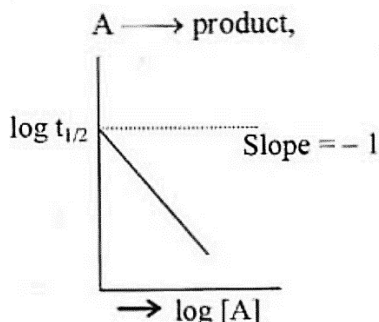
Rough work

34. At the point of intersection of the two curves shown, the concentration of B is given by. for, $A \rightarrow nB$:



- (A) $\frac{nA_0}{2}$ (B) $\frac{A_0}{n-1}$ (C) $\frac{nA_0}{n+1}$ (D) $\left(\frac{n-1}{n+1}\right) A_0$

35. The graph of $\log t_{1/2}$ v/s $\log [A]$ is given below for the reaction,



The rate law for the reaction is :

- (A) $-\frac{d[A]}{dt} = k$ (B) $-\frac{d[A]}{dt} = k[A]$ (C) $-\frac{d[A]}{dt} = k[A]^2$ (D) $-\frac{d[A]}{dt} = k[A]^3$

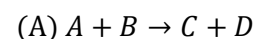
36. The rate law has the form $\text{rate} = K[A][B]^{3/2}$ can the reaction be elementary process

- (A) yes (B) no (C) may be yes or no (D) cannot be predicted

37. Match the following:

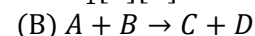
Column-I

Column-II



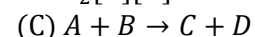
(P) Unit of rate constant possess concentration unit

$r = k_1[A][B]$



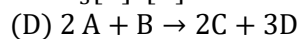
(Q) Rate constant for the reaction of both the reactants are equal

$r = k_2[A][B]^0$



(R) Rate of consumption of at least one of the reactants is equal to rate of production of at least one of the products

$r = k_3[A]^0[B]^0$



(S) If both reactants are taken in stoichiometric ratio, half life for both reactants are equal

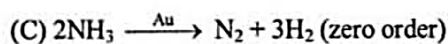
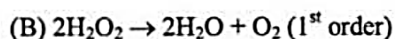
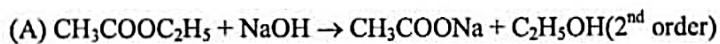
$r = k_3[A]^0[B]^0$

(T) Order of reaction is zero

Rough work

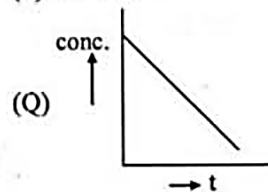
38.

Column I



Column II

(P) $k = Ae^{-\frac{E_a}{RT}}$

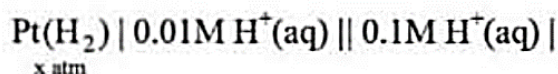


(R) $\text{Rate} = r_0 e^{-kt}$

(S) $t_{1/2}$ is constant w.r.t. to conc. of Reactant

39.

For the cell,



$$\text{Pt}(\text{H}_2) | \text{E}_{\text{cell}} = 0.00\text{V. Thus, } \left(\frac{x}{y}\right) \text{ is :}$$

y atm

(A) 100

(B) 10

(C) 0.01

(D) 0.1

40.

Consider the following cell reaction

At $[\text{Fe}^{2+}] = 1 \times 10^{-3}\text{M}$, $p_{\text{O}_2} = 0.1 \text{ atm}$ and $\text{pH} = 3$, the cell potential at 298 K is

(A) 1.47 V

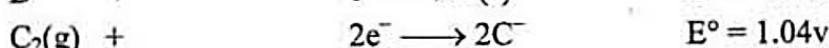
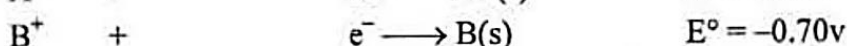
(B) 1.77 V

(C) 1.87 V

(D) 1.57 V

41.

Given



The incorrect statement among the following is

(A) $\text{C}_2(\text{g})$ will oxidize both A and B(B) A^{3+} will oxidize B(C) The reaction $6\text{C}^- + 2\text{A}^{3+} \longrightarrow 3\text{C}_2 + 2\text{A(s)}$ will be spontaneous.(D) The oxidizing power is in the order $\text{C}_2 > \text{A}^{3+} > \text{B}^+$

Rough work

42. **Statement-1:** Electrical conductivity of semi-conductors increases with increasing temperature.
Statement-2: With increase in temperature, number of electrons from the valence bond can jump to the conduction band in semi-conductor's.
 (A) Statement-1 is True, Statement- 2 is True; Statement-2 is a correct explanation for Statement-1.
 (B) Statement-1 is True, Statement- 2 is True; Statement- 2 is NOT a correct explanation for Statement-1.
 (C) Statement-1 is True, Statement-2 is False.
 (D) Statement-1 is False, Statement- 2 is True.
43. **Statement-1:** Molar conductivity increases with decrease in concentration for weak electrolytes.
Statement-2: No. of ions increases and no. of ions per unit volume decreases due to dilution.
 (A) Statement-1 is True, Statement- 2 is True; Statement-2 is a correct explanation for Statement-1.
 (B) Statement-1 is True, Statement- 2 is True; Statement- 2 is NOT a correct explanation for Statement-1.
 (C) Statement-1 is True, Statement- 2 is False.
 (D) Statement-1 is False, Statement- 2 is True.
44. The standard electrode potential of a metal-metal ion ($\text{Ag}|\text{Ag}^+$) and metal-sparingly soluble salt anion ($\text{Ag}|\text{AgCl}|\text{Cl}^-$) are related as -
 (A) $E^\circ_{\text{Ag}^+|\text{Ag}} = E^\circ_{\text{Cl}^-|\text{AgCl}|\text{Ag}} + \frac{RT}{F} \ln K_{sp}$
 (B) $E^\circ_{\text{Cl}^-|\text{AgCl}|\text{Ag}} = E^\circ_{\text{Ag}^+|\text{Ag}} + \frac{RT}{F} \ln K_{sp}$
 (C) $E^\circ_{\text{Cl}^-|\text{AgCl}|\text{Ag}} = E^\circ_{\text{Ag}^+|\text{Ag}} - \frac{RT}{F} \ln \frac{[\text{Cl}^-]}{K_{sp}}$
 (D) $E^\circ_{\text{Cl}^-|\text{AgCl}|\text{Ag}} = E^\circ_{\text{Ag}^+|\text{Ag}} - \frac{RT}{F} \ln \frac{K_{sp}}{[\text{Cl}^-]}$
45. The standard electrode potentials E° of the following half reactions are.
- | | E° (volt) |
|---|------------------|
| (i) $\text{MnO}_4^- + 8\text{H}^+ + 5\text{e}^- \longrightarrow \text{Mn}^{+2} + 4\text{H}_2\text{O}$ | 1.51 |
| (ii) $\text{Sn}^{+2} \longrightarrow \text{Sn}^{+4} + 2\text{e}^-$ | - 0.15 |
| (iii) $\text{Cr}_2\text{O}_7^{-2} + 14\text{H}^+ + 6\text{e}^- \longrightarrow 2\text{Cr}^{+3} + 7\text{H}_2\text{O}$ | 1.33 |
| (iv) $\text{Ce}^{+3} \longrightarrow \text{Ce}^{+4} + \text{e}^-$ | - 1.61 |
- The oxidizing power of the various species are related as :
- | | |
|---|---------------------------------------|
| (A) $\text{Cr}_2\text{O}_7^{-2} > \text{MnO}_4^-$ | (B) $\text{Ce}^{+4} > \text{Sn}^{+4}$ |
| (C) $\text{Ce}^{+4} > \text{MnO}_4^-$ | (D) $\text{MnO}_4^- > \text{Sn}^{+4}$ |

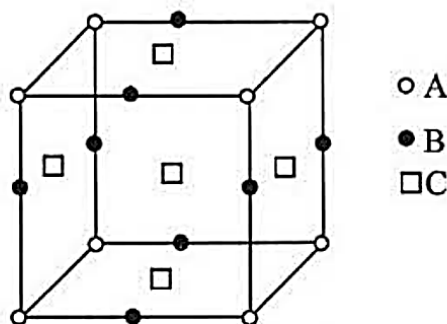
Rough work

46. Given : $E^\circ_{\text{Ag}^+|\text{Ag}} = 0.80\text{V}$; $E^\circ_{\text{Mg}^{2+}|\text{Mg}} = -2.73\text{V}$; $E^\circ_{\text{Cu}^{2+}|\text{Cu}} = 0.34\text{V}$; $E^\circ_{\text{Hg}^{2+}|\text{Hg}} = 0.79\text{V}$

Select the incorrect statements

- (A) AgNO_3 can be stored in copper vessel
 (B) $\text{Cu(NO}_3)_2$ can be stored in magnesium vessel
 (C) CuCl_2 can be stored in silver vessel
 (D) HgCl_2 can be stored in copper vessel

47. Given : The unit cell structure of compound is shown below:
 The formula of compound is:



- (A) $\text{A}_8\text{B}_{12}\text{C}_5$ (B) AB_2C_3 (C) $\text{A}_2\text{B}_2\text{C}_5$ (D) ABC_5

48. In a crystalline solid, atoms of X form fcc packing and the atoms of Y occupy all octahedral voids. If all the atoms along one body diagonal are removed then the simplest formula of the crystalline solid will be -
 (A) XY (B) X_4Y_3 (C) X_5Y_4 (D) X_4Y_5

49. Which of the following statement for crystal having Frenkel defect is not correct?

- (A) Frenkel defects are observed where the difference in sizes of cations and anions is large.
 (B) The density of crystals having Frenkel defect is less than that of a pure perfect crystal.
 (C) Anionic crystal having Frenkel defect may also contains Schottky defect.
 (D) Usually alkali halides do not have Frenkel defect.

50. A compound AB has rock salt structure where A is fcc packed and B is at edge centre and at centre of unit cell. The edge length is 115pm. The distance between two nearest atoms of A is :

- (A) 57.5pm (B) 81.3pm
 (C) 40.6pm (D) 89pm

51. Select the correct statement (s) :

- (A) Co-ordination no. of Cs^+ and Cl^- are 8,8 respectively in CsCl crystal
 (B) If radius ratio (r_c/r_a) < 0.225 then shape of compound must be linear

Rough work

(C) If radius ratio (r_c/r_a) is lie between 0.0414 to 0.732 then shape of ionic compound may be square planer (Ex. PtCl_4^{2-})

(D) If radius ratio is less than 0.155 then shape of compound is linear

52. The HCP and CCP structure for a given element would be expected to

- (A) The same co-ordination number
- (B) The same volume of unit cell
- (C) The same packing fraction
- (D) The same effective number of atoms per unit cell

53. Column I

- (A) Rhombohedral
- (B) Orthorhombic
- (C) Tetragonal
- (D) Hexagonal
- (A) A-P, B-S, C-Q, D-P
- (B) A-P, B-S, C-Q, D-R
- (C) A-R, B-Q, C-S, A-P
- (D) A-P, B-Q, C-S, D-P

Column II (Types of bravais lattice)

- (P) Primitive only
- (Q) Primitive and body centred only
- (R) Primitive and end centred only
- (S) Primitive, body centred, end centred and face centred

Directions (Ques. 54 - 55)

A non - volatile hydrocarbon has 5.6% hydrogen. When 3.0gm of hydrocarbon is dissolved in 100gm of benzene the relative lowering in vapour pressure of benzene is $1.306 \times 10^{-2} \text{Nm}^{-2}$

54. What is the molar mass of hydrocarbon?

- (A) 156.71
- (B) 176.83
- (C) 125.280
- (D) 135.5

55. Molecular formula of hydrocarbon is

- (A) C_7H_5
- (B) C_3H_2
- (C) $\text{C}_{14}\text{H}_{10}$
- (D) $\text{C}_{15}\text{H}_{10}$

56. Match the column :

Column-I

- (A) Elevation in boiling point
- (B) Depression in freezing point
- (C) Osmotic pressure
- (D) Vapour pressure of a liquid

Column-II

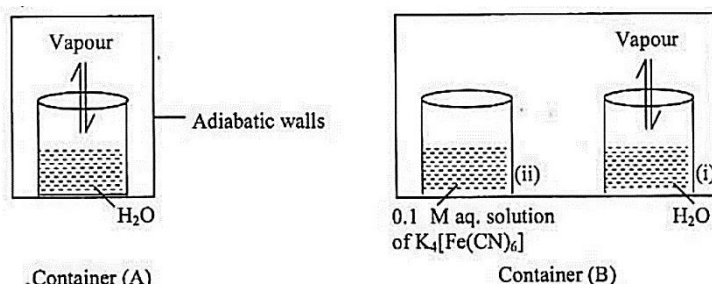
- (P) Used in molecular mass determination of polymers
- (Q) proportional to the molality of solution
- (R) Colligative property
- (S) Depends on the intermolecular force
- (T) NOT a colligative property

- (A) A-(P)(S),B-(Q)(R),C-(R),D-(Q)(R)
- (B) A-(Q)(R),B-(Q)(R),C-(P)(R),D-(S)(T)
- (C) A-(P)(R),B-(P)(R),C-(Q)(S),D-(P)
- (D) A-(S),B-(Q)(R),C-(P)(R),D-(T)

Rough work

57. **Column I**
- (A) Acetone + CHCl_3
 (B) $\text{C}_2\text{H}_5\text{OH} + \text{H}_2\text{O}$
 (C) $\text{CH}_3\text{OH} + \text{CCl}_4$
 (D) n-hexane + n-heptane
- Column II**
- (P) $\Delta S_{\text{mix}} > 0$
 (Q) $\Delta V_{\text{mix}} > 0$
 (R) $\Delta H_{\text{mix}} < 0$
 (S) $\Delta V_{\text{mix}} < 0$
 (T) Minimum boiling azeotropes
- (A) A-(P)(R)(S), B-(P)(Q)(T), C-(P)(Q)(T), D-(P)
 (B) A-(P)(R)(Q), B-(P)(Q)(T), C-(P)(Q)(T), D-(P)
 (C) A-(P)(R)(Q), B-(P)(S)(T), C-(P)(Q)(T), D-(P)
 (D) A-(P)(R)(S), B-(P)(Q)(T), C-(P)(Q)(T), D-(T)

Directions (58 & 59)



58. **If we create vacuum and maintain it in container A at 25°C then**
- (A) Water will be completely vaporized in the container A
 (B) There will be no vaporization in the container A
 (C) The equilibrium will establish in between water vapour and liq. H_2O and vapour pressure of water will remain same as it would be in presence of atmospheric pressure
 (D) The equilibrium in between $\text{H}_2\text{O}(\text{g})$ and $\text{H}_2\text{O}(\ell)$ will establish but vapour pressure of $\text{H}_2\text{O}(\text{g})$ will be more than as it would be in presence of atmospheric pressure
59. **Which of the following statement is correct regarding container B?**
- (A) water will migrate from Glass (i) to Glass (ii) and no equilibrium will establish
 (B) water will migrate from Glass (i) to Glass (ii) and equilibrium will establish after some time
 (C) water will not migrate to any side
 (D) water will migrate from Glass (ii) to Glass (i) and equilibrium will establish after some time
60. **Which one of the following statement is false ?**
- (A) Raoult's law states that vapour pressure of a component over a solution is proportional to its mole fraction in solution
 (B) The correct order of osmotic pressure for 0.01M aqueous solution of each component is

Rough work

$\text{CaCl}_2 > \text{NaCl} > \text{CH}_3\text{COOH} > \text{glucose}$.

(C) The osmotic pressure (π) of a solution is given by the relation $\pi = CRT$ where C is molarity of solution

(D) Two glucose solutions of same molality prepared in different solvents will have the same freezing point depression.

Rough work

Section-III (Mental ability)

61. Read the following information carefully to answer the question given below it
(a) 'A \$ B' means 'A is mother of B'.
(b) 'A # B' means 'A is father of B'.
(c) 'A @ B' means 'A is the husband of B'.
(d) 'A % B' means 'A is daughter of B'.
Which of the following expression indicates 'R is the sister of H'?
- (1) R \$ D @ F # H
(2) H % D @ F % R
(3) R % D @ F \$ D
(4) None
62. A's son B is married with C whose sister D is married to E, the brother of B. How D is related to A ?
- (1) Sister (2) Daughter-in-law
(3) Sister-in-law (4) Cousin
63. P started from his house towards west. After walking a distance of 25 m, he turned to the right and walked 10 m. He then again turned to the right and walked 15 m. After this he is to turn right at 135° and to cover 30 m. In which direction should he go?
- (1) West (2) South (3) South-West (4) South - East
64. If CIGARETTE is coded as GICERAETT, then DIRECTION will be coded as :
- (1) IRDCTIONE (2) NOIETCRID (3) RIDTCENOI (4) NORTECDII
65. What was the day on 2nd May 1976?
- (1) Monday (2) Saturday (3) Sunday (4) Tuesday
66. The number have been arranged under some rule. Based on that rule which number will come in place of the Question Mark?
- 1,1,2,6,24,?,720
- (1) 100 (2) 104
(3) 108 (4) 120
67. A clock is set right at 8am. The clock gains 10 minutes in 24 hours. What will be the true time when the clock indicates 1pm on the following day ?
- (1) 12 O'clock (2) 48 minutes past 12
(3) 42 minutes past 12 (4) None of these
68. At what angle the hands of a clock are inclined at 50 minutes past 5 ?
- (1) 125° (2) 130°
(3) 135° (4) 140°
69. How many leap years and ordinary years are there in the first 100 years ?
- (1) 25,75 (2) 23,77
(3) 24,76 (4) 26,74

Rough work

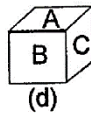
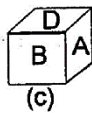
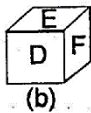
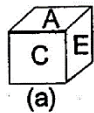
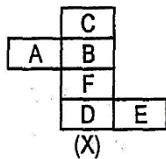
70. All the six faces of a cube are coloured with six different colours :- Black, Brown, Green, Red, White and Blue.

- (1) Red face is opposite to the black face.
- (2) Green face is between red and black faces.
- (3) Blue face is adjacent to white face.
- (4) Brown face is adjacent to blue face.
- (5) Red face is in the bottom.

Which of the following is adjacent to green ?

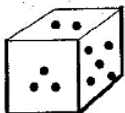
- (1) Black, White, Brown, Red
- (2) Blue, Black, Red, White
- (3) Red, Black, Blue, Brown
- (4) None of these

71. The figure (X) given in problem, is folded to form a cube. Choose from amongst the alternatives (1), (2), (3) and (4), the cubes that are similar to the cube formed.

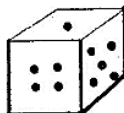


- (1) d only
- (2) b and d only
- (3) a and c only
- (4) c only

72. In the following question two positions of the same dice have been shown. You have to see these figures and select the number opposite to the number as asked in the question.



(i)



(ii)

Rough work

What is the number of dots on the face opposite to the face that contains 2 dots?

- (1) 1 (2) 3
(3) 4 (4) 6

73. A cube is coloured red on two opposite faces, blue on two adjacent faces and yellow on two remaining faces. It is then cut into two halves along the plane parallel to the red faces. One piece is then cut into four equal cubes and the other one into 32 equal cubes. How many cubes do not have any red face ?

- (1) 8 (2) 16
(3) 20 (4) 24

74. In the following question, choose the correct water-image of the figure (X) from amongst the four alternatives (1), (2), (3) and (4) given with it.



75. Direction:

- (i) There is a group of five persons - A, B, C, D and E.
(ii) One of them is a horticulturist, one is a physicist, one is a journalist, one is an industrialist and one is an advocate.
(iii) Three of them - A, C and advocate prefer tea over coffee and two of them - B and the journalist prefer coffee over tea.
(iv) The industrialist and D and A are friends to one another but two of them prefer coffee to tea.
(v) The horticulturist is C's brother.

Who is the horticulturist?

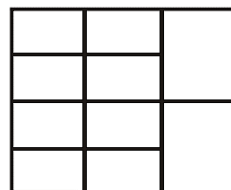
- (1) A (2) B
(3) C (4) D

76. In a certain code 15724 is written as QXFTB and 8369 is written as WRAP. How is 5376419 written in that code:

- (1) XFRAQBP (2) XRFABQP
(3) RFXABQP (4) XRFABPQ

77. How many rectangles (excluding squares) are there in the following figure?

- (1) 25 (2) 28
(3) 29 (4) 30



Rough work

78. **Direction :**
In the following question, two statements are given followed by four conclusions numbered I, II, III and IV. You have to take the given statements to be true even if they seem to be at variance from the commonly known facts and then decide which of the given conclusions logically follows from the given statements disregarding commonly known facts.
- Statements :** All aeroplanes are trains. Some trains are chairs.
- Conclusions :** I. Some aeroplanes are chairs.
II. Some chairs are aeroplanes.
III. Some chairs are trains.
IV. Some trains are aeroplanes.
(1) None follows (2) Only II and III follow
(3) Only I and III follow (4) Only III and IV follow
79. **Direction:**
In the following question, two statements are given followed by four conclusions numbered You have to take the given two statements to be true even if they seem to be at variance from commonly known facts. Read the conclusions and then decide which of the conclusions logically follows from the two given statements.
- Statements :** All roads are poles.
- Conclusions :** No pole is house.
I. Some roads are houses.
II. Some houses are poles.
(1) Only conclusion I follows
(2) Only conclusion II follows
(3) Either I or II follows
(4) Neither I nor II follows
80. Some boys are sitting in a line. Mahindra is on 17th place from left and Surendra is on 18th place from right. There are 8 boys in between them. How many boys are there in the line?
(1) 43 (2) 42
(3) 41 (4) 44
- Directions :** Read the following information and answer the questions given below:
A is the son of B. C, B's sister has a son D and a daughter E. F is the maternal uncle of D.
81. **How is A related to D ?**
(1) Cousin (2) Nephew
(3) Uncle (4) Brother
82. **How is E related to F ?**
(1) Sister (2) Daughter
(3) Niece (4) Wife
83. A clock is so placed that at 12 noon its minute hand points towards north-east. In which direction does its hour hand point at 1.30 p.m. ?

Rough work

- (1) North (2) South
(3) East (4) West

Directions : Read the following information carefully and answer the question given below it:

- (i) Eight persons E, F, G, H, I, J, K and L are seated around a square table two on each side.
(ii) There are three lady members and they are not seated next to each other.
(iii) J is between L and F.
(iv) G is between I and F.
(v) H, a lady member, is second to the left of J.
(vi) F, a male member is seated opposite E, a lady member.
(vii) There is a lady member between F and I.

84. Who among the following is seated between E and H :

- (1) F (2) I
(3) Cannot be determined (4) None of these

85. How many persons are seated between K and F :

- (1) One (2) Two
(3) Three (4) Cannot be determined

86. Who among the following are the three lady members :

- (1) E, G and J
(2) E, H and G
(3) G, H and J
(4) Cannot be determined

87. Who among the following is to the immediate left of F :

- (1) G (2) I
(3) J
(4) Cannot be determined

Directions : These questions consist of a number series which contains a wrong term. This term is given as one of the four alternatives among the four numbers given below. The wrong term is :

88. **89, 78, 86, 80, 85, 82, 83**

- (1) 83 (2) 82
(3) 86 (4) 78

89. **1, 1, 3, 9, 6, 36, 10, 100, 16, 225**

- (1) 225 (2) 16
(3) 10 (4) 9

Directions : Words in capital letters in column-I are written in small letters in a code language in column-II. Decode the Language and find out the correct alternative for the given word in each question.

Rough work

Column-I**Column-II**

HERO

tbfw

JOIN

bakp

LAZY

nsvg

MINE

pdk

PART

rwsx

SAURY

wveos

BLUE

eglt

CIGAR

vsqwp

WRIT

wpxy

VIRUS

pzwoe

QUACK

jqems

PIRL

wprg

90. Code for letters in the word TOIL are :

(1) pxba

(2) bpgn

(3) bpxg

(4) mpxg

91. Code for letters in the word COST are:

(1) boqx

(2) xqps

(3) qost

(4) xqnr

92. Code for letters in the word ULCER are:

(1) ggwmr

(2) teqwp

(3) ktegp

(4) gteqw

93. Code for letters in the word SINE are :

(1) ptkl

(2) toka

(3) ptok

(4) optb

94. Find the odd one out ?

(1) 488

(2) 929

(3) 776

(4) 667

95. Two buses start from the opposite points of a main road, 150 km apart. The first bus runs for 25 km and takes a right turn and then runs for 15 km. It, then turns left and runs for another 25 km and takes the direction back to reach the main road. In the meantime, due to the minor breakdown the other bus has run only 35 km along the main road. What would be the distance between the two buses at this point

(1) 65 km

(2) 80 km

(3) 75 km

(4) 85 km

Directions :

Rough work

A, B and C are playing a game. When they start, they have 46 points between the 3 of them. They play 3 games. A wins the first, C the second and B the third game. When A wins, he gets 3 points from B and 3 points from C. When B wins, his points double and he gets some of these points from A and some from C. When C wins, he gets 2 points from A and 4 points from B. After the 3 games, all three of them have the same points with each of them that they had started with.

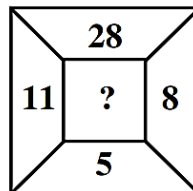
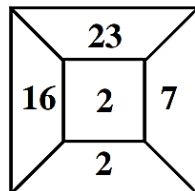
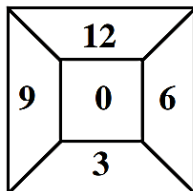
96. How many points did B start with ?

- (1) 12 (2) 16
(3) 14 (4) cannot be determined

97. When B wins, how many points does he get from C ?

- (1) 5 (2) 3 (3) either 3 or 4 (4) 4

98. Insert the missing character



- (1) 15 (2) 14 (3) 20 (4) 12

Directions :

In each of the following questions, the two rows of numbers are given. Resultant number in each row is to be worked out separately based on the following rules and the question below the row of numbers is to be answered. The operations of numbers progress from left to right.

Rules :

- (i) If an even number comes before a prime number, they are to be multiplied.
- (ii) If an even number comes before a composite odd number, odd number is to be subtracted from even number.
- (iii) If a composite odd number comes before a prime number, the first number is to be divided by the second number.
- (iv) If an odd number comes before an even number which is a perfect square, they are to be added.
- (v) If an odd number comes before another odd number they are to be added.

99. 36 21 5 16
27 3 16 5

What is the sum of the resultants of the two rows?

- (1) 25 (2) 24
(3) 125 (4) 81

100. 39 13 11 17
24 5 55 13

Rough work

What is the difference between the resultants of the two rows?

(1) 14

(2) 9

(3) 243

(4) 233

Rough work

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एस्पायर ने बरकरार रखी हिमाचल टॉपर देने की अपनी परंपरा

जेईई मेन्स परीक्षा में हिमाचल टॉपर के बाद नीट में भी दिया हिमाचल टॉपर

ड्रॉपर बैच के लिए एस्पायर संस्थान बना छात्रों की पहली पसंद, ड्रॉपर बैच के 125 छात्रों का चयन लगभग तय

शिमला: एस्पायर ने नीट व जेईई परीक्षा में टॉपर देने का मीलमिला जेईई मेन्स 2022 में फिमेल कैंटेगरी में हिमाचल टॉपर देने के बाद नीट 2022 परीक्षा परिणामों में भी कायम रखा। जेईई 2022 में एस्पायर की वाणी पराशर ने पूरे हिमाचल में फोमेल कैंटेगरी में पहला स्थान प्राप्त किया था और अब नीट 2022 परीक्षा परिणामों में एस्पायर की ही आदित्य राज शर्मा ने 720 में से 687 अंक प्राप्त कर हिमाचल में पहला स्थान प्राप्त किया है। एस्पायर संस्थान के निदेशक योगेंद्र कुमार मीणा ने आदित्य व उनके अभिभावकों को बधाई देते हुए कहा कि बच्चों की सफलता में संस्थान के शिक्षकों का योगदान के साथ इस सफलता का श्रेय बच्चों को महानतम उसका अभिभावकों को भी जाता है साथ-साथ बच्चों की सफलता में उन शिक्षकों का भी पूरा योगदान रहता है जिन्होंने बच्चों को प्रारंभिक शिक्षा प्रदान की है। नीट परीक्षा परिणामों में संस्थान के बच्चों ने बहुत बेहतर प्रदर्शन किया है। संस्थान के 13 बच्चों ने 600 से अधिक अंक प्राप्त किए हैं जिसमें आदित्य राज शर्मा ने 687 अंक प्राप्त किए और दिवेश शर्मा ने 651, पुलकित शाही ने 645, रिशु सज ने 640, राहोमा ने 640, निखिल ठाकुर ने 637, शिवम अत्री ने 635, सुमिन भादवाज ने 625, पिपुष मेहरा ने 624, मानिक खडवाल ने 622, निखिल राज ने 617, श्रेया शर्मा ने 610 व गगनदीप कपिल ने 603 अंक प्राप्त किए। 500 से अधिक अंक प्राप्त करने वाले बच्चों की संख्या 82 है। सभी कैंटेगरी में संस्थान के 130 से ज्यादा बच्चों का एम.बी.बी.एस. के लिए चयन होना संभावित है। संस्थान के निदेशक योगेंद्र कुमार मीणा ने सभी बच्चों को इस उपलब्धि पर बधाई दी उनके उत्कृष्ट भविष्य के लिए शुभकामनाएं दीं।



नीट 2022 में उतीर्ण छात्रों के साथ एस्पायर के अध्यक्ष गण जशन मनाते हुए

आर्थिक रूप से असह्य 20 बच्चों को एस्पायर मुहैया कराएगा नि.शुल्क रहन-सहन व शिक्षा: जेन ऑफ हिमाचल परीक्षा के माध्यम से 20 विद्यार्थियों का चयन "एस्पायर सुपर 20" बैच के लिए किया जाएगा और उन 20 बच्चों को एस्पायर संस्थान द्वारा एक वर्ष के लिए नि:शुल्क कॉर्चिंग के साथ-साथ होस्टल में नि:शुल्क रहन-सहन व खान-पान का प्रबंध भी किया जाएगा। इस बैच में प्रवेश पाने के लिए विद्यार्थियों को "जेन ऑफ हिमाचल" में बैठना अनिवार्य होगा। जेन ऑफ हिमाचल में अच्छा प्रदर्शन करने वाले बच्चों को दूसरे स्तर की परीक्षा के लिए आमंत्रित किया जाएगा। दूसरी परीक्षा में अच्छा प्रदर्शन करने वाले बच्चों को दस्तावेज सत्यापन व स्कॉलरशिप के लिए बुलाया जाएगा। दस्तावेज सत्यापन के पश्चात् "सुपर-20" बैच के लिए उतीर्ण बच्चों को सूची निकाली जाएगी। जो बच्चे अभी बाहरवीं कक्षा में पढ़ रहे हैं व 2023 में 12वीं कक्षा उतीर्ण करेंगे वे बच्चे इस बैच के लिए योग्य होंगे। इस परीक्षा के लिए विद्यार्थी 13 जुलाई से ऑनलाइन व ऑफलाइन आवेदन कर सकते हैं। ऑनलाइन आवेदन करने के लिए एस्पायर की वेबसाइट boh.aspireit.in पर जाकर विद्यार्थी अपना पंजीकरण सुनिश्चित कर सकते हैं। ऑफलाइन आवेदन के लिए विद्यार्थी शिमला विश्व एस्पायर संस्थान व उनका संस्थान में जाकर आवेदन कर सकते हैं।

NEET
हिमाचल
TOPPER
2022



687

AADITYA RAJ SHARMA
HILLGROVE PUB. SCH. SHIMLA

I am Aaditya Raj Sharma. I scored 687 in NEET 2022. I would like to give credit of my success to Aspire Institute. I will always cherish my time in Aspire and I would like to express my gratitude to everyone from Aspire Family.

JEE
हिमाचल
TOPPER
(Female)



99.7
PERCENTILE

VANI PARASHAR
HILLGROVE PUB. SCH. SHIMLA

I studied in Aspire from one year. My whole experience with this institution was great. I gained so much of knowledge and support from my teachers and Yogi sir. In my one year of journey my teachers were my motivators and guides. How to prepare for exam, what to prepare all was done with the help of Aspire Academy. I am sincerely thankful to each and every person of Aspire who helped me in my preparation and to achieve my goal.

(Divesh Sharma)



651

DIVESH SHARMA
DAV LAKKAR BAZAR, SHIMLA



645

PULKIT SHAHI
HILLGROVE. PUB.SCH. SHIMLA

I am Pulkit Shahi and I scored 645 marks in NEET 2022. I would like to give the credit to Aspire Institute for helping me turn my dreams into a reality. The faculty was always present to clear my doubts and solve problems. Even apart from studies the Academics are outstanding and I am definitely proud to be an Aspire alumni.

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21
OCT.2022

RESULT DECLARATION
OF ALL PARTICIPANTS