MC SQUARE EDUCATION PVT.LTD

PAPER-07

DATE-13/04/2017

NEET 2017 FINAL TEST SERIES

TOTAL MARK: 720

SR.NO	STUDENT NAME	CHEMISTRY		PHYSICS		BIOLOGY		TOTAL MARKS
1	ADWAIT GOKHALE	30	12	26	6	71	12	478
2	RUTUJA VETHEKAR	9	8	0	3	24	30	91
3	JOSHNA CHOUDHARI	3	6	5	2	55	17	227
4	VARUN BELORIA							
5	MAMTA RAJAWAT	5	7	2	4	31	36	105
6	AKSHATA SHINDE	2	3	1	2	28	30	89
7	RIDDHI RAUT	8	14	3	2	53	19	221
8	ARUNDHATI GOTEKAR	11	14	13	6	53	26	262
9	KOMAL SABBANI	13	8	6	8	44	25	211
10	SHREYA PAREKH	12	8	1	5	28	22	129
11	POOJA UPASE	3	6	6	4	47	29	185
12	ADITYA SASANE	12	4	7	1	56	18	277
13	RUTUJA SASANE	3	8	2	3	46	18	175
14	VIVEK RATHORE							
15	SONAM SINGH	6	10	0	0	38	23	143
16	WAJID RAY							
17	RUSHIKESH GHUTUGADE	5	9	2	1	42	27	159
18	SUMIT BORA	22	7	10	10	55	19	312
19	ROHAN PAWAR							
20	PAWAN KHAMKAR	22	16	0	0	44	34	214
21	SUMIT KAMBLE	10	7	4	3	39	26	176
22	SHIVANI SINGH							
23	VAIBHAV INGOLE	5	15	0	0	32	50	83
24	RENUKA KATTIMANI							
25	HARSHA SHINDE	11	14	4	10	51	23	217
26	PAYAL MANE	4	1	0	0	22	15	88
27	AMRUTA MULE	12	8	3	7	18	39	78
28	SHRUTI BARVE	18	9	20	2	55	14	347
29	SIMRAN GURUBAXANI	18	6	0	0	40	20	206
30	SAYALI JADHAV	10	4	10	9	59	14	289
31	AYUSHEE AGARWAL	6	3	5	2	38	33	158
32	ANKITA NIMMALWAR	5	17	5	7	58	23	225
33	SNEHA LOKHANDE	7	12	0	3	45	30	163
34	NEHA CHAVAN							
35	HIMALI CHOUDHARI	7	16	5	14	17	60	26
36	SUMIT SAWANT	13	19	21	15	49	27	271
37	MANALI UBHEDAL							
38	ANAM PANSARE							
39	PURVA SHEDGE	17	18	15	16	71	17	361
40	ANJALI SOLANKE							
41	AISHWARIYA NALANAGLU	5	4	0	0	53	17	211
42	AKASHA SANER							
43	SHUBHAM MANE							
44	AMRUTA BHOSALE	7	5	0	3	39	11	165
45	MANASI KASHID	7	5	3	2	27	21	120
46	HARSHADA JADHAV	4	9	3	4	27	31	92
47	RUSHIKESH AWATE	11	25	6	9	26	45	93
48	DIPALI GAIKWAD	7	5	0	0	26	17	110
49	PRITI BIRADAR	7	6	2	4	48	19	199
50	SHEFALI RATHOD	2	6	12	6	46	28	200
51	AISHWARYA BORHADE	3	3	1	3	27	23	95
52	NADEEM SHIKALGAR	8	32	9	28	13	63	-3
53	RASHMI GAIKWAD							
54	YASH RAGHUWANSHI							
55	AVINASH CHENDAKE							
56	RUTUJA GHUTUGADE	11	16	5	10	29	38	116
57	NIRAJ PATIL							
58	KETAN MORE							
59	MADHAVI KATRE	11	14	3	10	40	39	153
60	KETAKI SHINDE	2	9	3	5	45	34	152
61	SONAM BENDRE	2	10	4	1	36	32	125
62	AKASH BAGADE							
63	RAHUL DESHOTWOD							
64	ASHWINI PATEL							
65	KANCHAN JAISWAL	7	15	8	11	32	49	113
66	SAMRAGGI HATI	5	3	6	2	35	30	149
67	SONAL KAMBLE	10	11	1	6	29	34	109
68	PRANALI GAIKWAD							
69	VIJAYA DHUMAL	13	7	15	1	62	6	346
70	DIPTI GURAV	21	8	23	4	52	16	356
71	AKASH BHISE							
72	SHABNAM BANU	5	5	0	2	44	26	163
73	AMRITESH							
74	DARSHANA V H							
75	AISHWARYA PATIL	17	13	5	1	43	30	216
76	DEVIKA CHANDRAKANT	3	3	4	4	22	20	89
77								

NEET
TEST-7-SOLUTIONS

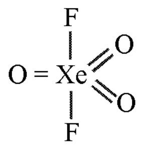
STANDARD ANSWER KEY											
Q	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
A	C	B	B	D	B	C	C	A	C	B	C
Q	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**
A	A	D	A	B	B	A	C	A	D	D	B
Q	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**
A	B	A	C	A	B	C	B	B	B	A	A
Q	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**
A	A	B	C	D	C	D	C	C	D	A	D
Q	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**
A	C	B	D	B	B	C	D	D	B	B	A
Q	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**
A	D	B	C	B	A	A	A	B	C	A	A
Q	**67**	**68**	**69**	**70**	**71**	**72**	**73**	**74**	**75**	**76**	**77**
A	A	B	A	B	A	A	B	B	D	C	A
Q	**78**	**79**	**80**	**81**	**82**	**83**	**84**	**85**	**86**	**87**	**88**
A	B	A	D	A	C	B	C	B	B	B	C
Q	**89**	**90**	**91**	**92**	**93**	**94**	**95**	**96**	**97**	**98**	**99**
A	A	C	D	A	D	B	B	A	A	D	C
Q	**100**	**101**	**102**	**103**	**104**	**105**	**106**	**107**	**108**	**109**	**110**
A	D	D	B	B	D	D	D	C	A	B	D
Q	**111**	**112**	**113**	**114**	**115**	**116**	**117**	**118**	**119**	**120**	**121**
A	C	B	D	C	D	B	A	D	C	B	D
Q	**122**	**123**	**124**	**125**	**126**	**127**	**128**	**129**	**130**	**131**	**132**
A	C	D	A	D	B	C	C	B	D	B	C
Q	**133**	**134**	**135**	**136**	**137**	**138**	**139**	**140**	**141**	**142**	**143**
A	C	A	B	D	B	C	A	B	D	A	B
Q	**144**	**145**	**146**	**147**	**148**	**149**	**150**	**151**	**152**	**153**	**154**
A	A	C	D	C	C	C	A	C	D	A	B
Q	**155**	**156**	**157**	**158**	**159**	**160**	**161**	**162**	**163**	**164**	**165**
A	A	C	B	A	C	C	C	D	C	C	D
Q	**166**	**167**	**168**	**169**	**170**	**171**	**172**	**173**	**174**	**175**	**176**
A	A	B	C	B	C	C	D	D	C	A	B
Q	**177**	**178**	**179**	**180**							
A	C	B	B	C							

(1) **(C).** The noble gases are almost exclusively nonreactive and include all the inert gases on the far right of the periodic table (with full valence electron shells): He, Ne, Ar, Kr, Xe, and Rn. Many of the incorrect answer have either incomplete lists or include gases that are not noble gases on the list.

(2) **(B).** The oxidation number of a metal in a coordination compound is found by balancing the charge of the entire complex with the ligands and the metal. Neutral ligands do not affect the overall charge (H_2O, NH_3), whereas anionic ligands (Cl^-, CN^-) contribute a charge equal to that of the free anion (–1 for chloride and cyanide). Thus, the other oxidation numbers are: choice (A) Cu (II), choice (C) Fe (II), choice (D) Cr (II).

(3) **(B).** Tincture of iodine is an aqueous solution of I_2 in KI.

(4) **(D).** The structure of XeO_3F_2



No. of lone pair of Xe = 0 and no. of bond pair = 5
Hybridisation of Xe = sp^3d
Hence, shape of XeO_3F_2 should be trigonal bipyramidal and not octahedral.

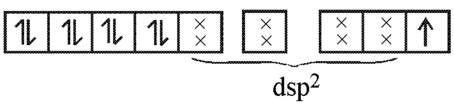
(5) **(B).** The constituents of Misch metal is approximately 50% cerium and 25% lanthanum with small amounts of neodymium and praseodymium.

(6) **(C).** The complex $PtCl_4.5NH_3$ is designated as $[Pt(NH_3)_5Cl]Cl_3$ which ionizes to $[Pt(NH_3)_5Cl]^{3+} + 3Cl^-$ ions. Thus total ions produced are four but three moles of AgCl are produced from $3Cl^-$ ions with $AgNO_3$.

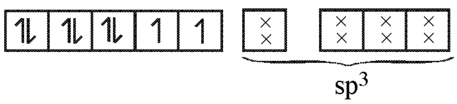
(7) **(C).** $XePtF_6$ was first real compound of any of the noble gases.

(8) **(A).** As in complex $[Co(NH_3)_5Cl]^{2+}$ unpaired electrons are present, so it requires less energy for excitation. Thus, the wavelength of light absorbed will be highest (i.e., $E \propto 1/\lambda$).

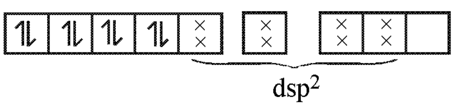
(9) **(C).** $[Cu(NH_3)_4]^{2+}$:



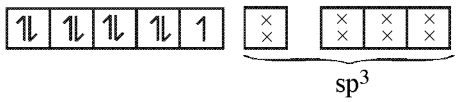
No. of unpaired electrons = 1
So, $[Cu(NH_3)_4]^{2+}$ is paramagnetic.
$[NiCl_4]^{2-}$:



No. of unpaired electrons = 2
So, $[NiCl_4]^{2-}$ is paramagnetic.
$[PtCl_4]^{2-}$:



No. of unpaired electrons = 0
So, $[PtCl_4]^{2-}$ is diamagnetic.
$[Cu(H_2O)_4]^{2+}$:



No. of unpaired electrons = 1
So, $[Cu(H_2O)_4]^{2+}$ is paramagnetic.

(10) (B)
(11) (C)
(12) (A)
(13) (D)
(14) (A)
(15) (B)

(16) **(B).** When the complex dissolved in water, it gives three ions, which shows that two Cl^- ions are present outside the coordination sphere.
∴ The formula of the complex is

$$[Co(NH_3)_5Cl]Cl_2 \xrightarrow{\text{Water}} \underbrace{[Co(NH_3)_5Cl]^{2+} + 2Cl^-}_{3\text{ ion}}$$

(17) **(A).** Nickel oxide is reduced by water gas to obtain the metal. Other oxides are reduced by other reducing agent.

$$ZnO + C \xrightarrow{\Delta} Zn + CO$$

$$WO_3 + 3H_2 \xrightarrow{\Delta} W + 3H_2O$$

$$Fe_2O_3 + 3CO \xrightarrow{\Delta} 2Fe + 3CO_2$$

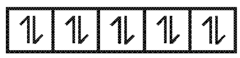
$$2NiO + \underbrace{CO + H_2}_{\text{Water gas}} \longrightarrow 2Ni + CO_2 + H_2O$$

(18) **(C).**

Mineral	Formula
Galena	PbS
Cerussite	$PbCO_3$
Cassiterite	SnO_2
Anglesite	$PbSO_4$

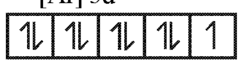
Thus, cassiterite (tin stone) is a mineral for tin.

(19) **(A).**
(A) $Cu^+ = [Ar]\,3d^{10}$



(One unpaired electron is present, so it is coloured)
$Zn^{2+} = [Ar]\,3d^{10}$
(No unpaired electrons, so it is colourless)

(B) $Cu^{2+} = [Ar]\,3d^9$



(One unpaired electron is present, so it is coloured)
Zn^{2+} is colourless.

(C) The colour of Fe^{2+} is green while that of Fe^{3+} is blue.

(D) MnO_4^- contains no unpaired electrons, however, it is coloured due to charge transfer. Thus, only statement given in option (A) is correct.

(20) **(D).** Ferric salts (such as $FeCl_3$) form Prussian blue (blue ppt or colouration) with potassium ferrocyanide.
$4FeCl_3 + 3K_4[Fe(CN)_6] \rightarrow \underset{\text{Prussian blue (ferric ferrocyanide)}}{Fe_4[Fe(CN)_6]_3} + 12\,KCl$

(21) **(D).**
(A) $Cr_2O_3 + 2Al \rightarrow \overset{+3}{Al_2O_3} + 2Cr$
(B) $2PbS + 3O_2 \rightarrow 2PbO + 2SO_2$
$PbS + 2PbO \rightarrow 3Pb + SO_2$ (self reduction)
$PbO + C \rightarrow Pb + CO$ (carbon reduction)
(C) $4\,Au(s) + 8CN^-(aq) + 2H_2O(aq) + O_2(g)$
$\rightarrow 4\,[Au\,(CN)_2]^-(aq) + 4OH^-(aq)$ - leaching
$2\,[Au\,(CN)_2]^-(aq) + Zn\,(s) \rightarrow 2Au\,(s) + [Zn\,(CN)_4]^{2-}(aq)$ - reduction
(D) It is molten mixture of alumina and cryolite.

(22) **(B).** Chalcopyrite is $CuFeS_2$ which contains both copper and iron.
Sphalerite or Zinc blende = ZnS ;
$2ZnS + 3O_2 \rightarrow 2ZnO + 2SO_2$ (roasting)
$ZnO + C \rightarrow Zn + CO$ (carbon reduction)
Argentite = Ag_2S
Cassiterite = SnO_2
$SnO_2^+ + 2C \rightarrow Sn + 2CO$ (carbon reduction)

(23) **(B).** $P_4\,(\text{white}) + 3NaOH\,(aq) + 3H_2O\,(\ell)$
$\rightarrow PH_3 + 3NaH_2PO_2$
$\ddot{P}H_3$ is a weaker base than NH_3.

(24) **(A).**

(25) **(C).** MaBCD – Square planar complex show 3 geometrical isomers.

(26) **(A).** Hoop's process is used to refine aluminium while fractional distillation is used to refine zinc metal (as it is easily volatile).

(27) **(B).** With progressive increase in atomic number, the reduction potential of halogens decreases, thus oxidising power also decreases, Hence, a halogen with lower atomic number will oxidise the halide ion of higher atomic number and therefore, will liberate them from their salt solution. Hence, the reaction
$Cl_2 + 2F^- \rightarrow 2Cl^- + F_2$ is not possible.

(28) **(C).** $2Al + 2NaOH + 2H_2O \rightarrow \underset{\text{Sodium meta aluminate}}{2NaAlO_2} + 3H_2$
Sodium meta aluminate, thus formed, is soluble in water and changes into the $[Al(H_2O)_2(OH)_4]^-$, in which co-ordination number of Al is 6.

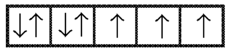
(29) **(B).** Zn^{+2} forms coordination compound with NaOH to give $Na_2[Zn(OH)_4]$ and with ammonia it gives $[Zn(NH_3)_4]^{2+}$ while Aluminium only forms complex with NaOH to give $Na[Al(OH)_4]$

(30) **(B).** Ozone is not stable at high temperature. It decomposes to give $2O_3 \rightarrow 3O_2$. Hence, the reverse reaction is non spontaneous at high temperature.

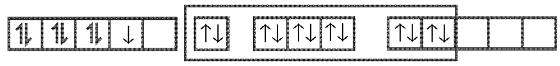
(31) **(B).** The extent of Lanthanoid Contraction (≈ 1.4 pm) which is almost similar to actinoid contraction (≈ 17 pm)

(32) **(A).** $H[AuCl_4]$ Tetrachloridoaurate (III)

(33) **(A).** In $[Co(NH_3)_6]^{+2} \rightarrow Co^{+2}$ - $4s^0\,3d^7$
Electronic configuration - $_{18}Ar$



$[Co(NH_3)_6]^{+2}\,[_{18}Ar]$:



sp^3d^2

(34) **(A).** Fe^{+2} is d^6 system with 4 unpaired electrons.
CO^{+2} is d^7 system with 3 unpaired electrons.
Cr^{+3} is d^3 system with 3 unpaired electrons.
Ni^{+2} is d^8 system with 2 unpaired electrons.
Hence Fe^{+2} has highest magnetic moment.

(35) **(B).** Ligand is one which has an unshared pair of electrons.

(36) **(C).**

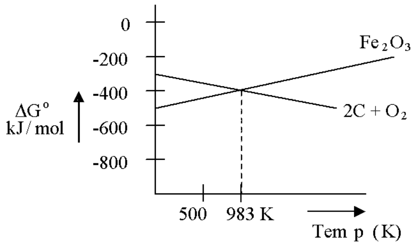
(37) **(D).** The group 18 elements have completely filled subshells. They are diamagnetic.
They are He, Ne, Ar, Kr & Xe.

(38) **(C).** $HO\text{–}SO_2\text{–}OH + 2PCl_5 \rightarrow SO_2Cl_2 + 2POCl_3 + 2HCl$

(39) **(D).**

(40) **(C).** Pure phosphine is non inflameable. It catches fire when heated to 423 K.

(41) **(C).**



Below 983 K, conversion of Iron to ferric oxide is more favourable.

(42) **(D).** $_{25}Mn\ 3d^5\,.\,4s^2$
$Mn^{4+}\ 3d^3\,.\,4s^0$
$= \sqrt{3\,(3+2)} = \sqrt{15}$

(43) **(A).** IUPAC name of $[Co(NH_3)_4Cl_2]Cl$ is tetraammine dichloro cobalt (III) chloride.

(44) **(D).** A ligand donates a pair of electrons. Therefore it is a Lewis base.

(45) **(C).** In transition series paramagnetism first increases due to increase in the number of unpaired electrons.
Beyond chromium number of unpaired electrons decreases. So paramagnetism decreases.

(46) **(B).** Unthinking application of the first right-hand rule would indicate the answer should be (A). However, you must remember that the charge on the electron is negative. Therefore, any result you get with the righthand rule applied to an electron must be reversed. Choices (C) and (D) can be eliminated because both of these choices set the magnetic field parallel or antiparallel to the force. Recall that for the Lorentz force to work, velocity, magnetic field, and force must all have mutually perpendicular components.

(47) **(D).** As pendulum A swings through the magnetic field, eddy currents are established in the copper. These currents flow through a material with some finite resistance. Therefore, some energy is used to heat the copper. The source of this energy is the kinetic energy-of the pendulum as it moves. Thus, there is a reduction in the energy of pendulum A that is not present in pendulum B. This means pendulum A will stop before pendulum B.

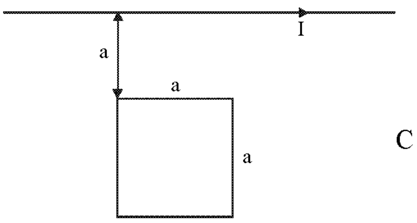
(48) **(B).** As the bar moves through the field, the charge carriers in the bar experience a Lorentz force that tends to deflect them to one end. This results in an electric field being established in the bar. When the electric repulsion from the charge separation has a magnitude equal to the Lorentz force, no more charge carriers will flow. This condition will give an estimate of the potential difference between the ends. Mathematically, your reasoning should be as follows:

$F_E = F_M$; $Eq = qvB$; $E = vB$

But, since we know that $E \approx V/\ell$, we arrive at choice (B) after substituting.

(49) **(B).** By the first right-hand rule, the force on a positive charge is directed down the page. This allows us to eliminate any answers with statement I. Because the electron is negative, though, it feels a force directed up the page. Our answer must therefore include statement II. The path radius for a charged particle in a magnetic field is mv/qB. Both particles have the same magnitude charge and the same speed. The mass of the proton, however, is about 1,800 times the mass of the electron, and its path radius will be an equal factor larger.

(50) **(C).** We must solve the integral $\int_S \vec{B}.d\vec{\ell}$. The following figure depicts the situation.



Everywhere in the loop, $\vec{B} \parallel d\vec{A}$. This simplifies our integral a bit to $\int_S B\,dA$. In a direction parallel to the wire, the magnetic field strength is constant. This lets us evaluate that portion of the surface integral immediately. Further, we can insert the formula for the magnetic field strength near a long, conducting wire.

We get $\int_a^{2a} \frac{\mu_0 I}{2\pi} \frac{a}{r} dr$

Moving all of the constants out, this becomes a standard integral of 1/r. The answer is

$$\frac{\mu_0 Ia}{2\pi}(\ln(2a) - \ln(a))$$

which, after using the subtraction/quotient rule for logarithms, gives us choice (C).

(51) **(D).** A falling magnet generates an electric field because the magnetic field is moving. This electric field will induce electric currents in the copper pipe, which can conduct electricity. The electric currents in the copper pipe in turn induce a magnetic field, even though the copper pipe is not magnetic. By Lenz's law, the induced magnetic fields are induced in a direction that opposes their cause. Here it is important to note that the cause of the induced magnetic field is not the magnetic field of the magnet. Rather it is the change in this magnetic field. This change is caused by the fact the magnet is moving. So by Lenz's law, the induced magnetic fieldis in a direction that will oppose, and therefore slow, the motion of the falling magnet. Thus, the magnet falling in the copper pipe will fall more slowly than it would otherwise.

The magnet falling in the PVC pipe will fall at the same rate as the magnet that is outside the pipes, because the PVC pipe does not conduct electricity and therefore will not induce any electric currents or magnetic fields. Hence, the magnet in the PVC pipe and the magnet outside the pipe fall at the same rate, and the magnet in the copper pipe falls more slowly.

(52) **(D).** Ampere's law tells us that the line integral of the dot product of the magnetic field vector $\vec{B}$ and the displacement vector $d\vec{s}$ around any closed path will equal the product of the permeability of free space μ_0 and the current I_0.

$$\int \vec{B} \cdot d\vec{s} = \mu_0 I_0$$

For this problem, we are integrating around the wire at a distance r from the center of the wire such that $r \geq R$. This means that the path we are following is simply the circumference of the circle at radius r.

Applying this to Ampere's law, we get

$$\int \vec{B} \cdot d\vec{s} = B\int ds = B(2\pi r) = \mu_0 I_0$$

Dividing both sides of the equation by the circumference gives us the magnitude of the magnetic field B at $r > R$.

$$B = \frac{\mu_0 I_0}{2\pi r}$$

(53) **(B).** We will employ Ampere's law again to solve this problem. In this situation, the integral path will be around a circle of radius r that is inside the radius R of the wire. The magnetic field in this region is produced by the fraction of the current I_0 that moves through this part of the wire.

Since we have been told to assume that the current is uniform through a cross section of the wire, the fraction of the current in the radius r < R can be determined by considering the ratios of the areas in question, πr^2 and πR^2. This ratio will equal the ratios of the currents through the areas I and I_0.

$$\frac{I}{I_0} = \frac{\pi r^2}{\pi R^2}$$

Solving for I, we find that

$$I = \left(\frac{r^2}{R^2}\right) I_0$$

Applying Ampere's law around the path $2\pi r$ with a current I

$$\int \vec{B}\cdot d\vec{s} = B\int ds = B\,(2\pi r) = \mu_0 I_0 = \mu_0 \left(\frac{r^2}{R^2}\right) I_0$$

Dividing both sides by the circumference and solving for B, we find that the magnitude of the magnetic field can be obtained from $B = \frac{\mu_0 I_0 r}{2\pi R^2}$.

(54) **(B).** The changing magnetic flux through a wire loop will cause an induced emf and an induced current in the wire loop. The direction of the current can be deduced from Lenz's law, which states that the polarity of the induced emf will produce a current in the wire loop that will create a magnetic flux to oppose the change in magnetic flux through the loop.

In this situation, as the bar magnet rapidly approaches the wire loop, the magnetic flux through the loop increases with time. A current is produced in the wire loop that produces a magnetic flux in the opposite direction from that produced by the bar magnet. This means that the induced current is produced in the wire loop in the counterclockwise direction.

(55) **(A).** Gauss's law states that the net magnetic flux through any closed surface is always zero.

$$\phi_c = \int \vec{B}\cdot d\vec{A} = 0$$

Central to the validity of this statement is the fact that no isolated magnetic poles or monopoles have been detected in the universe (perhaps they don't even exist). All magnetic phenomena are observed to have a dipole nature. This means that the magnetic field lines coming from the north-oriented part of the magnet will always fall back onto the southoriented part of the magnet.

If we surround a bar magnet with a Gaussian sphere, then the number of lines coming from the north end of the magnet and exiting the Gaussian surface will equal the number of lines entering the Gaussian surface and coming back onto the south-oriented part of the magnet. Therefore, the net magnetic flux through the Gaussian surface will be zero.

(56) **(D).** According to Faraday's law of induction, the emf induced in the circuit is directly proportional to the rate of change of the magnetic flux over time through the circuit. As the magnet moves rapidly to the right, the needle on the galvanometer will be deflected from zero. As the magnet moves rapidly to the left, the galvanometer's needle will be deflected in the opposite direction. Therefore, as the magnet moves rapidly back and forth through the coil, the needle on the galvanometer will be deflected fullscale in the both directions.

(57) **(B).** The electrons in the conducting bar will experience a force along the conductor that can be determined from $\vec{F} = q\vec{v}\times\vec{B}$. Becausethe magnetic field B is directed into the page and the velocity vector is perpendicular to the magnetic field, when we calculate the cross product of $\vec{v}$ and $\vec{B}$, we find that the electrons in the conducting bar will experience downward force (by the right-hand rule). This force will cause the electrons to move to the lower end of the conducting bar as the bar starts moving through the magnetic field.

(58) **(C).** If we consider emf induced in small segments of the bar as it rotates at velocity u, then we can determine the total emf induced between both ends of the bar.

$$\varepsilon = \int Bvdr$$

where dr is the length of a small segment of the bar. The velocity v can be written as the product of the angular velocity and a length r along the bar.

$$v = \omega r$$

Evaluating the integral yields:

$$\varepsilon = \int_0^{\ell} Bvdr = \int_0^{\ell} B\,(\omega r)\,dr = B\omega\int_0^{\ell} r\,dr$$

$$= \frac{1}{2}B\omega r^2\Big]_0^{\ell} = \frac{1}{2}B\omega\,(\ell^2 - 0^2)$$

Therefore, the emf induced between the two ends of the bar as it rotates in the magnetic field B with a velocity v is $\varepsilon = \frac{1}{2}B\omega\ell^2$.

(59) **(B).** Net charge of system = 0

∴ Net force on system = 0.

Now consider one charge: T = qvB.

(60) **(A).** With increase in frequency, reactance of LC circuit will increase. As a result, voltage increases. So, brightness will increase.

(61) **(A).**

(62) **(A).** Velocity of electromagnetic wave is $c = \frac{1}{\sqrt{\mu_0\varepsilon_0}}$.

(63) **(B).** Inductance of a coil is given by

$$L = \frac{1}{2}\mu_0 \pi N^2 R \Rightarrow \frac{L_2}{L_1} = \frac{N_2^2}{N_1^2}$$

$$\therefore \quad L_2 = L_1 \frac{N_2^2}{N_1^2} = \left(\frac{500}{100}\right)^2 15\text{mH} = 375\text{mH}$$

(64) **(C).** Relative magnetic permeability of diamagnetic substances is always less than unity. i.e. $\mu_r < 1$
$\mu_r = (1 + \chi_m)$ as $\mu_r < 1$, χ_m is negative.
Hence, susceptibility of diamagnetic substances has a small negative value.

(65) **(A).** The energy loss due to eddy currents is reduced by using laminated core in a transformer.

(66) **(A).** Given, B = 1T, r = 0.2m

$$r = \frac{mv}{qB} \text{ i.e., } v = \frac{0.2 \times 1.6 \times 10^{-19} \times 1}{1.6 \times 10^{-27}} = 0.2 \times 10^8 \text{ m/s}$$

(67) **(A).** In series LCR circuit, the phase angle ϕ is given by

$$\tan\phi = \frac{X_L - X_C}{R}$$

When $X_L > X_C$, $\tan\phi$ is positive. Therefore the phase difference is positive.

(68) **(B).** We know that the time period of a vibrating bar magnet

$$T = 2\pi\sqrt{\frac{I}{MB_H}}$$

Given, $T_1 = 8$s, $I_1 = I$, M = 4 Am^2

$$8 = 2\pi\sqrt{\frac{I}{4 \times B_H}} \qquad ....(1)$$

Given, $T_2 = 6$s, $I_2 = 9 \times 10^{-2}$ kg-m^2, M = 8 Am^2

$$6 = 2\pi\sqrt{\frac{9 \times 10^{-2}}{8 \times B_H}} \qquad ....(2)$$

Dividing eqs. (1) and (2), $\frac{8}{6} = \sqrt{\frac{2I}{9 \times 10^{-2}}}$

Squaring both sides and solving, we have
$I = 8 \times 10^{-2}$ kg-m^2

(69) **(A).** Work done W = MB (1 – cos 60°) = MB/2
The torque required to maintain the magnetic needle

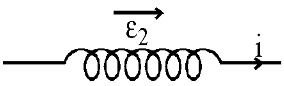
$$\tau = MB\sin\theta = MB\sin 60° = MB\frac{\sqrt{3}}{2}\ ; \quad \tau = \sqrt{3}\ W$$

(70) **(B).** Magnetic field intensity = Am^{-1}
Magnetic flux = Wb
Magnetic pole strength = A-m
Magnetic induction = Wb-m^{-2}

(71) **(A).** The intensity of magnetic induction field

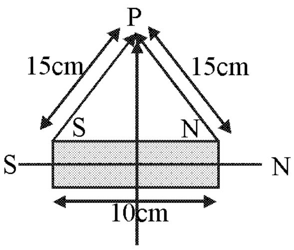
$$B = \frac{\mu_0 i}{2r} = \frac{4\pi \times 10^{-7} \times 0.9}{2 \times 5 \times 10^{-2}} = 36\pi \times 10^{-7}\text{ T}$$

(72) **(A).** $B = \dfrac{\mu_0 I}{4\pi \times \dfrac{R}{\sqrt{2}}}(\sin 90° + \sin 135°) = \dfrac{\mu_0 I}{4\pi R}(\sqrt{2} - 1)$

(73) **(B).** 

Current is decreasing and $L = \dfrac{17}{25kA} = 680\mu H$

(74) **(B).** Since magnetic field is in vertical direction and Needle is free to rotate in horizontal plane only so magnetic force can not rotate the needle in horizontal plane so needle can stay in any position.

(75) **(D).** 

Since, $H = \dfrac{\mu_0}{4\pi} \cdot \dfrac{15}{(15 \times 10^{-2})^3} \qquad (M = m \times 2\ell)$

$$0.4 \times 10^{-4} = 10^{-7} \times \frac{m \times 10 \times 10^{-2}}{15 \times 15 \times 15 \times 10^{-6}}$$

or $$\frac{0.4 \times 10^{-4} \times 15 \times 15 \times 15 \times 10^{-6}}{10^{-8}} = m$$

or $m = 1350 \times 10^{-2} = 13.5$A-m
Hence, pole strength m = 13.5 A-m

(76) **(C).** $r = \dfrac{mv}{qB} \Rightarrow r = \dfrac{v}{(q/m)B}$

$$r = \frac{10^7}{(10^{11})10^{-4}} = 1\text{ m}$$

(77) **(A).** $B_R = \sqrt{B_1^2 + B_2^2}$

$$B_1 = \frac{\mu_0}{4\pi} \times \frac{2\pi I}{r} = 10^{-7} \times \frac{2\pi(4)}{2\pi \times 10^{-2}}$$

$$B_1 = 3 \times 10^{-5},\ B_2 = \frac{\mu_0}{4\pi} \times \frac{2\pi I}{r} = \frac{10^{-7} \times 2\pi(4)}{2\pi \times 10^{-2}}$$

$B_2 = 4 \times 10^{-5}$

$$B_R = \sqrt{(3 \times 10^{-5})^2 + (4 \times 10^{-5})^2}$$

$$B_R = 10^{-5}\sqrt{9 + 16} = 5 \times 10^{-5}\text{T}$$

(78) **(B).**

(79) **(A).** $e = B \ell v = 1.75 \times 10^{-5} \times 40 \times 300 = 0.21$ V

(80) **(D).** $\frac{d}{dt}(I_m \sin \omega t) = I_m \omega \cos \omega t$

For maximum value of emf $\frac{dI}{dt}$ is maximum.

$$\cos \omega t = 1 \Rightarrow \frac{dI}{dt} = I_m \omega$$

$$e = \frac{\mu dI}{dt} = \mu\,(I_m \omega) = 0.005 \times 10 \times 100\pi = 5\pi$$

(81) **(A).** $\chi \propto \frac{1}{T}$; $\frac{\chi_2}{\chi_1} = \frac{T_1}{T_2}$

$$\frac{\chi_2}{0.0075} = \frac{273-73}{273-173} \ ; \ \frac{\chi_2}{0.0075} = \frac{200}{100} \ ; \chi = 0.0150$$

(82) **(C).** $P_{av} = VI \cos \phi$

$\phi = \pi/2$, $P_{av} = 0$

(83) **(B).** The ratio of magnetic moments is $\frac{M_1}{M_2} = \frac{T_2^2 + T_1^2}{T_2^2 - T_1^2}$

where T_1 = periodic time when the similar poles are on the same side, T_2 = periodic time in when the opposite poles are on the same side

$$\frac{M_1}{M_2} = \frac{n_2^2 + n_1^2}{n_2^2 - n_1^2} \quad \left(\because T = \frac{1}{n}\right)$$

Given $n_1 = 15$, $n_2 = 20$

$$\frac{M_1}{M_2} = \frac{(20)^2 + (15)^2}{(20)^2 - (15)^2} = \frac{625}{175}$$

$\therefore$ $M_1 : M_2 = 25 : 7$

(84) **(C).** The magnetic induction at any point distance x from its centre $B = \frac{\mu_0}{4\pi} \times \frac{2\pi N I r^2}{(r^2 + x^2)^{3/2}}$ .... (1)

where r is the radius of the circular coil. Then,

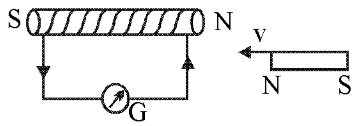
$$B = \frac{\mu_0}{4\pi} \times \frac{2\pi N I r^2}{[r^2 + (\sqrt{3}r)^2]^{3/2}}$$

or $B = \frac{\mu_0}{2\pi} \times \frac{N I r^2}{(r^2 + 3r^2)^{3/2}}$ [Given $x = \sqrt{3}r$]

or $B = \frac{\mu_0}{2\pi} \times \frac{N I r^2}{(4r^2)^{3/2}} = \frac{\mu_0}{2\pi} \times \frac{N I r^2}{(2r)^3} = \frac{\mu_0}{2\pi} \times \frac{N I r^2}{8r^3}$

or $B = \frac{\mu_0 N I}{16\pi r}$

(85) **(B).** When the north pole of the magnet is brought towards one end of the coil, the induced current flows in the coil in such a direction that the end of the coil near the magnet becomes a north pole which repels the magnet and opposes the motion of the north pole of the magnet towards the coil, thus direction of induced current is anticlockwise.



(86) **(B).** From the relation, $\frac{N_1}{N_2} = \frac{V_1}{V_2}$

Given, $N_1 = 1500$, $N_2 = 1125$, $V_1 = 200$ volt, $V_2 = ?$

$$\therefore \ \frac{1500}{1125} = \frac{200}{V_2} \Rightarrow V_2 = \frac{200 \times 1125}{1500} = 150 \text{ volt}$$

(87) **(B).** $B_R = B_1 - B_2 = 2B - B = B$. If $2B = 0$, $B_R = B$

(88) **(C).**

(89) **(A).** Use Fleming's right hand rule

(90) **(C).** $I = \frac{V}{R} = \frac{100}{1000} = 0.1$ A

$$V_L = V_C = \frac{I}{\omega C} = \frac{0.1}{200 \times 2 \times 10^{-6}} = 250V$$

(91) **(D).** The chance of having a daughter at each birth is 1/2, Each birth is an independent event, so the rule of multiplication applies. You must multiply the chance of each-event occurring by the number of events: $1/2 \times 1/2 \times 1/2 \times 1/2 = 1/16$

(92) **(A).** Adenine is present in all nucleotides (DNA and RNA), in nicotinamide adenine dinucleotide (NAD), and in flavin adenine dinucleotide (FAD).
Proteins are polymers of amino acids and contain the elements sulfur, phosphorous, carbon, oxygen, hydrogen, and nitrogen. Cytochromes and hemoglobin are proteins. Cellulose is a carbohydrate.

(93) **(D).** The genotype of the bar-eyed female is X-X-, the red-eyed (normal) male is XY, and the bar-eyed male is X-Y. Since this trait is sex-linked, if the male has one affected gene, he has the condition. Here is the cross

(females)	X	Y (males)
X–	X–X	X–Y
X–	X–X	X–Y

All the males have one affected allele and are bar-eyed.

(94) **(B).** Here is the cross.

	X^B	Y
X^B	X^BX^B	X^BY
X^Y	X^BX^Y	X^YY

X^BX^B is a black female. X^BY is a black male. X^BX^Y is a calico female. X^YY is a yellow male. The chance of getting a calico cat is 25%.

(95) (B).

(96) (A). Barr bodies are condensed, inactive X chromosomes. When there are two X chromosomes in a cell, one will always deactivate. Thus, normal body cells in a human female, which have two X chromosomes, will always have one Barr body. Therefore, the presence of a Barr body indicates the presence of two X chromosomes.

(97) (A). Out of 10 offspring, if 5 are white, then 5 are black, and the ratio of black to white is 1 : 1. From that ratio, you should know that the parents are B/b and b/b. Here is the cross. Since half of the offspring are white, each parent must contribute a recessive (b) allele. In addition, one parent must have two recessive (b) alleles.

	b	b
B	Bb	Bb
b	bb	bb

Bb appears black and bb appears white.

(98) (D). Mutations were not discovered until around 1900 when DeVries, while working with polyploidy plants, coined the term. Darwin could not explain the origin of all the variation he observed among organisms. It was the weak part of his theory of natural selection.

(99) (C). A population in Hardy-Weinberg equilibrium, as the question states, means a population is stable and nonevolving. By definition, if the population is not evolving, the frequency of the allele does not change; it remains at 0.4.

(100) (D). The percentage of students with blue eyes (homozygous recessive) is 16%, so that means $q^2 = 0.16$ and $q = 0.4$. Since $p + q = 1$, $p = 0.6$. Since the percent of students with pure brown eyes is p^2, then $0.6 \times 0.6 = 36\%$.

(101) (D). Approach this type of problem by trying to eliminate the wrong choices first. Can you eliminate autosomal or sex-linked dominant? Yes. Daughter #2 in the F2 generation has the condition but neither parent has it. You can also eliminate sex-linked recessive as a possibility for the same reason as above. In order for daughter #2 in the F2 generation to have the condition, she must have received a gene from both parents. Her dad cannot carry a sex-linked trait; if he has the gene, he must have the condition. Holandric means carried on the Y chromosome; such traits have to do with maleness. This must be eliminated because two females have the condition. The trait must therefore be transmitted as autosomal recessive.

(102) (B). The trait is inherited as an autosomal recessive. Person #5 does not have the condition and neither does his wife, #6, and yet they have a child with the condition. Therefore, person #5 is hybrid, A/a.

(103) (B). Person #4 in the F_2 generation does not have the condition, so we know she has at least one dominant (good) trait. She has a sister with the condition; therefore the parents must be hybrid. However, we do not know if either parent passed the recessive trait onto #4. Person #4 could be either A/A or A/a.

(104) (D). SnRPs, which is short for small nuclear ribonucleoproteins, along with other proteins are responsible for removing the introns from a new RNA strand. This is an important part of RNA processing.

(105) (D). Exons are coding or expressed sequences. They code for polypeptides. Introns are intervening sequences and do not get translated into proteins.

(106) (D). The codon is the triplet associate with mRNA. The anticodon is the triplet associated with tRNA. They are complementary to each other. Remember, there is no thymine (T) in RNA; it is replaced with uracil (U).

(107) (C). When RNA polymerase attaches to the promoter, DNA replication can proceed.

(108) (A). Selection acts on the phenotype of a population. Selection cannot act on something that does not react with the environment. The genotypes, alleles, and entire genome may be hidden and unexpressed.

(109) (B).

(110) (D).

(111) (C). Two alleles that are the same are said to be homozygous.

(112) (B). Darwin was not able to explain the origin of variation in the populations he saw. Mendel, who published his theories of the law of segregation and law of independent assortment, could have explained some of the variation that Darwin saw. However, although Mendel made his work public, no one understood it until 50 years later.

(113) (D). Since $p + q = 1$, if the frequency of the allele for blue eyes is 0.3, then the frequency of the allele for brown eyes is 0.7. The percentage of the population with pure brown eyes is p^2, which is $0.7 \times 0.7 = 0.49$ or 49%.

(114) (C). Polyploidy is having extra sets of chromosomes, 3n, 4n, or 5n. This is common in plants. Plants that exhibit polyploidy cannot breed with diploid plants. This isolation can result in sympatric speciation. Behavioral isolation applies only to animals because only they can move from one place to another. Genetic drift, flow of genes due to chance, and mutation occur in both animals and plants.

(115) (D). A population is the smallest biological unit that can evolve. A single individual or cell can never evolve. A population is one type of organism living in one place. A species can be spread over a great distance and can consist of thousands of isolated populations worldwide that do not interbreed and are not part of the same population.

(116) (B). Bacterial transformation was discovered by Frederick Griffith when he performed experiments with several different strains of the bacterium *Diplococcus pneumoniae*. Some strains were virulent and caused pneumonia in humans and mice, and some strains were harmless. Griffith discovered that something in the heat-killed virulent bacteria could be taken up by the live harmless bacteria and transform them.

(117) (A). Transposons are movable genetic elements and are often called jumping genes. They were discovered by Barbara McClintock, who was studying the genetics of corn. Some transposons jump, in a cut-and-paste fashion, from one part of the genome to another. Others make copies of themselves that then move to another region of the genome, leaving the original behind. There are two types: insertion sequences and complex transposons.

(118) (D). Translation is the process by which the codons of mRNA sequence are changed into an amino acid sequence. This occurs at the ribosome and consists of three parts: initiation, elongation, and termination.

(119) (C). Transcription is the process by which DNA makes RNA. Transcription occurs in three stages: initiation, elongation, and termination.

(120) (B). The physical distance between two genes determines both the strength of the linkage and the frequency of the crossing over between two genes. The strength of the linkage increases with the closeness of the two genes. On the other hand the frequency of crossing over increases with the increase in the physical distance between the two genes.

(121) (D). Co-dominance is the phenomenon when the two genes neither show dominant-recessive relationship nor show intermediate condition, but both of them express themselves simultaneously. This has been reported in roan character of cattle (i.e., patches of 2 different colours on the skin).

(122) (C). DNA polymerase can polymerize nucleotides only in 5' $\rightarrow$ 3' direction on 3' $\rightarrow$ 5' strand because it adds them at the 3' end. Since the two strands of DNA run in antiparallel directions, the two templates provide different ends for replication. Replication over the two templates thus proceeds in opposite directions. One strand with polarity 3' $\rightarrow$ 5' forms its complementary strand continuously because 3' end of the latter is open for elongation. It is called leading strand.
Replication is discontinuous on the other template with polarity 5' $\rightarrow$ 3' because only a short segment of DNA strand can be built in 5' $\rightarrow$ 3' direction due to exposure of a small stretch of template at one time. Short segments of replicated DNAare called Okazaki fragments.

(123) (D). The binding site of tRNA with mRNA is anticodon loop and with amino acid is CCA end.

(124) (A). *Homo erectus* appeared about 1.7 million years ago in middle pleistocene. *H. erectus* evolved from *Homo habilis*. He was about 1.5-1.8 metres tall.

(125) (D).

(126) (B). There are 64-triplet codons which code for 20 amino acids. This is due to the degeneracy of code as some amino acids are influenced by more than one codon. Only tryptophan and methionine are specified by single codons. All other amino acids are specified by two (e.g., phenylalanine-UUU, UUC) to six (e.g., arginine-CGU, CGC, CGA, CGG, AGA, AGG) codons.

(127) (C). Cystic fibrosis is an abnormal recessive disorder of infants, children and young adults that is due to an abnormal recessive autosomal allele present on chromosome 7.
Phenylketonuria is an inborn, autosomal, recessive metabolic disorder in which the homozygous recessive individual lacks the enzyme phenylalanine hydroxylase needed to change phenylalanine to tyrosine in liver. Lack of the enzyme ili due to the abnormal autosomal recessive gene on chromosome 12.

(128) (C). Concept of chemical evolution refers to origin of life from non living matter. First inorganic compounds and then organic compounds were formed in accordance with ever changing environmental conditions.

(129) (B). Industrial melanism is an adaptation where the moths living in the industrial areas developed melanin pigments to match their body to the soot-covered surroundings. The phenomenon provides an excellent example of operation of selection in natural conditions. Industrial melanism, therefore, presents an excellent example of natural selection (proposed by Darwin), but it is not the example of acquired characters proposed by Lamarck.

(130) (D) **(131)** (B)

(132) (C) **(133)** (C)

(134) (A)

(135) (B). One parent's alleles are labeled above the top of the grid. The other parent's alleles are labeled down the side of the grid.

(136) (D) **(137)** (B)

(138) (C) **(139)** (A)

(140) (B). In Mendel's monohybrid cross he chose pure tall as female and pure dworf as male in pea plant and he check the result with the help of receiprocal cross. Result was not effected.

(141) (D). Mutation : Sudden inheritable change in known as mutation.
Transduction : Transmission of genetic material occurs with the help of phage (bacteriophages)
Transformation: In Griffith's experiment, when he infected the mice with heat killed S-strain mixed with live R-strain, disease developed and mice died.
He concluded that some chemical 'Transformant' transformed R-strain to S-strain which ultimately caused disease.
Transfection : Transfer of genetic material to a eukaryotic cell.

(142) (A). Processing of eukaryotic hn RNA involves capping at 5' and with 7-methyl guanosine triphosphate and tailing at 3' end with poly polyadenylate resisdues removal of introns is known as splicing.

(143) (B).

Parent: AABB ⊗ aabb
Red Kernels ↓ White Kernels

F1 generation: AaBb ⊗ AaBb

Phenotypic ratio	1	: 4	: 6	: 4	: 1
	Red	Medium Red	Intermediate Red	Light Red	White

(144) (A). One anther having 4 sporangis.

∵ 4 sporangia produce 1280 microspore

∴ 1 sporangia produce $\rightarrow \frac{1280}{4} = 320$ microspore

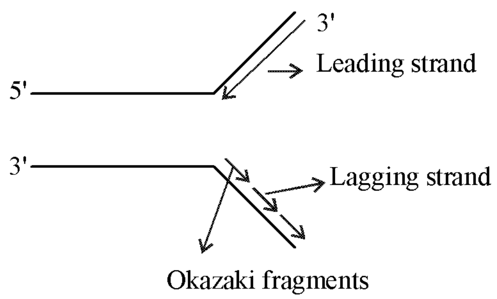
∵ 4 microspore produced by 1 → microspore mother cell

∴ 320 microspore produced

$= \frac{1}{4} \times 320 = \frac{80 \text{ micro spore mother cell}}{\text{cell}}$

(145) (C). Human skin colour is govened by 6 genes and thus, it is an example of polygenic inhertitance which shows cumulative effect. Hence quantitative inheritance is shown depending on the no. of dominant genes.

(146) (D). During DNA replication the addition of nuclestides on the lagging strand occurs discontinuous by



(147) (C). This pedigree shows that certain individuals are carriers for the trait being studied, as indicated by the half-filled squares and circles.

(148) (C).

∵ 34Å long DNA has : 10 base pairs

∴ 340Å long DNA has : $\frac{10}{34} \times 340 = 100$ base pair

= 200 base

Acc. to Chargaff's rule

Purines = Pyrimidine

$A = T, G \equiv C$

In the question - Thymine = 20, so A is 20

$G \equiv C \Rightarrow 200 - (20 + 20) = 200 - 40 = 160$

∴ $G = \frac{160}{2} = 80$

(149) (C). Purines - Adenine (A) and Guanine (G)
Pyrimidines - Thymine (T) and Cytosine (C)

(150) (A). Types of gamtes = 2^n where n = no. of hybrids

∵ n = 2 ; Types of gamete = $2^n = 4$

AaBbCc = ABC | Abc | aBc | abc

(151) (C). Myophia, night blindness and Haemophilia are rescessive x-linked disease.
Nephritis is not x-linked

(152) (D). Fossile of Austalopitheous africans discovered in line qarry at Taung, south Africa.

(153) (A). Epicanthal skin fold and simian crease are characteristics of Down's syndrome.

(154) (B). Dinosaurs dominatd in jurassic period, mesozoic era.

(155) (A). Darwin's failed to explain arrival of fittest.

(156) (C). Drosophila melanogaster was selected by Morgan for studying linkage because of its
(a) Smaller life cylce (Around a week)
(b) Few no. of chromosomes (4 pairs)
(c) Can be grown on simple and synthetic medium.

(157) (B).

(158) (A). Darwin's Finches - Adaptive radiation.

(159) (C). Karyotypes are images of chromosomes marked during metaphase. They provide an additional way to study chromosomes.

(160) (C). Recessive character will be expressed only in presence of recessive alleles. A dominant allele will not allow the expression of a recessive allele.

(161) (C). Uracil is exclusively found in RNA. Polypeptide chain has amino acids.

(162) (D). A marraige between two carriers of sickle cell anemia will produce normal, carrier and anaemic progeny in 1:2:1 ratio.

(163) (C). The F_1 generation has mullatoes with 8 types of gametes. The genetic combination is AaBbCc. As there are three pairs of heterozygous alleles it will form 8 types of gametes.

(164) (C).

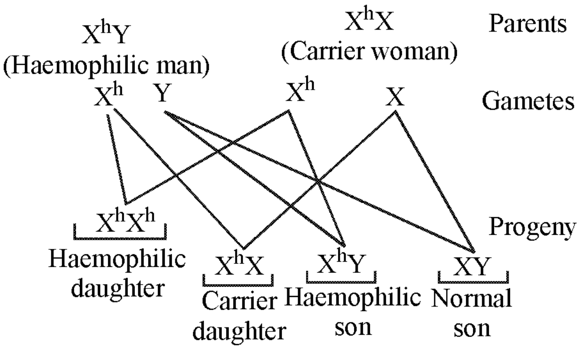
(165) (D). Thalassemia is the autosomal disease where person suffers from anaemia and jaundice.
Down's syndrome is due to trisomy of chromosome 21, where person has flat nose and simian crease.
Turner's syndrome is due to absence of X chromosome.

(166) (A). The rise of first primates occurred in Palaeocene epoch.

(167) (B). Test-cross is a cross in which F1 dominant is crossed with recessive parent in order to know whether the dominant trait is homozygous (both alleles dominant) or heterozygous (one allele dominant and other recessive). The ratio of dominant and recessive will be 1 : 1 in monohybrid's test cross.

(168) (C). Domestication is the first step in the development of cultivated plants from their wild species. Agriculture and domestication of animals were not in practice during paleolithic age. The practice of agriculture begin 7000-13000 year ago in mesolithic age. In USA and Japan several members of Euphorbiaceae are being domesticated.

(169) (B). Haemophilia is a X-linked recessive disease in human. The affected person lacks a normal blood clotting substance thromboplastin.



So, half the daughter are haemophilic where other half are carrier.

(170) (C). Barr and Bertram (1949) reported dee stained chromatin body in the nerve cell fen cat, which was absent in male. These chromatin bodies are called Barr bodies after the name their discoverer. MF Lyon demonstrated when the number of X-chromosomes was or more than two, the number of Barr body was one less than the number X-chromosomes.

(171) (C). Duplex molecule of DNA consists of two polynucleotide chains twisted arround one another to form a right-handed helix. The backbone of each polynucleotide strand consists of deoxyoyribose sugar alternating with phosphate groups that links the 3' carbon of one sugar to 5' carbon of next.

(172) (D). In complete or partial or intermediate dominance when red flowered plant of Mirabills jalapa have crossed with white flowered plants, the plants in F1 generation have pink flower. On selfing of the plants with pink flower the red, pink and white flowered plants are produced in 1 : 2: 1 genotypic as well as phenotype ratio in F2 generation.

When two separate pairs of genes interact produce the phenotype in such a way that neither of the dominant gene is expressive unless the other one is present are called, complementary genes.

The Mendelian cross, which is made on the basis of a single character at a time is called, **monohybdrid cross**. Whereas, the cross talcing into account two characters at the same time is called, dihybrid cross.

(173) (D). Mutation is inheritable qualitative or quantitative change in the genetic material of an organism. The substances or agents, which induce artificial mutation are called, mutagenic agents.

(i) Radiations : These may be ionizing like X-rays, gamma rays, alpha, beta, electrons, protons and other fast moving particles or non-ionising like UV and visible light.

Ionising radiations cause break in poly-sugar phosphate backbone of DNA and thus, causing chromosomal mutations such as break, deletion, addition, inversion and translocation.

(ii) The UV radiation (non-ionising) produces several effects of DNA one being the formation of **thymine dimer**.

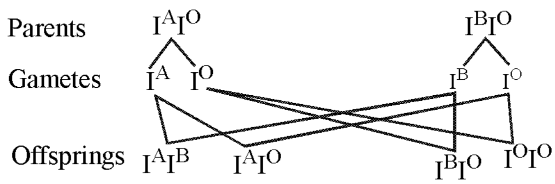
(174) (C). The codon UAA function as stop or termination codon. It does not code for any amino acid and, therefore, called non-sense codon. Hence, the polypeptide synthesis terminated and a polypeptide of 24 amino acids is formed.

Polypeptide chain of 124 amino acids is formed only when the 125th codon works as stop codon.

(175) (A). Herkogamy refers to a situation when a natural barrier develops between anther and stigma in a bisexual in a bisexual flower to check the self pollination, e.g., Members of Caryophyllaceae family contain projected stigma beyond the stamen so that the pollen grain can not reach on it.

(176) (B). The ribosome has three sites: the A site , the P site and the E site. The A site is the point of entry for the aminoacyl tRNA. The first aminoacyl tRNA (f-met-tRNA) enters at the P site, here peptidyl tRNA is formed on the ribosome. E site is the exit site of the now uncharged tRNA after it gives its amino acid to the growing peptide chain.

(177) (C). The mother with blood group I^BI^O and father with blood group I^AI^O has a child with blood group O.



(178) (B). In eukaryotes hnRNA (heterogenous nuclear RNA) is synthesised by a single cistron (gene), i.e., split gene. Due to variation in size of mRNA population in a cell, the mRNA is often regarded as hnRNA. In eukaryotes it carries information for one peptide only, i.e., monogene, or monocistronic, it is transcribed from a single gene and possess a single initiator codon and a single terminator codon.

(179) (B). In DNA each larger helix (turn) has 10 pairs of nucleotides. So, 8 turns have $10 \times 8 = 80$ nucleotides. If in a DNA fragments, there are 8 turns, with 40% of the bases of cytosine.

So, number of cytosine in this DNA fragment

$$= \frac{40 \times 80}{100} = 32$$

Cytosine is complementary to guanine.

Cytosine forms three hydrogen bonds with guanine.

So no. of H_2 bonds = $32 \times 3 = 96$

Rest nucleotides are adenine and thymine = 48

Adenine forms two hydrogen bonds with thymine

$= 48 \times 2 = 96$ (C + G) + (A + T)

Total number of hydrogen bond in DNA = 96 + 96= 192

(180) (C). This picture shows the base paring stage of DNA replication, in which a parent DNA strand separates and forms new strands. The new strands are referred to as leading and lagging strands. Ozaki fragments are synthesized on the lagging strand.