**1.** The correct statement about $ICl_5$ and $ICl_4^-$ is :
(1) $ICl_5$ is trigonal bipyramidal and $ICl_4^-$ is tetrahedral.
(2) $ICl_5$ is square pyramidal and $ICl_4^-$ is square planar.
(3) $ICl_5$ is square pyramidal and $ICl_4^-$ is tetrahedral.
(4) Both are isostructural.

**Sol.** **2**
$ICl_5$ $\sigma = 5$ lp = 1 $sp^3d^2$ square pyramidal
$ICl_4^-$ $\sigma = 4$ lp =2 $sp^3d^2$ square planer

**2.** The percentage composition of carbon by mole in methane is :
(1) 25% (2) 75% (3) 80% (4) 20%

**Sol.** **4**

$$\text{Mole \%} = \frac{1}{1+4} \times 100 = \frac{100}{5} = 20\%$$

**3.** The mond process is used for the :
(1) Extraction of Zn (2) Purificatiokn of Zr and Ti
(3) Purification of Ni (4) Extraction of Mo

**Sol.** **3**

$$\underset{\text{Impure}}{\text{Ni}} + 4\text{CO} \xrightarrow{\Delta} \underset{(g)}{\text{Ni(CO)}_4} \xrightarrow[\Delta]{T\uparrow} \underset{(s)}{\text{Ni}} + \underset{(g)}{\text{CO}}$$

Mond Proces

**4.** For the following reactions, equilibrium constants are given :
$S(s) + O_2(g) = SO_2(g)$ ; $K_1 = 10^{52}$
$2S(s) + 3O_2(g) = 2SO_3(g)$ ; $K_2 = 10^{128}$
The equilibrium constant for the reaction, $2SO_2(g) + O_2(g) = 2SO_3(g)$ is :
(1) $10^{77}$ (2) $10^{154}$ (3) $10^{25}$ (4) $10^{181}$

**Sol.** **3**
Reaction (1) × (–2) + reaction (2)
$= (k_1)^{-2} \times k_2$
$= 10^{-104} \times 10^{129}$
$= 10^{25}$

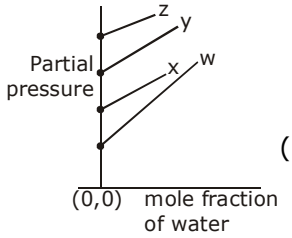
**5.** Fructose and glucose can be distinguished by :
(1) Benedict's test (2) Fehling's test (3) Seliwanoff's test (4) Barfoed's test

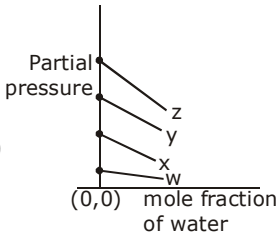
**Sol.** **3**
Barfoed's test $\rightarrow$ monosaccharides $Cu(CH_3Cu)_2 \rightarrow Cu_2O$

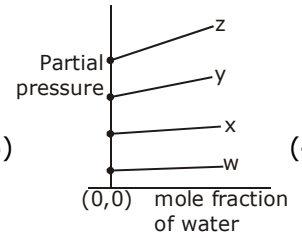
**6.** The ion that has $sp^3d^2$ hybridization for the central atom, is :
(1) $[BrF_2]^-$ (2) $[ICl_2]^-$ (3) $[ICl_4]^-$ (4) $[IF_6]^-$

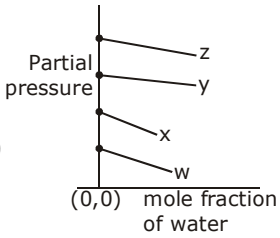
**Sol.** **3**
$[BrF_2]^-$ $\sigma = 2$ lp = 3 $sp^3d$
$[ICl_2]^-$ $\sigma = 2$ lp = 3 $sp^3d$
$[ICl_4]^-$ $\sigma = 4$ lp = 2 $sp^3d^2$
$[IF_6]^-$ $\sigma = 6$ lp = 1 $sp^3d^3$

**7.** For the solution of the gases w, x, y and z in water at 298 K, the Henrys law constants ($K_H$) are 0.5, 2, 35 and 40 kbar, respectively. the correct plot for the given data is :

(1) 


(2) 


(3) 

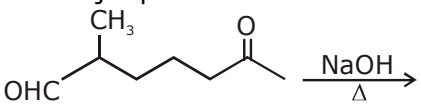

(4) 

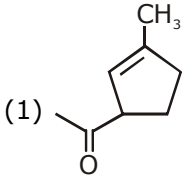

**Sol.** **2**

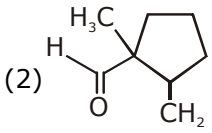
$P_x = K_H(x)\,[1-x_w]$

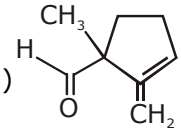
$p_y = K_H(y)\,[1-x_x]$

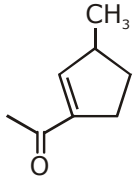
**8.** The major product obtained in the following reaction is :



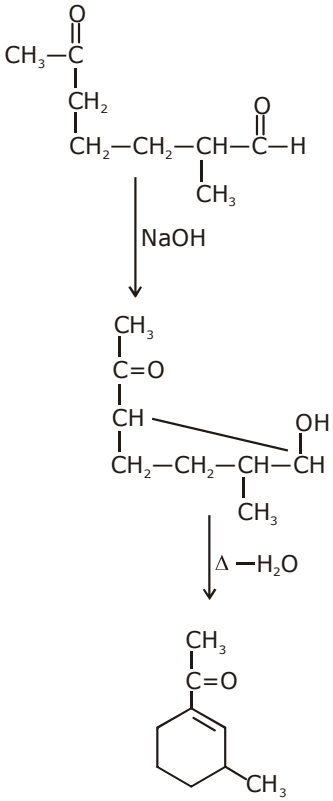

(1) 


(2) 


(3) 


(4) 


**Sol.** **4**

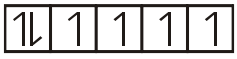


**9.** The calculated spin-only magnetic moments(BM) of the anionic and cationic species of $[Fe(H_2O)_6]_2$ and $[Fe(CN)_6]$, respectively, are :

(1) 2.84 and 5.92 (2) 0 and 5.92 (3) 4.9 and 0 (4) 0 and 4.9

**Sol.** **4**

$[Fe(H_2O)_6]_2$ given in question paper should be

$[Fe(H_2O)_6]^{2+}$ $Fe^{+2}$ $3d^6$  n = 4

weak field ligand $\mu = \sqrt{n(n+2)}$ BM

$= \sqrt{4(4+2)}$

$= \sqrt{35}$ BM

$= 4.9$

$[Fe(CN)_6]$ given in question paper should be

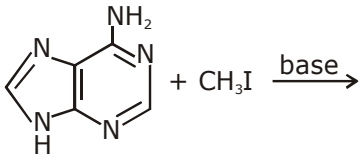
$\downarrow$

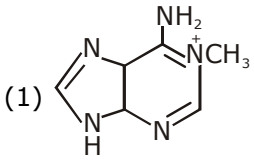
$[Fe(CN)_6]^{4-}$ $Fe^{+2}$ $3d^2$  n = 0

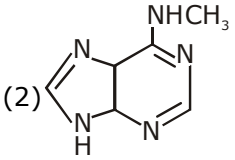
$\uparrow$

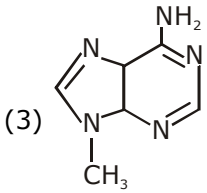
Strong field ligand $\mu = 0$

**10.** The major product in the follwoing reaction is :



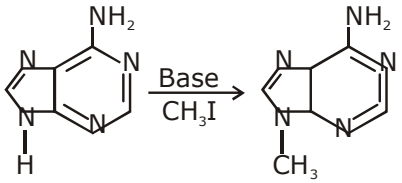
(1) 

(2) 

(3) 

(4) 

**Sol.** **3**

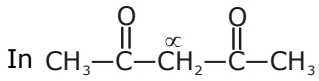


**11.** Which of the following compounds will show the maximum 'enol' content ?

(1) $CH_3COCH_2CONH_2$ (2) $CH_3COCH_2COCH_3$

(3) $CH_3COCH_2COOC_2H_5$ (4) $CH_3COCH_3$

**Sol.** **2**

In 

$\propto$ – is most acidic

**12.** 5 moles of an ideal gas at 100 K are allowed to undergo reversible compression till its temperature becomes 200 K. If $C_V$ = 28 J $K^{-1}$ $mol^{-1}$, calculate $\Delta U$ and $\Delta pV$ for this process. (R = 8.0 J $K^{-1}$ $mol^{-1}$)

(1) $\Delta U$ = 14J ; $\Delta(pV)$ = 0.8 kJ (2) $\Delta U$ = 14J ; $\Delta(pV)$ = 4 kJ

(3) $\Delta U$ = 14J ; $\Delta(pV)$ = 18 kJ (4) $\Delta U$ = 2.8 kJ ; $\Delta(pV)$ = 0.8 kJ

**Sol.** **2**

$\Delta u = 5 \times 28 \times 100$

$= 14000 = 14$ kJ

$\Delta(pV) = \Delta(nRT)$

$= 5 \times 8 \times 100 = 4000$ kJ $= 4$kJ

**13.** If p is the momentum of the fastest electron ejected from a metal surface after the irradiation of light having wavelength $\lambda$, then for 1.5 p momentum of the photoelectron, the wavelength of the light should be :

(Assume kinetic energy of ejected photoelectron to be very high in comparison to work function) :

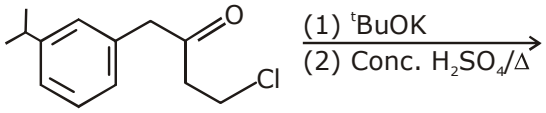
(1) $\frac{3}{4}\lambda$ (2) $\frac{2}{3}\lambda$ (3) $\frac{1}{2}\lambda$ (4) $\frac{4}{9}\lambda$

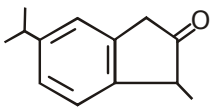
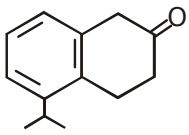
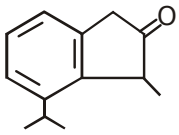
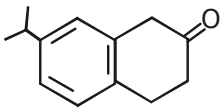
**Sol.** **4**

$$\frac{hc}{\lambda} = \phi + \frac{p^2}{2m} = \frac{hc}{x} = \phi + \frac{9P^2}{8m}$$

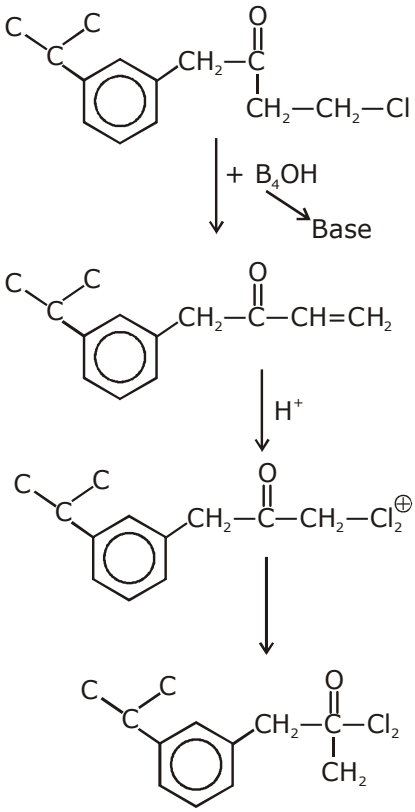
$$\frac{x}{\lambda} = \frac{1/2}{9/8} = \frac{4}{9} \Rightarrow x = 4/9\ \lambda$$

**14.** The major product of the following reaction is :




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

**Sol.** **4**




**15.** The covalent alkaline earth metal halide (X=Cl, Br, I) is :

(1) $BeX_2$ (2) $CaX_2$ (3) $SrX_2$ (4) $MgX_2$

**Sol.** **1**

Covalent character $\alpha$ polarisation

$\alpha$ charge on cation & anion

$\alpha$ size of anion

$$\alpha \frac{1}{\text{Size of cation}}$$

Order of covalnet character

$$\underset{\text{Size of cation}\uparrow \text{ Polarisation}\downarrow CC\downarrow}{BeX_2 > MgX_2 > CaX_2 > SrX_2}$$

**16.** Among the following molecules/ions,

$C_2^{2-}, N_2^{2-}, O_2^{2-}, O_2$

Which one is diamagnetic and has the shortest bond length ?

(1) $N_2^{2-}$ (2) $O_2^{2-}$ (3) $C_2^{2-}$ (4) $O_2$

**Sol.** **3**

$C_2^{2-}$ $14\ \sigma 2p_z^2$ $\frac{10-4}{2} = 3$ dia Bond length $\alpha \frac{1}{BO}$

$N_2^{2-}$ $16\ Ti^{*1}_{2Px=\Pi^{*}2P_4^1}$ $\frac{10-6}{2} = 2$ para

$O_2^{2-}$ $18\ \Pi^{*2}_{2P_x} = \Pi^{*2}_{2P_y}$ $\frac{10-8}{2} = 1$ dia

$O_2$ $16\ \Pi^{*1}_{2Px=\Pi^{*1}_2P_4}$ $\frac{10-6}{2} = 2$ Para

**17.** The IUPAC symbol for the element with atomic number 119 would be :
(1) uue (2) uun (3) une (4) unh

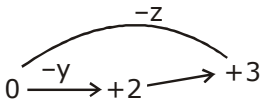
**Sol.** **1**
1 1 9
un un em
uue

**18.** Calculate the standard cell potential (in V) of the cell in which following reaction takes place :
$Fe^{2+}(aq) + Ag^{+}(aq) \rightarrow Fe^{3+}(aq) + Ag(s)$
Given that

$E^0_{Ag^+/Ag} = x\ V$ $E^0_{Fe^{2+}/Fe} = yV$ $E^0_{Fe^{3+}/Fe} = zV$

(1) x – z (2) x + 2y – 3z (3) x + y – z (4) x – y

**Sol.** **2**




$-3Z = -2y + \alpha$
$\alpha = 2y - 3z$
$E^o_{cell} = x + 2y - 3z$

**19.** The strength of 11.2 volume solution of $H_2O_2$ is : [Given that molar mass of H =1 g $mol^{-1}$ and O=16 g $mol^{-1}$]
(1) 3.4% (2) 13.6% (3) 1.7% (4) 34%

**Sol.** **1**
$M \times 11.2 = 11.2$

$M = 1\ mol/lit = \frac{\%w/V \times 10}{34} = 34\ g/lit$

%w/v = 3.4%

**20.** The compound that inhibits the growth of tumors is :
(1) cis-$[Pd(Cl)_2(NH_3)_2]$ (2) trans-$[Pd(Cl)_2(NH_3)_2]$
(3) trans-$[Pt(Cl)_2(NH_3)_2]$ (4) cis-$[Pt(Cl)_2(NH_3)_2]$

**Sol.** **4**
cis-platin cis–$[PtCl_2(NH_3)_2]$
used as a anticancer drug

**21.** The maximum prescribed concentration of copper in drinking water is :
(1) 0.5 ppm (2) 3 ppm (3) 5 ppm (4) 0.05 ppm

**Sol.** **2**

**22.** Which one of the following alkenes when treated with HCl yields majorly an anti Markovnikov product ?
(1) $Cl–CH=CH_2$ (2) $H_2N–CH=CH_2$ (3) $F_3C–CH=CH_2$ (4) $CH_3O–CH=CH_2$

**Sol.** **3**

$Cl—CH=CH_2 \xrightarrow{HCl} Cl—\overset{\oplus}{C}H—CH_2$ Cl=+m power (more stable)

$H_2N—CH=CH_2 \xrightarrow{HCl} N—\overset{\oplus}{C}H—CH_3$ $NH_2$ + m

$F_3C—CH=Cl_2 \xrightarrow{HCl} F_3C—CH_2—\overset{\oplus}{Cl_2}$ $CF_3$—-I power

Cl, $NH_2$ contain +M power but Cf is -I power

$Cl_3O—CH=CH_2 \xrightarrow{HCl} Cl_3O—\overset{\oplus}{C}H—CH_2$

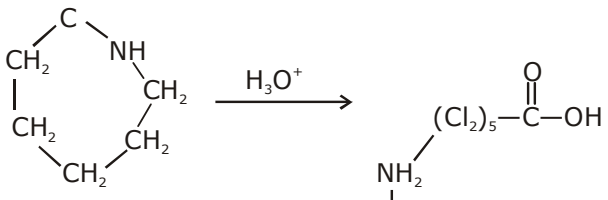
$OCH_3 \longrightarrow$ +M power

**23.** The structure of Nylon-6 is :

(1) $\left[-\overset{O}{\overset{\|}{C}}-(CH_2)_5-\overset{H}{N}-\right]_n$ (2) $\left[-(CH_2)_6-\overset{O}{\overset{\|}{C}}-\overset{H}{N}-\right]_n$

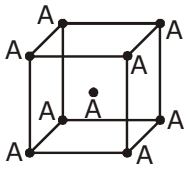
(3) $\left[-(CH_2)_4-\overset{O}{\overset{\|}{C}}-\overset{H}{N}-\right]_n$ (4) $\left[-\overset{O}{\overset{\|}{C}}-(CH_2)_6-\overset{H}{N}-\right]_n$

**Sol.** **1**

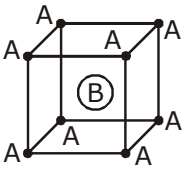



$\left[-NH-(CH_2)_5-C-\right]_n$

**24.** Consider the bcc unit cells of the solids 1 and 2 with the position of atoms as shown below. the radius of atom B is twice that of atom A. The unit cell edge length is 50% more in solid 2 than in 1. What is the approximate packing efficiency in solid 2 ?




**Solid 1**




**Solid 2**

(1) 65% (2) 45% (3) 75% (4) 90%

**Sol.** **4**

$$\frac{4}{3}\pi\frac{\times 2\times r_A^3}{a_1^3} = 68\%$$

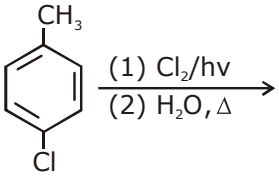
$$\frac{\frac{4}{3}\pi\left\{r_A^3+r_B^3\right\}}{a_2^3} = ??$$

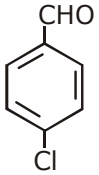
$$\frac{\left(r_A^3+r_B^3\right)}{2r_A^3}\left(\frac{a_1}{a_2}\right)^3 = \frac{x}{68}$$

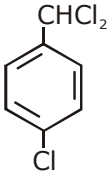
$$\frac{8}{27}\times\frac{1}{2}\left\{1+\left(\frac{r_B}{r_A}\right)^3\right\} = \frac{x}{68} = \frac{8\times 9}{27\times 2}$$

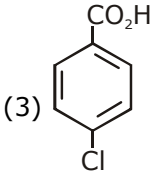
$$x = \frac{68\times 4}{3} = 90\%$$

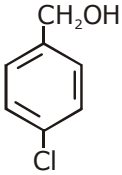
**25.** The major product of the following reaction is :




(1) 


(2) 


(3) 


(4) 

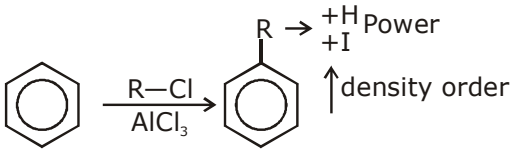

**Sol.** **1**

**26.** Polysubstitution is a major drawback in :

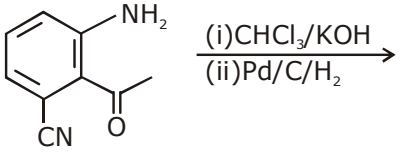
(1) Friedel Craft's alkylation (2) Reimer Teimann reaction

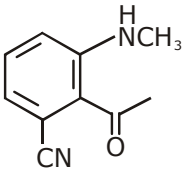
(3) Acetylation of aniline (4) Friedel Craft's acylation

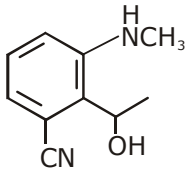
**Sol.** **1**

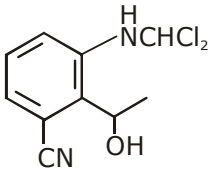


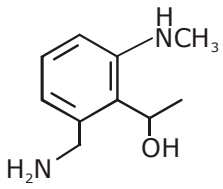

**27.** The major product obtained in the following reaction is :



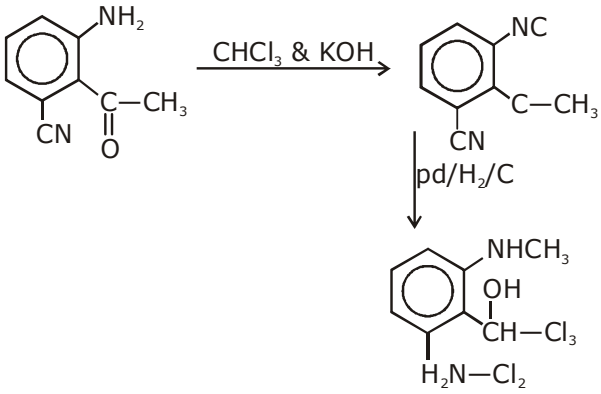

(1) 


(2) 


(3) 


(4) 


**Sol.** **4**




**28.** For a reaction schems $A \xrightarrow{k_1} B \xrightarrow{k_2} C$, if the rate of formation of B is set to be zero then the concentration of B is given by :

(1) $k_1k_2[A]$ (2) $\left(\frac{k_1}{k_2}\right)[A]$ (3) $(k_1-k_2)[A]$ (4) $(k_1 + k_2)[A]$

**Sol.** **2**

$K_1[A] - K_2[B] = 0$

$K_1[A] = K_2[B]$

$[B] = \frac{K_1}{K_2} \times [A]$ $[B] = \frac{K_1}{K_2} A$

**29.** The statement that is INCORRECT about the interstitial compounds is :
(1) they have high melting points (2) they are chemically reactive
(3) they have metallic conductivity (4) they are very hard

**Sol.** **2**
fact

**30.** 0.27 g of a long chain fatty acid was dissolved in 100 $cm^3$ of hexane. 10 mL of this solution was added dropwise to the surface of water in a round watch glass. Hexane evaporates and a mono-layer is formed. The distance from edge to centre of the watch glass is 10 cm. What is the height of the monolayer ?
[Density of fatty acid = 0.9 g $cm^{-3}$; $\pi = 3$ ]
(1) $10^{-4}$ m (2) $10^{-2}$ m (3) $10^{-8}$ m (4) $10^{-6}$ m

**Sol.** **4**

$\frac{0.27}{100} \times 10$ gm of fatty acid forms monolayer

$\therefore$ mass $= \pi R^2 h \times$ density

$$0.027 = 3 \times \left(\frac{10}{100}\right)^2 \times h \times \frac{0.9}{\left(10^{-2}\right)^3}$$

$h = (10^{-2})^3 = 10^{-6}$ m

# मोशन ने बनाया साधारण को असाधारण

# JEE Main Result Jan'19

## 4 RESIDENTIAL COACHING PROGRAM (DRONA) STUDENTS ABOVE 99.9 PERCENTILE





Total Students Above 99.9 percentile - **17**

Total Students Above 99 percentile - **282**

Total Students Above 95 percentile - **983**

% of Students Above 95 percentile $\frac{983}{3538} = 27.78\%$

### Scholarship on the Basis of 12th Class Result

| Marks PCM or PCB | Hindi State Board | State Eng OR CBSE |
|---|---|---|
| 70%-74% | 30% | 20% |
| 75%-79% | 35% | 25% |
| 80%-84% | 40% | 35% |
| 85%-87% | 50% | 40% |
| 88%-90% | 60% | 55% |
| 91%-92% | 70% | 65% |
| 93%-94% | 80% | 75% |
| 95% & Above | 90% | 85% |

**New Batches** for Class 11th to 12th pass
**17 April 2019 & 01 May 2019**

**हिन्दी माध्यम के लिए पृथक बैच**

### Scholarship on the Basis of JEE Main Percentile

| Score | JEE Mains Percentile | English Medium Scholarship | Hindi Medium Scholarship |
|---|---|---|---|
| 225 Above | Above 99 | Drona Free (Limited Seats) | |
| 190 to 224 | Above 97.5 To 99 | 100% | 100% |
| 180 to 190 | Aboev 97 To 97.5 | 90% | 90% |
| 170 to 179 | Above 96.5 To 97 | 80% | 80% |
| 160 to 169 | Above 96 To 96.5 | 60% | 60% |
| 140 to 159 | Above 95.5 To 96 | 55% | 55% |
| 74 to 139 | Above 95 To 95.5 | 50% | 50% |
| 66 to 73 | Above 93 To 95 | 40% | 40% |
| 50 to 65 | Above 90 To 93 | 30% | 35% |
| 35 to 49 | Above 85 To 90 | 25% | 30% |
| 20 to 34 | Above 80 To 85 | 20% | 25% |
| 15 to 19 | 75 To 80 | 10% | 15% |

**सैन्य कर्मियों के बच्चो के लिए 50% छात्रवृत्ति**

**प्री-मेडिकल में छात्राओं को 50% छात्रवृत्ति**