AITS FULL TEST-08

ANSWER KEY

PHYSICS

Q.1 (2)	**Q.2** (3)	**Q.3** (3)	**Q.4** (4)	**Q.5** (3)	**Q.6** (4)	**Q.7** (4)	**Q.8** (2)	**Q.9** (4)	**Q.10** (2)
Q.11 (3)	**Q.12** (4)	**Q.13** (3)	**Q.14** (3)	**Q.15** (3)	**Q.16** (1)	**Q.17** (1)	**Q.18** (4)	**Q.19** (3)	**Q.20** (1)
Q.21 (4)	**Q.22** (3)	**Q.23** (1)	**Q.24** (4)	**Q.25** (4)	**Q.26** (4)	**Q.27** (4)	**Q.28** (4)	**Q.29** (2)	**Q.30** (3)
Q.31 (1)	**Q.32** (1)	**Q.33** (1)	**Q.34** (3)	**Q.35** (4)	**Q.36** (4)	**Q.37** (2)	**Q.38** (4)	**Q.39** (2)	**Q.40** (3)
Q.41 (2)	**Q.42** (4)	**Q.43** (4)	**Q.44** (3)	**Q.45** (2)	**Q.46** (2)	**Q.47** (3)	**Q.48** (4)	**Q.49** (4)	**Q.50** (3)

CHEMISTRY

Q.51 (2)	**Q.52** (4)	**Q.53** (4)	**Q.54** (4)	**Q.55** (1)	**Q.56** (3)	**Q.57** (3)	**Q.58** (1)	**Q.59** (4)	**Q.60** (1)
Q.61 (4)	**Q.62** (2)	**Q.63** (2)	**Q.64** (4)	**Q.65** (3)	**Q.66** (4)	**Q.67** (1)	**Q.68** (2)	**Q.69** (1)	**Q.70** (2)
Q.71 (1)	**Q.72** (2)	**Q.73** (4)	**Q.74** (4)	**Q.75** (4)	**Q.76** (2)	**Q.77** (4)	**Q.78** (3)	**Q.79** (4)	**Q.80** (2)
Q.81 (3)	**Q.82** (2)	**Q.83** (1)	**Q.84** (1)	**Q.85** (1)	**Q.86** (1)	**Q.87** (4)	**Q.88** (4)	**Q.89** (1)	**Q.90** (1)
Q.91 (2)	**Q.92** (3)	**Q.93** (3)	**Q.94** (3)	**Q.95** (2)	**Q.96** (2)	**Q.97** (2)	**Q.98** (3)	**Q.99** (3)	**Q.100** (4)

BIOLOGY

Q.101 (4)	**Q.102** (4)	**Q.103** (1)	**Q.104** (2)	**Q.105** (3)	**Q.106** (4)	**Q.107** (3)	**Q.108** (2)	**Q.109** (2)	**Q.110** (1)
Q.111 (2)	**Q.112** (1)	**Q.113** (3)	**Q.114** (1)	**Q.115** (2)	**Q.116** (1)	**Q.117** (2)	**Q.118** (2)	**Q.119** (4)	**Q.120** (2)
Q.121 (3)	**Q.122** (3)	**Q.123** (4)	**Q.124** (3)	**Q.125** (1)	**Q.126** (3)	**Q.127** (2)	**Q.128** (4)	**Q.129** (3)	**Q.130** (3)
Q.131 (1)	**Q.132** (3)	**Q.133** (2)	**Q.134** (4)	**Q.135** (4)	**Q.136** (3)	**Q.137** (3)	**Q.138** (1)	**Q.139** (3)	**Q.140** (3)
Q.141 (2)	**Q.142** (3)	**Q.143** (2)	**Q.144** (3)	**Q.145** (4)	**Q.146** (2)	**Q.147** (4)	**Q.148** (2)	**Q.149** (1)	**Q.150** (3)
Q.151 (3)	**Q.152** (2)	**Q.153** (3)	**Q.154** (4)	**Q.155** (4)	**Q.156** (3)	**Q.157** (3)	**Q.158** (1)	**Q.159** (1)	**Q.160** (2)
Q.161 (2)	**Q.162** (2)	**Q.163** (4)	**Q.164** (3)	**Q.165** (1)	**Q.166** (2)	**Q.167** (3)	**Q.168** (4)	**Q.169** (2)	**Q.170** (2)
Q.171 (2)	**Q.172** (2)	**Q.173** (2)	**Q.174** (2)	**Q.175** (4)	**Q.176** (2)	**Q.177** (1)	**Q.178** (1)	**Q.179** (2)	**Q.180** (4)
Q.181 (1)	**Q.182** (1)	**Q.183** (1)	**Q.184** (1)	**Q.185** (1)	**Q.186** (3)	**Q.187** (3)	**Q.188** (3)	**Q.189** (2)	**Q.190** (1)
Q.191 (4)	**Q.192** (3)	**Q.193** (3)	**Q.194** (4)	**Q.195** (2)	**Q.196** (4)	**Q.197** (3)	**Q.198** (4)	**Q.199** (3)	**Q.200** (2)

PHYSICS
SECTION-A

Q.1 (2)
If the number less than I, the zero (s) on the right of decimal point and before the first non-zero digit are not significant.

Q.2 (3)
Smaller the least count, more accurate will be the result

$$(L.C.)_A = \frac{1mm}{100} = (L.C.)_B = \frac{1}{2}\frac{mm}{(70)} = \frac{1}{140}mm$$

$$(L.C.)_C = \frac{4\,mm}{3(100)} = \frac{1}{75}mm$$

$$(L.C.)_D = \frac{5}{6}\frac{mm}{(50)} = \frac{1}{60}\ mm$$

$\therefore$ Accuracy order : 8 > A > C > D

Q.3 (3)
Initial velocity of stone u = 12 m/sec downwards

$$\therefore \text{ displacement } h = ut + \frac{1}{2}gt^2$$

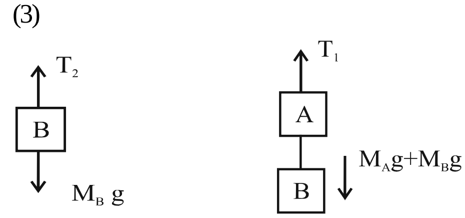
$$= 12 \times 10 + \frac{1}{2} \times 9.8 \times (10)^2 = 120 + 490 = 610\text{ m}$$

Q.4 (4)

$$T = \frac{2u\sin\theta}{g}\ ;\ H = \frac{u^2\sin^2\theta}{2g}\ ;\qquad \theta_A < \theta_B$$

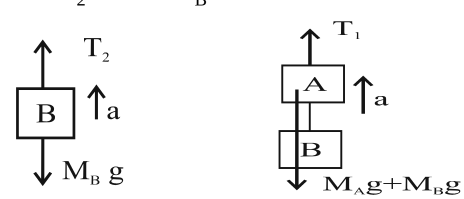
$$\Rightarrow \sin\theta_A < \sin\theta_B \Rightarrow T_A < T_B \Rightarrow \quad H_A < H_B$$

Q.5 (3)



$T_2 = M_Bg \qquad T_1 = M_Ag + M_Bg$

$$\frac{T_1}{T_2} = \frac{M_A + M_B}{M_B} = \alpha$$



$T_2 - M_Bg = M_Ba \qquad T_1 - (M_A + M_B)g = (M_A + M_B)a$
$T_2 = M_B(g + a) \qquad T_1 = (M_A + M_B)(g + a)$

$$\frac{T_1}{T_2} = \frac{M_A + M_B}{M_B} = \alpha$$

Q.6 (4)

$s = \frac{v^2}{2\mu_k g} = \frac{100\times100}{2\times0.5\times10} = \frac{100\times100}{5\times2} =$ 1000 m

Q. 7 (4)

$\omega_i = 0$ $\theta = 5\times2\pi \text{ rad} = 10\pi \text{ rad}$

$R = \frac{25}{\pi} m$ Δt = sec.

$\theta = \omega_i t + \frac{1}{2}\alpha t^2$

$10\pi = 0 + \frac{1}{2}\alpha (5)^2$

$\Rightarrow \alpha = \frac{4\pi}{5} \frac{rad}{s^2}$

$a_t = R\alpha = \frac{25}{\pi}\cdot\frac{(4\pi)}{5} = 20 m/s^2$

Q.8 (2)

$\Delta u = -\int F.dx$

$W = -\Delta u$

$= \int_0^5 F.dx = \int_0^5 (3x^2 - 2x + 7)dx$

$= \{x^3 - x^2 + 7x\}_0^5 = \{5^3 - 5^2 + 7(5)\} - 0 = 135J$

Q.9 (4)

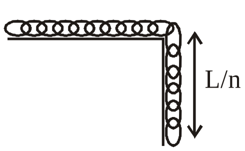
$K.E. - 3 = \vec{F}\cdot\vec{d}$

$K.E. = 3 + (3\hat{i} - 12\hat{j})\times(4\hat{i})$

$K.E. = 3 + 12 = 15 J$

Q.10 (2)

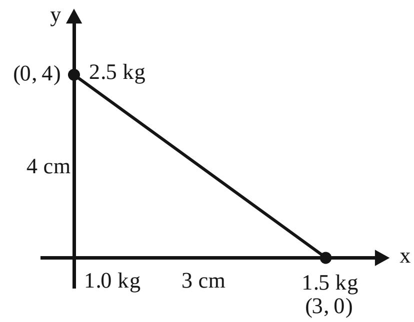
Mass of the hanging part $= \frac{M}{n}$



$h_{COM} = \frac{L}{2n}$

work done $W = mgh_{COM} = \left(\frac{M}{n}\right)g\left(\frac{L}{2n}\right) = \frac{MgL}{2n^2}$

Q.11 (3)



Let 1 kg as origin and x-y axis as shown

$x_{cm} = \frac{1(0)+1.5(3)+2.5(0)}{5} = 0.9cm$

$y_{cm} = \frac{1(0)+1.5(0)+2.5(4)}{5} = 2 cm$

Q.12 (4)

$I = 2m(\ell/\sqrt{2})^2 + m(\sqrt{2}\ell)^2 = 3m\ell^2$.

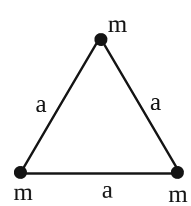
Q.13 (3)

$\frac{1}{2} I\omega^2 = mgh =$

$\frac{1}{2}\left(\frac{m\ell^2}{3}\right)\omega^2 = mgh$

$h = \frac{\omega^2\ell^2}{6g}$

Q.14 (3)



Work done $= -\Delta PE = PE_i - PE_F$

$= \left(\frac{Gmm}{a}\right)\times3 - \left(\frac{Gmm}{2a}\right)\times3 = \frac{3Gm^2}{2a}$

Q.15 (3)

v is maximum at mean position and a is maximum at extreme position and zero at mean position

Q.16 (1)

$v = \frac{\omega}{k} = \frac{8}{\frac{1}{4}} = 32 m/s$

Q.17 (1)

$$\lambda \propto \frac{1}{T}$$

$$\frac{T_S}{T_M} = \frac{\lambda_M}{\lambda_S} = \frac{10^{-4}}{0.5\times10^{-6}} = 200$$

Q.18 (4)

$$\frac{60-40}{7} = C\left(\frac{60+40}{2}-10\right)$$

$$\frac{40-x}{7} = C\left(\frac{40+x}{2}-10\right)$$

$$\Rightarrow x = 28$$

Q.19 (3)

Ideal gas equation ,

$PV = nRT$

$$n = \frac{PV}{RT}$$

$$\frac{N}{N_A} = \frac{PV}{RT}$$

$$N = \frac{PV}{\frac{R}{N_A}T} = \frac{PV}{kT}$$

Q.20 (1)

$$n_A = 1 - \frac{T_S}{T_A}$$

$$= 1 - \frac{400}{1000} = 0.6$$

$$n_B = 1 - \frac{400}{1100} = 0.69$$

$$\Rightarrow n_B > n_A$$

Q. 21 (4)

For a closed loop process, Total change in internal energy is zero.

Q.22 (3)

Force constant = Y × spacing

$$= 20\times10^{10}\frac{N}{m^2}\times4\times10^{-10}m$$

$$= 80\frac{N}{m} = 8\times10^{-9}\frac{N}{Å}$$

Q.23 (1)

$A_1V_1 = A_2V_2$

$$\Rightarrow V_2 = \left(\frac{A_1V_2}{A_2}\right) = \frac{2\times10^{-4}\times4}{10\times10^{-6}}$$

= 80 cm/s

Q.24 (4)

Velocity is less at points in contact with the surface of tube and maximum at the middle .

Q.25 (4)

No. of lines α majnitude of charge α |Q|

α |Q|

$\Rightarrow |Q_1| > |Q_2|$

According to Gausss Law,

$$\text{Net flux} = \frac{\text{Total chage enclosed}}{\varepsilon_0} = \frac{Q_1+Q_2}{\varepsilon_0}$$

Q. 26 (4)

| E | = |–Slope of v - x curve |

$$|E_1| = \frac{10}{2} = 5\ V/m$$

$$|E_2| = 0$$

$$|E_3| = \frac{5}{1} = 5V/m$$

$$|E_4| = \frac{15}{1} = 15V/m$$

$$E_4 > E_3 = E_1 > E_2$$

Q.27 (4)

$$E = \frac{-dV}{dx} = \frac{-d}{dx}(4x) = -4\,V/m$$

$$\text{Net Flux} = \frac{\text{Charge enclosed}}{\varepsilon_0}$$

Charge enclosed = Net flux × ε_0

Since Net flux through the closed cube is zero due to constant uniform electric field .

⇒ Charge = 0

Q.28 (4)

$$\text{Energy stored} = \frac{1}{2}CV^2 = \frac{1}{2}\frac{\epsilon_0 A}{d}V^2 = \frac{\epsilon_0 V^2 A}{2d}$$

Q.29 (2)

$$\text{Mobility} = \frac{V_d}{E} = \frac{\frac{eEt}{m}}{E} = \frac{et}{m}$$

∴ mobility is independent of E

Q.30 (3)

Current through 4Ω = $\frac{20}{4}$ = 5A

Q.31 (1)

$R = \frac{\rho\ell}{A} = \frac{2\times10^{-8}\times3{\cdot}14}{\pi(0.3^2-0.2^2)}$

$= 0.8\times10^{-6}\,\Omega$

Q.32 (1)

Current in the ring, $I = qf = q\frac{\omega}{2\pi}$

$B = \frac{\mu_0 I}{2r} = \frac{\mu_0}{2r}\times\frac{q\omega}{2\pi} = \frac{\mu_0}{4\pi}\left(\frac{q\omega}{r}\right)$

Q.33 (1)

$R = \frac{1}{B}\sqrt{\frac{2mV}{q}}$ so, $R \propto \sqrt{m}$

$\Rightarrow \frac{R_1}{R_2} = \sqrt{\frac{m_1}{m_2}} \Rightarrow \frac{2cm}{3cm} = \sqrt{\frac{m_A}{m_B}}$

$\Rightarrow \frac{m_A}{m_B} = \frac{4}{9}$

Q.34 (3)

$e = -\frac{d\phi}{dt} = -\frac{d(50t^2-10t+100)}{dt} = (100t-10)$

at t = 4 sec e = –(100 × 4 – 10) = –390 volt

Q.35 (4)

As there is no flux passing through coil: so there is no flux change.

Q.36 (4)

$I_{RMS} = 10A; V_{RMS} = 25V$

so, Power = $I_{RMS}\,V_{RMS}\cos\phi$

⇒ Power = 10 + 25 × cosϕ

⇒ Power = 250 cosϕ

⇒ Power = 250 cosϕ

as cosϕ ≤ 1

⇒ Power ≤ 250 W

Q.37 (2)

$\frac{1}{F} = \left[\frac{\mu_L}{\mu_S}-1\right]\left[\frac{1}{R_1}-\frac{1}{R_2}\right]$

If $\mu_L = \mu_S \Rightarrow \frac{1}{F} = 0 \Rightarrow F = \infty$

Q. 38 (4)

$m = \frac{f_0}{f_e}$; $f_0 = 150cm$

$\Rightarrow f_e = \frac{f_0}{m} = \frac{150}{30} = 5$ cm

Length of telescope

$l = f_0 - f_e = 150 - 5 = 145$ cm

Q.39 (2)

As parallel rays gets converge after reflection from a mirror, hence mirror is converging mirror.

Q.40 (3)

$I' = \frac{1}{2}\cos^2\theta = \frac{1}{6}$ or $\cos\theta = \frac{1}{\sqrt{3}}$

Q.41 (2)

$\lambda = \frac{h}{\sqrt{2mE}}$

$\lambda_2 = \frac{hc}{E}$

$\frac{\lambda_1}{\lambda_2} = \frac{1}{c}\left(\frac{E}{2m}\right)^{1/2}$

Q. 42 (4)

When electron jump from lower to higher energy level, energy absorbed so statement-I incorrect.

When electron jump from higher to lower energy level, energy of emitted photon

$E = E_2 - E_1$

$hf = E_2 - E_1 \Rightarrow f = \frac{E_2 - E_1}{h}$

So statement-II is correct.

Q.43 (4)

$V_n \propto \frac{Z}{n}$

$Z = 1, \therefore V_n \propto \frac{1}{n}$

$\therefore \frac{V_3}{V_7} = \frac{7}{3}$

$\therefore V_3 = \frac{7}{3}V_7$

$= \frac{7}{3}\times3.6\times10^6$ m / s

$= 8.4\times10^6$ m / s

Q.44 (3)

In option (3)

$_5Li^{11} + _1H^1 \rightarrow _4Be^9 + _2He^4$

mass is not conserved.

Q.45 (2)

Binding energy per nucleon is almost constant in the mass number range 30-170. This is because nuclear force is a short range force.

Q.46 (2)

The spectral range of visible light is 400nm to 800nm. The corresponding photon energy is 1.8eV to 3 eV . Thus for fabrication of LEDs , minimum band gap should be 1.8eV is almost the same . Thus the nuclear force is also almost equal which is not the case for smaller and larger nuclei.

Q.47 (3)

Based on theory.

Q.48 (4)

In intrinisc semi-conductor holes and electron are equal in concentration.

Q.49 (4)

$$\chi = \frac{1}{H}$$

$$1 = \frac{\text{Magnetic moment}}{\text{Volume}} = I = \frac{20\times10^{-6}}{10^{-6}} = 20N/m^2$$

$$= \chi = \frac{20}{60\times10^3} = \frac{1}{3}\times10^{-3} = 0.33\times10^{-3} = 3.3\times10^{-4}$$

Q.50 (3)

The orderly arrangement of different parts of EM wave in decreasing order of wavelength is as follows :

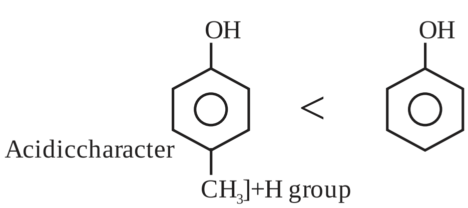
$$\lambda_{\text{radio waves}} > \lambda_{\text{micro waves}} > \lambda_{\text{visible}} > \lambda_{\text{X-rays}}$$

CHEMISTRY
SECTION-A

Q.51 (2)	**Q.52** (4)	**Q.53** (4)	**Q.54** (4)	**Q.55** (1)
Q.56 (3)	**Q.57** (3)	**Q.58** (1)	**Q.59** (4)	**Q.60** (1)
Q.61 (4)	**Q.62** (2)	**Q.63** (2)	**Q.64** (4)	**Q.65** (3)
Q.66 (4)				

Q.67 (1)

Both statements are true.



Q.68 (2)

Q.69 (1)

Assertion and Reason true and R is the correct explanation of A.

Q.70 (2)	**Q.71** (1)	**Q.72** (2)	**Q.73** (4)	**Q.74** (4)
Q.75 (4)	**Q.76** (2)	**Q.77** (4)	**Q.78** (3)	**Q.79** (4)
Q.80 (2)	**Q.81** (3)			

Q.82 (2)

$$K_2Cr_2O_7 \xrightarrow[\text{Heated}]{\text{Conc.}H_2SO_4} K_2SO_4 + Cr_2(SO_4)_3 + H_2O + O_2$$

Q.83 (1)

Q.84 (1)

$[Co(NH_3)_3Cl_3]$ does not give a precipitate with $AgNO_3$ solution because all the chloride ions are non-ionizable. $[Co(NH_3)_3Cl_3]$ does not ionise

Q.85 (1)

dsp^2 hyb. $\rightarrow$ square plannar geometry.

SECTION-B

Q.86 (1)	**Q.87** (4)	**Q.88** (4)	**Q.89** (1)

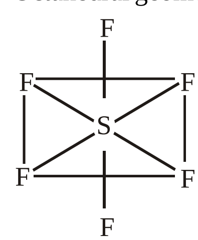
Q.90 (1)

$$SF_6 : H = \frac{1}{2}[6+6-0+0] = \frac{12}{2} = 6$$

sp^3d^2

↓

Octahedral geometry



Q.91 (2)	**Q.92** (3)	**Q.93** (3)	**Q.94** (3)	**Q.95** (2)
Q.96 (2)	**Q.97** (2)	**Q.98** (3)	**Q.99** (3)	**Q.100** (4)

BOTANY
SECTION - A

Q.101 (4)	**Q.102** (4)	**Q.103** (1)	**Q.104** (2)	**Q.105** (3)
Q.106 (4)	**Q.107** (3)	**Q.108** (2)	**Q.109** (2)	**Q.110** (1)
Q.111 (2)	**Q.112** (1)	**Q.113** (3)	**Q.114** (1)	**Q.115** (2)
Q.116 (1)				

Q.117 (2)

Ethylene synthesized from methionine.

Q.118 (2)

Q.119 (4)

Q.120 (2)

The transfer of pollen grains from the anther of a flower to the stigma of the same flower or another flower of the same plant is known as geitonogamy. It is functionally cross pollination by involving pollinating agent but genetically it is autogamy.

Q.121 (3) **Q.122** (3) **Q.123** (4) **Q.124** (3) **Q.125** (1)
Q.126 (3) **Q.127** (2) **Q.128** (4) **Q.129** (3) **Q.130** (3)
Q.131 (1) **Q.132** (3) **Q.133** (2) **Q.134** (4) **Q.135** (4)

SECTION - B

Q.136 (3) **Q.137** (3) **Q.138** (1) **Q.139** (3) **Q.140** (3)

Q.141 (2)
In the absence of any enzyme this reaction is very slow, with about 200 molecules of H_2CO_3 being formed in an hour. However, by using the enzyme present within the cytoplasm called carbonic anhydrase, the reaction speeds dramatically with about 600,000 molecules being formed every second. The enzyme has accelerated the reaction rate by about 10 million times.

Q.142 (3)
Q.143 (2)
Q.144 (3)
ATP synthesis occurs in. two steps of glycolysis which are
(i) Conversion of BPGA to PGA
(ii) Conversion of phosphoc=nol pyruvate to pyruvic acid.

Q.145 (4) **Q.146** (2) **Q.147** (4) **Q.148** (2) **Q.149** (1)
Q.150 (3)

ZOOLOGY

SECTION-A

Q.151 (3) **Q.152** (2) **Q.153** (3) **Q.154** (4) **Q.155** (4)
Q.156 (3) **Q.157** (3) **Q.158** (1)

Q.159 (1)
Electron micrographs of zygotene stage of prophase I of meiosis I indicate that chromosomes accompanied by the formation of complex structure called synaptonemal complex. During this stage chromosomes start pairing together (a process called synapsis).

Q.160 (2) **Q.161** (2) **Q.162** (2) **Q.163** (4) **Q.164** (3)
Q.165 (1) **Q.166** (2) **Q.167** (3) **Q.168** (4) **Q.169** (2)

Q.170 (2)
Yolk sac - site of formation of RBCs in initial stages of embryonic development.

Q.171 (2)
Q.172 (2)
Q.173 (2)
Phenotype of dihybrid cross in F_2 generation.
= Round yellow : Round green : Wrinkled yellow : Wrinkled green .
= 9 : 3 : 3 : 1
Hence, ratio of round green and wrinkled yellow
= 3:3
= 1:1

Q.174 (2) **Q.175** (4) **Q.176** (2) **Q.177** (1) **Q.178** (1)

Q.179 (2)
MALT is located within the lining of respiratory, digestive and urogenital tract.
After maturation, lymphocytes migrate to secondary lymphoid organs like spleen, lymph nodes, tonsils, Peyer's patches in small intestine and appendix.
MALT, present in the lining of respiratory, digestive and urogenital tract, constitutes around 50 percent of the lymphoid tissue in human body.

Q.180 (4)
Pectinase – *Aspergillus niger* and *Byssochlamys fulva*
Protease – *Mortirella renispora*, *Aspergillus* and *Bacillus* species

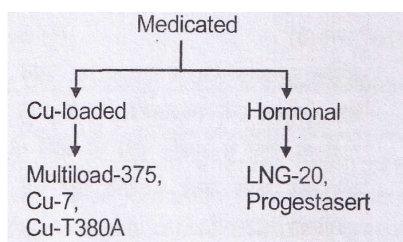
Q.181 (1) **Q.182** (1) **Q.183** (1) **Q.184** (1) **Q.185** (1)

SECTION-B

Q.186 (3)
Q.187 (3)
Q.188 (3)
Q.189 (2)
Here statement I is correct but statement II is incorrect.
II. The cytoskeleton in a cell are involved in many functions such as cell mechanical support, motility, maintenance of the shape of the cell.

Q.190 (1) **Q.191** (4) **Q.192** (3) **Q.193** (3) **Q.194** (4)
Q.195 (2)

Q.196 (4)
IUDs made up of stainless steel or polyethylene impregnated with barium sulphate.
IUDs are classified into two categorise-non medicated eg-Lippes loop and



Q.197 (3)
Overall masculine development occur in Klinefelter's syndrome.

Q.198 (4)
Q.199 (3)
Q.200 (2)
Rice is an important food grain. It were grown by the farmers of Dehradun. The diversity of rice in India is one of the richest in the world.