MC SQUARE EDUCATION PVT.LTD

PAPER-08

DATE-13/04/2017

NEET 2017 FINAL TEST SERIES

TOTAL MARK: 720

SR.NO	STUDENT NAME	CHEMISTRY		PHYSICS		BIOLOGY		TOTAL MARKS
1	ADWAIT GOKHALE	29	8	9	9	64	11	380
2	RUTUJA VETHEKAR	5	10	3	8	17	32	50
3	JOSHNA CHOUDHARI	4	5	4	2	49	9	212
4	VARUN BELORIA							
5	MAMTA RAJAWAT	1	7	1	1	23	36	56
6	AKSHATA SHINDE	5	5	3	3	15	17	67
7	RIDDHI RAUT	14	16	2	6	36	28	158
8	ARUNDHATI GOTEKAR	4	6	4	11	33	4	143
9	KOMAL SABBANI	11	6	7	11	42	27	196
10	SHREYA PAREKH	21	10	4	13	18	28	121
11	POOJA UPASE	6	5	7	4	39	20	179
12	ADITYA SASANE	4	6	3	5	54	14	219
13	RUTUJA SASANE	2	4	4	4	41	22	158
14	VIVEK RATHORE							
15	SONAM SINGH	4	7	0	0	44	16	169
16	WAJID RAY							
17	RUSHIKESH GHUTUGADE							
18	SUMIT BORA	18	14	13	16	55	22	292
19	ROHAN PAWAR							
20	PAWAN KHAMKAR							
21	SUMIT KAMBLE							
22	SHIVANI SINGH							
23	VAIBHAV INGOLE							
24	RENUKA KATTIMANI							
25	HARSHA SHINDE	5	4	5	6	38	31	151
26	PAYAL MANE	1	2	0	1	34	15	122
27	AMRUTA MULE	18	12	2	1	20	38	109
28	SHRUTI BARVE	8	8	27	7	49	11	310
29	SIMRAN GURUBAXANI	13	7	13	1	47	12	272
30	SAYALI JADHAV	18	12	6	7	48	19	250
31	AYUSHEE AGARWAL	4	4	3	5	43	23	168
32	ANKITA NIMMALWAR	6	12	2	2	47	25	181
33	SNEHA LOKHANDE	7	11	1	7	23	21	85
34	NEHA CHAVAN							
35	HIMALI CHOUDHARI	4	17	2	11	9	57	-25
36	SUMIT SAWANT	17	19	9	13	40	32	200
37	MANALI UBHEDAL							
38	ANAM PANSARE							
39	PURVA SHEDGE	15	12	16	9	48	28	267
40	ANJALI SOLANKE							
41	AISHWARIYA NALANAGLU	11	9	2	0	48	25	210
42	AKASHA SANER							
43	SHUBHAM MANE							
44	AMRUTA BHOSALE	11	5	3	1	30	15	155
45	MANASI KASHID	6	3	6	4	19	15	102
46	HARSHADA JADHAV	7	12	2	0	37	40	132
47	RUSHIKESH AWATE	10	21	1	7	37	30	134
48	DIPALI GAIKWAD	7	3	0	0	26	18	111
49	PRITI BIRADAR	6	10	4	1	43	25	176
50	SHEFALI RATHOD	7	16	7	10	41	36	158
51	AISHWARYA BORHADE	3	1	1	4	35	22	129
52	NADEEM SHIKALGAR	9	13	9	18	27	35	114
53	RASHMI GAIKWAD	9	32	10	21	19	59	40
54	YASH RAGHUWANSHI							
55	AVINASH CHENDAKE							
56	RUTUJA GHUTUGADE	5	25	4	6	29	29	92
57	NIRAJ PATIL							
58	KETAN MORE							
59	MADHAVI KATRE	6	6	5	5	30	38	125
60	KETAKI SHINDE	8	19	1	1	35	25	135
61	SONAM BENDRE	5	14	1	0	33	27	115
62	AKASH BAGADE							
63	RAHUL DESHOTWOD							
64	ASHWINI PATEL							
65	KANCHAN JAISWAL	3	16	0	1	40	37	118
66	SAMRAGGI HATI							
67	SONAL KAMBLE	3	15	0	1	35	28	108
68	PRANALI GAIKWAD							
69	VIJAYA DHUMAL	20	8	9	7	46	9	276
70	DIPTI GURAV	23	8	16	5	37	17	274
71	AKASH BHISE							
72	SHABNAM BANU	10	8	4	3	44	21	200
73	AMRITESH							
74	DARSHANA V H							
75	AISHWARYA PATIL							
76	DEVIKA CHANDRAKANT	5	11	0	0	27	10	107
77								

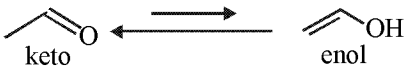
NEET
TEST-8-SOLUTIONS

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

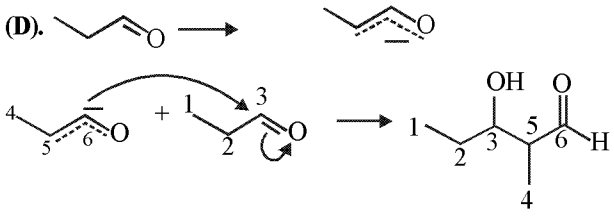
(1) **(A).** Tertiary alcohols can be oxidized but only under extreme conditions, since they do not have a hydrogen attached to the carbon with the hydroxyl group. Alcohol oxidation involves the removal of such a hydrogen; if none is present, a carbon-carbon bond must be cleaved instead. This requires a great deal of energy, and will therefore occur only under extreme conditions. Choice B is incorrect because the number of hydrogens attached to the α-carbon is irrelevant to the mechanism of alcohol oxidation. Choice C is incorrect because the hydroxyl group of a tertiary carbon is polarized.

(2) **(C).** The best way to prepare aldehydes from primary alcohols is to use PCC (pyridinium chlorochromate, $C_5H_6NCrO_3Cl$), which is choice C. $KMnO_4$, choice A, is a strong oxidizing agent and converts a primary alcohol to a carboxylic acid.
Jones' reagent, choice B, also converts a primary alcohol into a carboxylic acid. $LiAlH_4$, choice D, is a reducing agent; it cannot reduce an alcohol further and will certainly not oxidize an alcohol to an aldehyde.

(3) **(A).** When 1M of an ether reacts with HBr, the initial products are 1M alcohol and 1M alkyl bromide (choice C). However, under these acidic conditions, Br displaces H_2O, resulting ultimately in 1M each of two alkyl bromides. In this case, since the ether is symmetric, the product is 2M ethyl bromide, choice A. Choice B is incorrect because under these conditions, the alcohol is protonated, and H_2O (a good leaving group) is replaced by Br to form ethyl bromide. Choice D is wrong because the ether molecule is split at the oxygen atom; it does not rearrange, as would be required to produce a 3-carbon & a 1-carbon fragment.

(4) **(B).** 

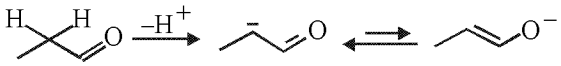
Esterification, choice A, is the formation of esters from carboxylic acids and alcohols. Tautomerization, choice B, is the interconversion of keto and enol forms of a compound. An elimination reaction, choice C, is a reaction in which a part of a reactant is lost and a multiple bond is introduced. A dehydration reaction, choice D, is one in which a molecule of water is eliminated. The above reaction involves an interconversion of keto and enol forms of ethanal. The correct choice is therefore B. Note that equilibrium lies to the left in the above reaction, since the keto form is more stable.

(5) **(D).** 

The above reaction is an example of aldol condensation. In the presence of a base, the alpha H is abstracted from an aldehyde, forming an enolate ion, $CH_3CH - CHO$. This enolate ion then attacks the carbonyl groups of the other aldehyde molecule, CH_3CH_2CHO, forming the above aldol. The correct choice is D.

(6) **(B).** Aldehydes are easily oxidized to the corresponding carboxylic acids by $KMnO_4$. The – CHO group is converted to – COOH. In this reaction, therefore, C_2H_5CHO is oxidized to C_2H_5COOH, which is choice B. In choice A, the aldehyde has been reduced to an alcohol. In choice C, a $-CH_2$ group has been added. Thus, choices A and C are incorrect. In choice D, the – CHO group has been oxidized to – COOH, but a $-CH_2$ group has been deleted, so choice D is incorrect.

(7) **(B).** Heating an aldehyde or a ketone with amalgamated Zn/HCl converts it to the corresponding alkane; this reaction is called the Clemmensen Reduction. Note that aldehydes and ketones can also be converted to alkanes under basic conditions by reaction with hydrazine (the Wolff-Kishner Reduction).

(8) **(B).** The hydrogen alpha to the carbonyl group is the most acidic, since the resultant carbanion is resonance stabilized:


(9) **(B).** $LiAlH_4$ reduces carboxylic acids, esters, and aldehydes to primary alcohols, and ketones to secondary alcohols. In this reaction, therefore, the ketone is converted to a secondary alcohol. Thus, the correct answer is choice B, $C_6H_5CH(CH_3)CHOHCH_2CH_3$.

(10) **(D).** This molecule corresponds to an acetal: two alkoxyl functionalities bonded to the same carbon. This question states that an excess of ethanol is present, so benzaldehyde will first be converted to a hemiacetal, having an alkoxyl and a hydroxyl functionality bonded to the same carbon, then an acetal. Choices A and B are wrong because they show the presence of two benzene rings in the final product. Choice C is wrong since this is the hemiacetal that is formed initially, which then goes on to react with excess ethanol to produce the acetal.

(11) **(B).** The acidity of carboxylic acids is significantly increased by the substitution of the highly electronegative halogens into the carbon chain. Their electron-withdrawing effect upon the carboxyl group increases the stability of the carboxylate anion, favoring the dissociation of the proton. This effect is especially strong for α-halogenated carboxylic acids. Among the five carboxylic acids listed, choice D is the only unsubstituted acid and therefore must have the lowest acidity. Choice A is β-halogenated, while choices B and C are α-halogenated, so A may be rejected. Finally, choice B contains 2 α-halogens and choice C includes only 1, so the electron-withdrawing effect in choice B is stronger and B is the correct answer.

(12) **(C).** The effects of different substituents upon the acidity of benzoic acid compounds is correlated with their effects on the reactivity of the benzene ring. Activating substituents donate electron density into the benzene ring, and the ring in turn donates electron density to the carboxyl group, destabilizing the benzoate ion formed and therefore decreasing a compound's acidity. Deactivating substituents have the opposite effect: they withdraw electrons from the ring, which in turn withdraws negative charge from the carboxyl group, thus stabilizing the carboxylate anion and increasing the compound's acidity. Choice A contains a nitro group attached to the ring, and choice B has a chloride; both of these substituents have deactivating effects, so these choices may be rejected. Choice D is unsubstituted benzoic acid, while choice C has a strongly activating substituent, hydroxyl. Thus, choice C will be the least acidic and is the correct answer.

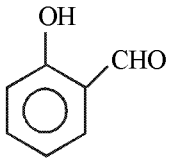
(13) **(B).** Jones' reagent (chromium trioxide in aqueous sulfuric acid) oxidizes primary alcohols directly to monocarboxylic acids, so choice B is correct. This reagent is too strong an oxidizing agent to give an aldehyde (aldehyde will be formed but will immediately be oxidized further), so choice A is wrong. Choice D, a dicarboxylic acid, cannot form because there is no functional group "handle" on the other end of the molecule for the reagent to attack, and it cannot attack the inert alkane. Nor will it produce an alkane such as choice C, so this is also wrong.

(14) **(C).** Carboxylic acids can form all of these types of compounds, except for alkenes, in one step. Acyl halides (choice A) are formed with thionyl chloride. Amides (choice B) are formed by reaction with ammonia. Alcohols (choice D) may be formed using a variety of reducing agents. To form alkenes (choice C), carboxylic acids may be reduced to alcohols, which can then be transformed into alkenes by elimination.

(15) **(D).** Lithium aluminum hydride is a very strong reducing agent. Its reaction with carboxylic acids yields alcohols, choice D. Aldehydes are intermediate products of this reaction, therefore choice A is wrong. Esters are formed from carboxylic acids by reaction with alcohols, so choice B is wrong. Ketones are formed by the Friedel-Crafts Acylation of the acyl chloride derivatives of acids, so choice C is wrong.

(16) **(D).** Treating a carboxylic acid with thionyl chloride results in the production of an acyl chloride. In this reaction, butanoic acid is converted to butanoyl chloride, which is choice D. Since none of the other choices are acyl chlorides, they can be eliminated.

(17) **(B).** X is



which undergoes Cannizzaro's reaction to give Z.

(18) **(A).** $2C_6H_5Cl + Cl_3CCHO \xrightarrow{H_2SO_4} Cl_3C-H$ (with two Cl-substituted phenyl rings)

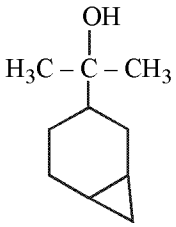
D.D.T.

(19) **(C).** On long storage in contact with air and moisture, oils and fats develop unpleasant smell. This process is known as ranicidification. It is due to

(A) Enzymatic hydrolysis - producing bad smelling lower fatty acids.

(B) Oxidation of unsaturated acids - producing aldehydes and ketones.

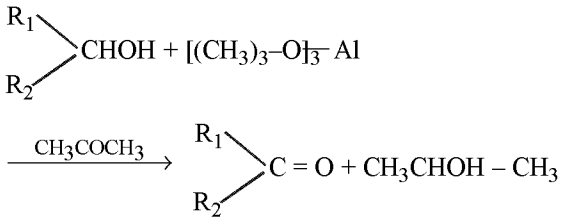
(20) **(A).** Degree of unsaturation of $C_{10}H_{18}O = 2$, but it contains no double or triple bond. Hence there are two rings - one six membered as indicated by product and the other three membered which is cleaved by HCl due to strain. Hence (A) has following structure.



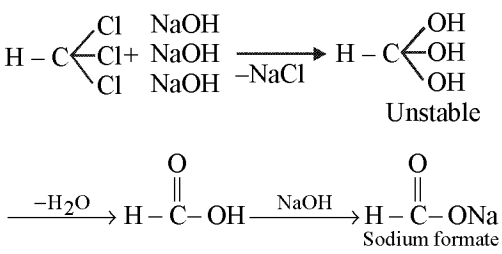
(21) **(A).** Presence of excess of HI favours S_N1 mechanism. So, formation of products is controlled by the stability of the carbocation resulting in the cleavage of C – O bond in protonated ether.

Thus the product for given equation are $C_6H_5CH_2I$, CH_3CH_2I, $HOCH_2 - CH_2OH$.

(22) **(C).** In Oppenauer's oxidation, secondary alcohol is oxidised to corresponding ketone in the presence of aluminium tertiary butoxide. Other oxidisable groups are not affected.



(23) **(C).** On heating chloroform with concentrated aqueous or alcoholic NaOH, we get sodium formate,



Unstable

Sodium formate

(24) **(A).** When acetaldehyde is treated with semicarbazide addition elimination reaction takes place and acetaldehyde semicarbazone is obtained as product.

$$CH_3CHO + H_2N.NHCONH_2 \xrightarrow[-H_2O]{} CH_3CH=N.NHCONH_2$$

acetaldehyde semicarbazone

(25) **(A).** Wolff-Kishner reduction is done by heating the carbonyl compound with a mixture of hydrazine and KOH in the presence of ethylene glycol.

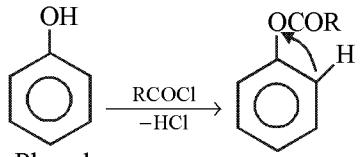
$$(CH_3)_2C=O + H_2N.NH_2 \xrightarrow[-H_2O]{} (CH_3)_2C=N.NH_2 \xrightarrow{KOH} (CH_3)_2CH_2 + N_2$$

Propane

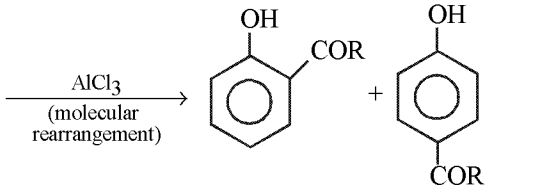
(26) **(B).** $C_2H_5-O-C_2H_5 + CO \xrightarrow[500\ atm]{BF_3/150^\circ C} C_2H_5COOC_2H_5$

(ethyl propionate)

(27) **(C).**



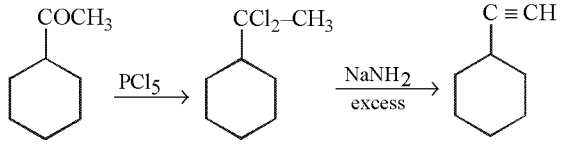
Phenol — O-acylated phenol



C-acylated phenol

(28) **(C).** Iodoform reaction requires a $H_3C-\overset{\overset{O}{\|}}{C}-$ group, which is not present in propan-1-ol, even after oxidation.

(29) **(C).**

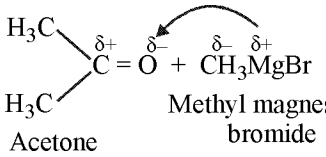


(30) **(C).** $2CH_3COOH + Ca(OH)_2 \rightarrow (CH_3COO)_2Ca + H_2O$

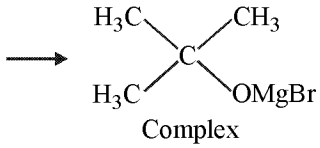
$$(CH_3COO)_2Ca \xrightarrow{\Delta} CH_3COCH_3 + CaCO_3$$

(31) **(D).** Among hydrogen halides, as the size of halide ion increases, its reactivity towards ethyl alcohol also increases. Thus, the order of reactivity of hydrogenhalides is HI > HBr > HCl > HF

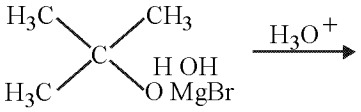
(32) **(B).**

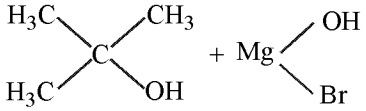


Acetone — Methyl magnesium bromide



Complex





'X' or $(CH_3)_3COH$

2- methyl propanol-2

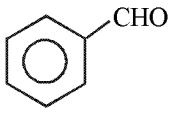
(33) **(C).** Acetic acid on reduction with lithium aluminiumhydride ($LiAlH_4$) gives ethyl alcohol while on reduction with HI and red P gives ethane.

$$CH_3COOH \xrightarrow{LiAlH_4} \underset{\text{ethyl alcohol}}{CH_3CH_2OH}$$

$$CH_3COOH \xrightarrow{\text{Red P+HI}} \underset{\text{ethane}}{CH_3-CH_3}$$

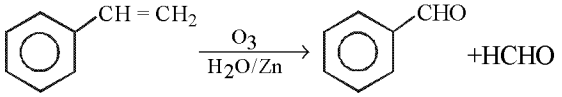
Hence, reagent A and B are respectively $LiAlH_4$ and HI/red P.

(34) **(B).** As Y is obtained from Etard's reaction, Y is

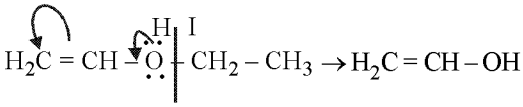


Z undergoes Cannizzaro's reaction. Hence Z is HCHO

$\therefore$ X is

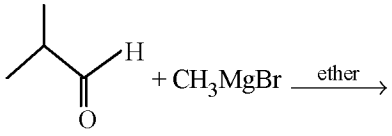


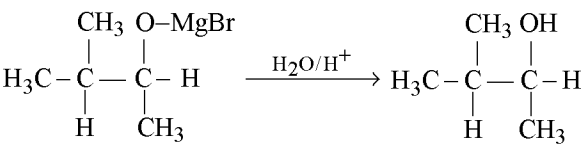
(35) **(D).**

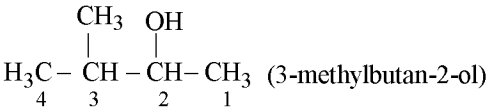


$$\leftrightarrow H_3C-CHO + CH_3CH_2I$$

(36) **(A).**

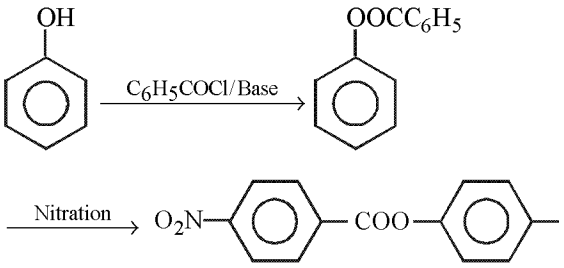




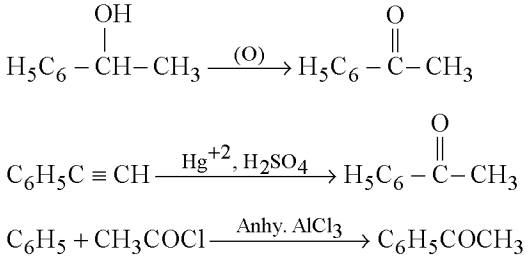


(3-methylbutan-2-ol)

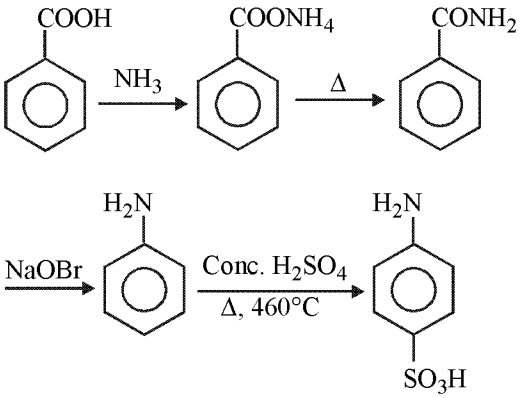
(37) **(A).**



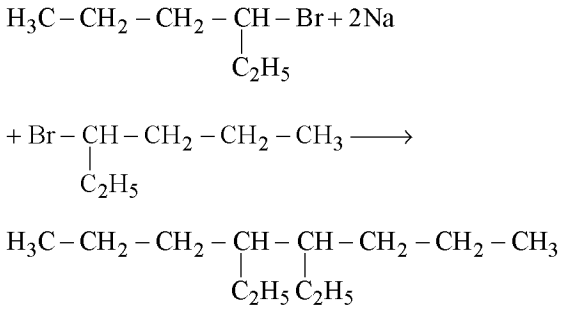
(38) **(B).**



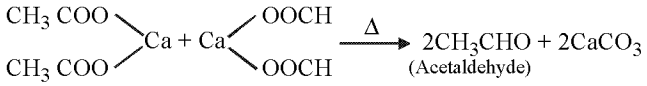
(39) **(C).**



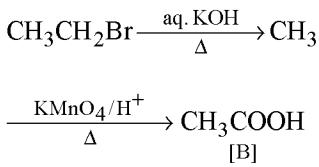
(40) **(D).**

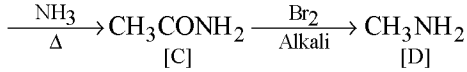


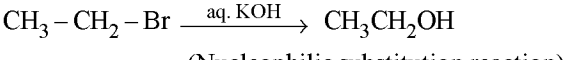
(41) **(B).**



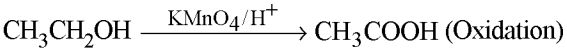
(42) **(D).**



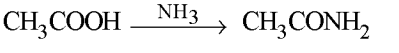


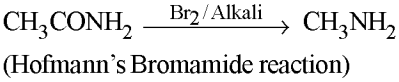


(Nucleophilic substitution reaction)



(Oxidation)



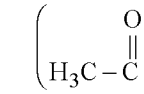


(Hofmann's Bromamide reaction)

(43) **(A).** Bromine in water

(44) **(A).** $R-CH_2OH + 2(O) \rightarrow RCOOH + H_2O$

When primary alcohol is oxidized, two hydrogens are removed and one oxygen is added to the molecule. Hence, molecular mass increases by 14 units.

(45) **(A).** Acetaldehyde  and acetone  due to presence of  group reacts with iodine in sodium hydroxide to give yellow crystals of iodoform.

(46) **(D).** The definition of the index of refraction is n = c/v, which means v = c/n. You should know that the speed must be less than 3.0×10^8 m/s. Writing n as a fraction (5/2) makes performing the division quite easy. The result is a speed of 1.2×10^8 m/s.

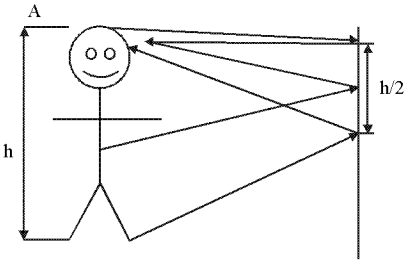
(47) **(B).** By Snell's law, we have $n_1 \sin\theta_1 = n_2 \sin\theta_2$. Because $n_1 > n_2$, we know that $\sin\theta_1 < \sin\theta_2$. Since the angles for refraction are always less than or equal to 90°, we can state with confidence that $\theta_1 < \theta_2$.

(48) **(D).** The critical angle is calculated when the refracted angle is 90°, or $\pi/2$ rad. The sine of this angle is 1. Therefore, $n_1 \sin\theta_1 = n_2$. For this problem, $n_2 = 2$ and $n_1 = 1$. This means $\sin\theta_1 = 1/2$. The angle that satisfies this is the critical angle. Numerically, it is 30 degrees, or $\pi/6$ radians.

(49) **(D).** The relationship between focal length and radius of curvature for a spherical mirror is f = R/2. Using this formula, we see that the focal length is 8 cm.

(50) **(D).** Remember that for a plane mirror, image distance equals object distance. Corners on the object near the surface of the mirror must lead to corners on the image that are near the surface of the mirror. You could also fold the paper along the mirror line and see which images overlap.

(51) **(A).**



The ray diagram illustrates the light path from the feet and other parts of the body to the eyes. If we make the approximation that our eyes are essentially at the top of our heads, then the ray from the feet to the eyes reflects off of a point on the mirror at half the body height. Rays from the knees, waist, and other parts of the body will reflect off points on the mirror higher than where the feet reflect. Hence, the mirror needs to extend from the level of the body midpoint to the top of the head level. It must be half a person's height with the top at head level.

(52) **(B).** First, find the image distance using the thin lens equation: $\frac{1}{s_i}+\frac{1}{s_0}=\frac{1}{f}$

where f is the focal length, 4 cm, s_i is the unknown image distance; and s_0 is the object distance, 8 cm. Substituting the numerical values and solving gives us s_i = 8 cm. Hence, the image is 8cm from the lens. Following the sign conventions, the fact that the image distance is positive tells us that the image is on the opposite side of the lens from the object. The light rays will actually cross at this point, so it is a real image.

The magnification, M, is given by this equation:

$$M=-\frac{s_i}{s_0}=-\frac{8cm}{8cm}=-1$$

The fact that the magnification is –1 tells us that the image is the same size as the object but is inverted. Therefore, the image is 8 cm from the lens on the opposite side from the object, real, and inverted.

(53) **(B).** In this case, the object is the sun, and the sun's image is the bright spot of light on the paper. Hence, the image distance is the distance between the lens and the bright spot on the paper, which is 12 cm. The object distance is the distance to the sun, which in this case is very close to infinity. When the object distance is infinity and its reciprocal is zero, the thin lens equation, $\frac{1}{f}=\frac{1}{s_i}+\frac{1}{s_0}$, gives $f = s_i$; the focal length equals the image distance. Hence, the focal length of the lens is 12 cm.

(54) **(D).** Due to insertion of slab, the optical path increases by x/μ, where x is thickness of slab.

Therefore the converging point will shift away by

$$\left[x-\frac{x}{\mu}\right]=x\left(1-\frac{1}{\mu}\right)$$

(55) **(A).** Since the wavelength of violet light is the smallest, therefore maximum deviation will occur for violet light.

(56) **(D).** Fringe width, $\beta=\frac{\lambda D}{d}$

From question, d' = 3d

$\therefore$ New fringe width, $\beta'=\frac{\lambda D}{d'}$

$\therefore$ $\beta'=\frac{\lambda D}{3d}=\frac{\beta}{3}$

(57) **(A).** Focal length of a convex lens having power 2.5D

$=\frac{1}{2.5}$ m

Also focal length of a lens in a medium of refractive index μ is given by

$$\frac{1}{f}=(\mu-1)\left(\frac{1}{R_1}-\frac{1}{R_2}\right)$$

$$2.5=\frac{1}{f}=\left(\frac{3}{2}-1\right)\left(\frac{1}{R_1}-\frac{1}{R_2}\right) \quad \text{.... (1) (in air)}$$

$$\frac{1}{f'}=\left(\frac{3}{4}-1\right)\left(\frac{1}{R_1}-\frac{1}{R_2}\right) \quad \text{.... (2) } [\because {}_{\ell}\mu_g=\frac{3}{4}]$$

(in liquid)

Dividing the two, $2.5f'=\frac{0.5}{-0.25}$

$$\Rightarrow \frac{1}{f'}=\frac{-5}{25\times0.25}=-1.25\ D$$

(58) **(A).** When sources are coherent, intensity at mid point is

$I_{max} = (a + a)^2 = 4a^2$

When sources are incoherent, no interference occurs. Intensity at mid point is

$I = I_1 + I_2 = a^2 + a^2 = 2a^2$

$\therefore$ $\frac{I_{max}}{I}=\frac{4a^2}{2a^2}=2:1$

(59) **(C).** The power of lens

$$P=\frac{1}{f}=\frac{1}{v}-\frac{1}{u}=\left[\frac{1}{25}-\frac{1}{N.P.}\right],$$

where N.P. = Near point of vision.

$$P=\left[\frac{1}{25}-\frac{1}{100}\right]=\frac{4-1}{100}=\frac{3}{100cm}=\frac{3}{1m}=3D$$

(60) **(C).** Here $f_1 = -20$ cm, $f_2 = +10$cm

Focal length of combination is,

$$\frac{1}{F} = \frac{1}{f_1} + \frac{1}{f_2} = \frac{1}{-20} + \frac{1}{10} = \frac{1}{20} \Rightarrow F = 20\text{cm}$$

Power of the combination, $P = \frac{100}{F} = \frac{100}{20} = +5D$

(61) **(C).**

(62) **(B).** For eye piece, $V_e = -25$cm, $f_e = 5$cm

$$\Rightarrow \quad \frac{1}{-25} - \frac{1}{u_e} = \frac{1}{5} \Rightarrow u_e = -\frac{25}{6}\text{cm}$$

$$v_0 = L - |u_e| = 10.5 - \frac{25}{6} = \frac{38}{6}\text{cm}$$

For objective, $\frac{1}{v_0} - \frac{1}{u_0} = \frac{1}{f_0}$

$$\frac{1}{38/6} - \frac{1}{u_0} = \frac{1}{1.9} \Rightarrow \frac{1}{u_0} = \frac{6}{38} - \frac{1}{1.9} \Rightarrow u_0 = 2.7\text{ cm}$$

(63) **(A).** $\Delta y = \frac{3\lambda D}{2d} = 1500 \times 10^{-7}$ m

(64) **(D).** $u = -25$ cm, $v = -75$ cm

$$\frac{1}{f} = -\frac{1}{u} + \frac{1}{v} = \frac{1}{25} - \frac{1}{75} = \frac{2}{75} \Rightarrow f = \frac{75}{2}$$

(65) **(C).** $m = -3, f = \frac{R}{2} = -\frac{30}{2} = -15\text{cm}$

$$m = \frac{f}{f-4} \; ; \; -3 = \frac{-15}{-15-4} \Rightarrow 45 + 3u = -15$$

$\Rightarrow \quad u = -20$cm.

(66) **(D).** $\theta_p + r = 90°$

$r = 90 - 57 = 33°$

(67) **(B).**

(68) **(A).** $n_1 \sin\theta = n_3 \sin 90° \; ; \; \sin\theta = n_3/n_1$

(69) **(A).** $n = \frac{\lambda_a}{\lambda_m} \Rightarrow \lambda_m = \frac{550}{4/3} = 376$ nm

(70) **(D).** $A = 2r$ for minimum deviation

$r = 60°/2 = 30°$

(71) **(C).** For plano convex lens, $f = \frac{R}{(n-1)}$; $R = 0.5\,f$

$$\frac{1}{2f} = \frac{1}{f} + \frac{1}{f_\ell} \Rightarrow \frac{1}{f_\ell} = -\frac{1}{2f} \Rightarrow f_\ell = -2f$$

$$f_\ell = \frac{R}{(n_\ell - 1)} \Rightarrow -2f = \frac{-0.5f}{n_\ell - 1}$$

$n_\ell - 1 = 0.25 \Rightarrow n_\ell = 1.25$

(72) **(B).** $\frac{n_2}{n_1} = \frac{1}{\sin C}$; $\frac{1}{\sin C} = \frac{\lambda_1}{\lambda_2} = \frac{6000}{4000} = \frac{3}{2}$

$C = \sin^{-1}(2/3)$

(73) **(C).** $\frac{n_g}{n_a} = \frac{c_a}{c_g}$; $\frac{3}{2} = \frac{3\times10^8}{c_g}$; $c_g = 2 \times 10^8$

$$t = \frac{\text{distance}}{\text{speed}} = \frac{4\times10^{-3}}{2\times10^8} = 2\times10^{-11}\text{s}$$

(74) **(A).** $r_2 = 0$ ($\because$ No refraction is there at second surface)

$\therefore \; r_1 = A = 30°$

$$n = \frac{\sin i_1}{\sin r_1} = \frac{\sin i_1}{\sin 30°} = \sqrt{2} \times \frac{1}{2} = \frac{1}{\sqrt{2}}$$

$\sin i_1 = \frac{1}{\sqrt{2}} \quad \therefore \; i_1 = 45°$

(75) **(A).** $n = \frac{\text{real depth}}{\text{apparent depth}} = \frac{6}{4} = \frac{3}{2}$

$\frac{n_1}{u} + \frac{n_2}{v} = \frac{n_1 - n_2}{R}$; $\frac{1.5}{6} - \frac{4}{17} = \frac{1.5-1}{R} \Rightarrow R = 34$cm.

(76) **(B).** $P_1 + P_2 = 9 \Rightarrow P = P_1 + P_2 - dP_1P_2$

$\frac{27}{5} = 9 - \frac{20}{100} \times P_1P_2$

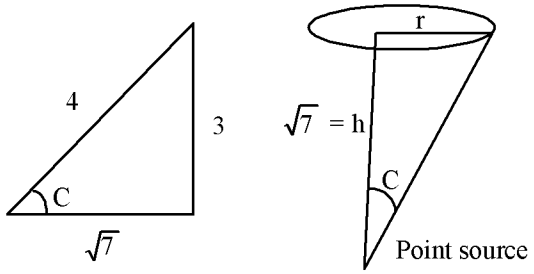
The above equation is correct for $P_1 = 3$, $P_2 = 6$.

(77) **(D).** Speed $\propto \lambda$

(78) **(B).** $\frac{1}{f_{eff}} = \frac{1}{f} + \frac{1}{f}$ for all cases

$\therefore \; f_1 : f_2 : f_3 = 1 : 1 : 1$

(79) **(A).** $\sin c = \frac{1}{n} = \frac{3}{4} \quad \therefore \; \tan c = \frac{3}{\sqrt{7}}$



Radius of the bright patch

$$r = h \tan c = \sqrt{7} \times \frac{3}{\sqrt{7}} = 3\text{m}$$

(80) **(C).** Thickness of the medium $= x\lambda_A = y\lambda_B$

$\Rightarrow \frac{\lambda_B}{\lambda_A} = \frac{x}{y}$

Refractive index of medium A with respect to medium B is $\frac{n_A}{n_B} = \frac{\lambda_B}{\lambda_A} = \frac{x}{y}$

(81) **(A).** For total internal reflection i > C

$$i > \sin^{-1}\left(\frac{v_1}{v_2}\right) \Rightarrow i > \sin^{-1}\left(\frac{1.5\times10^8}{2\times10^8}\right) ; \quad i > \sin^{-1}\left(\frac{3}{4}\right)$$

(82) **(D).** $\frac{R_1}{R_2} = \frac{1}{2} \Rightarrow R_1 = R \; ; \; R_2 = 2R$, f = 6 cm, n = 1.5

$$\frac{1}{f} = (n-1)\left[\frac{1}{R_1} + \frac{1}{R_2}\right] ; \quad R_1 = 4.5 \text{ cm}, R_2 = 9 \text{ cm}.$$

(83) **(B).** Both directly proportional to thickness

$$L_s = \frac{t\,[\sin(i-r)]}{\cos r} ; \quad L_N = t\left[1-\frac{1}{n}\right]$$

(84) **(A).** At the second surface light ray grazes so $n_2 > n_3$
At 1st surface light ray under goes refraction $n_2 > n_1$

(85) **(D).** $\phi = \frac{2\pi}{\lambda}\times\frac{\lambda}{6} = \frac{\pi}{3} = 60° \; ; \; I = I_0\cos^2(\phi/2)$

$$\frac{I}{I_0} = \cos^2(30°) = \left(\frac{\sqrt{3}}{2}\right)^2 = \frac{3}{4} = 0.75$$

(86) **(A).** $2nt\cos(r) = (2m+1)\frac{\lambda}{2}$

$$2\times1.5\times t\cos(0°) = (2(0)+1)\frac{\lambda}{2}$$

$$3t = \frac{\lambda}{2} \text{ or } t = \frac{\lambda}{6} = \frac{600\text{nm}}{6} = 100\text{nm}$$

(87) **(B).** $\frac{\sin\theta}{N} = n\lambda$

For maximum number of diffraction maxima $\theta = 90°$

$$n = \frac{1}{\lambda N} = \frac{1}{6.25\times10^{-7}\times2\times10^5} = 8$$

$\therefore$ Number of maxima = 2n + 1 = 2 × 8 + 1 = 17

(88) **(B).** $I \propto \frac{1}{\lambda^4}$; $\frac{I_2}{I_1} = \left(\frac{\lambda_1}{\lambda_2}\right)^4 = \left(\frac{500}{400}\right)^4 \simeq 25$

$I_2 = I_1(2.5) = 8 \times 2.5 = 20$

(89) **(D).** Over the wave front all the points are in same phase.

(90) **(A).** $A = \sqrt{A_1^2 + A_2^2 + 2A_1A_2\cos\phi}$

$$I = 9A^2 + 4A^2 + 2\times3A\times2A\times\frac{1}{2} = 19A^2$$

(91) **(B).**

(92) **(D).** Diptheria, leprosy and plague are the bacterial diseases of humans. Diptheria is a serious air-borne contagious disease. It is caused by *Cornybacterium diptheriae* which is a Gram-positive bacterium. It is inhaled through droplets and reaches to respiratory tract and infects it. Leprosy or Hansen's disease is a contact disease, caused by bacterium *Mycobacterium leprae*. It degenerates the tissues and deforms the body organs. Plague is a disease caused by bacterium *Yersinia pestis* or *Pasteurella pestis.*

(93) **(D).** A major problem in the treatment of bacterial mediated diseases is that many bacteria have been found to show resistance to antibiotics. The emergence of antibiotic-resistant bacteria is closely linked to the extent that antibiotics are used in humans and items of human diet. Resistant strains may appear rapidly or slowly, according to the amount or type of antibiotic used. Bacteria occur in such large numbers that there is a high chance of a mutant individual eventually appearing in the population. As soon as it does, use of the antibiotic to which it is resistant will give it a selective advantage over non-resistant types and it will multiply and eventually become the dominant type. Antibiotics may also be destroyed by enzymes inside the cells being targetted. A well-known and important example is the group of enzymes known as penicillinases which hydrolyses and destroys penicillins and cephalosporins.

(94) **(A).** The predator develops a preference to other diets and can give unforeseen negative results that could outweigh all benefits. For example, when the mongoose was introduced in Hawaii in order to control the rat population, it preyed on the endemic birds of Hawaii, especially their eggs, more often than it ate the rats. As most of the birds feed on insect and keep insect population low. The mangoose who destroy birds acts as secondary pest.

(95) **(C).** *Entamoeba histolytica* is a monogenetic parasite, i.e., living in a single host, in the large intestine of humans. It causes amoebiasis or amoebic dysentery.

(96) **(D).** DPT vaccine is a combined vaccine against diphtheria. whooping cough (pertussis), and tetanus now replaced by the DTaP/IPY/Hib and DTaP/IPY vaccines.

(97) **(D).** Haemophilia B is due to deficiency of factor (Christmas factor). The patient may experience prolonged bleeding following any injury or wound, and in severe cases there is spontaneous bleeding into muscles and joints.

(98) **(C).**

(99) **(C).**

Crop	Variety	Resistance to diseases
Wheat	Himgiri	Leaf and stripe rust, hill bunt
Brassica	Pusa swarnim	White rust
Cowpea	Pusa komal	Bacterial blight
Chilli	Pusa sadabahar	Chilly mosaic virus

(100) **(D).** Common cold can take place from one person to other as it is a communicable in nature. Typhoid occurs by the intake of contaminated water & food. While ringworm is one of the skin disease which can transfer from one person to other by the use of infected towel & handkerchief, AIDS (Acquired Immuno deficiency) does not occur or transfer by shaking hands.

(101) (B) **(102)** (D)

(103) (B) **(104)** (D)

(105) **(A).** Because of active immunity, you usually do not get certain diseases more than once.

(106) (B). Semi dwarf variety IR-8 was developed in philippines.

(107) (D).

(108) (C). Micropropagation is the practice of rapidly multiplying stock plants material to produce a large no. of progeny plants with similar genetic make up, using moderm plant tissue culture methods.

(109) (A). Vincristin is a sec. metabolite obtained from catharanthus roseus.
Anthocyanin is a secondary metabolite that is produced by Daucus carota
Menthol is produced by Mentha piperata.
Nicotine is produced by Nicotiana tabacum.

(110) (D). $\underset{\text{(Acetic acid)}}{\text{Organic acid}} \xrightarrow[\text{Bacteria like methanococcus methanobacillus}]{\text{Methanogenic}}$ Methane (Biogas) + CO_2

(111) (A). Pusa shubhra, Pusa snowball K-1 of cauliflower is for the disease curl blight black rot or black rot. Pusa sodabahar of chilli is for the disease leaf curl and chilli mosaic virus. Himgiri of wheat is resistant to leaf and stripe rust.

(112) (A). The initial step in preparation of beer is malting i.e. the process where barley grains are made ready for brewing

(113) (C). Heroin is diaceths marphine, It is also sedative.

(114) (B). *Nagpuri* is breed of *buffales*.

(115) (B).

	Name of disease	**Symptoms**
Mercury	Minamata disease	Abdominal pain, Haemolysis
Lead	Plumbism	Anaemia and Convulsions
Arsenic	Black foot disease	Hyperkeratosis and liver cirrhosis
Cadmium	Itai-Itai disease	Bone deformation testicular atrophy

(116) (C). Memory B - Cell divided into plasma-B-cells and given rise to antibodies.

(117) (A). **(118) (D).** **(119) (D).**

(120) (A). *Acetobacter aceti* is the source of acetic acid.

(121) (B). Colostrum is mother's first milk which is rich in immunoglobulins which provides Naturally acquired passive immunity.

(122) (D). Plasmodium falciparum causes cerebral malaria which is life threatening so is called as Malignant malaria.

(123) (A). Coat's disease is associated with eye, in which large white masses are developed deeply in the blood vessels of retina.
Alzheimer's disease is a brain disease. The people with this disease have
(i) Loss of neurons on the hippocampus and cerebral cortex.
(ii) Accumulation of intracellular proteins forming neurofibrilar tangles.
(iii) An accumulation of extra cellular protein deposits called, senile plaguses.

(124) (C). **Widal test** is performed for the diagnosis of typhoid fever in endemic areas. The patients serum is tested for O and H antibodies against their antigen suspensions. The stained Salmonella antigens are the diagnostic reagents for the in vitro detection and quantitative estimation of specific antibodies present in serum by rapid slide and conventional tube agglutination tests.
Dengue fever is a viral disease and spread by *Aedes aegypti*.
Cholera is communicable bacterial disease caused by *Vibno cholerae* and transmitted through contaminated food, drinks, etc. Malarial fever is a communicable protozoan disease caused by species of *Plasmodium* and transmitted through female *Anopheles* mosquito.

(125) (A). Living organisms or their products used for insect control are called bioinsecticides. Vedolian beetle (*Rhoiola cardinalis*) is a bioinsecticide against cottony cushion scale (*Icerya purchasi*).

(126) (C). When more than one species of *Plasmodium* infact the patient or when 2 or 3 generations of parasites mature on successive days, the fever is repeated daily. This is called, quotidian malaria.
Quartan malaria is caused by *Plasmodium malariae*. It is characterised by recurrence of fever every fourth day.
Tertian malaria is caused by *Plasmodium vivax* and characterised by recurrence of fever evety third day.
Aestivo-autumnal malaria is caused by *P. falciparum*. The fever is often fatal to the patient as it affects the brain.

(127) (A). **Parkinson's disease** also known as paralysis agitans results from widespread destruction of that portion of the substantia nigra (Pars compacta of **mesencephalon** (midbrain) that sends dopamine secreting nerve fibres to the caudate nucleus and putamen. The diseases is characterised by
(i) Rigidity of much of the musculature of body.
(ii) Involuntary tremor of the involved area.
(iii) Serious difficulty in initiating movement called **akinesia**.
Broca's aphasia and Wernicke's aphasia are due to injury in frontal lobe and temporal lobe of the cerebrum of brain.

(128) (D). Polioviruses are more stable than most other viruses and can remain infectious for relatively long period in water and food. The primary mode of transmission is ingestion of water contaminated with feaes containing the virus. It's primary area of multiplication are the throat and small intestine. Next the virus invades the tonsils and the lymph nodes of the neck and ileum. From the lymph nodes the virus enters to blood and by penetrating the capillary walls enters the central nervous system. The virus displays high affinity for particularly motor nerve cells and multiplies within the cytoplasm of motor nerve cells, hence, the cell die and results **paralysis**.

(129) (A). The alkaloid reserpine is obtained from bark of root of *Rauwoiffia serpentina*. It reduces the high blood pressure and mental hypertension. *Rauwoiffia* was first medicinal plant to be reported to cure a disease.

(130) (D). Bread wheat (*Triticum aestivum*) is hexaploid and used in making bread.
Durum wheat (*Triticum durum*) is tetraploids and used in mecarnii and noodles.

(131) (B). Mass selection is oldest method of selection and is useful in cross pollinated crops.
e.g., Bajara: Pusa moti
Cotton: Cambodias, Dharwar American
The progeny of single, self-pollinated homozygous individual is known as pureline. Choosing the desired purelines from a group of purelines is called as pureline selection. It is applied to only self-pollinated crops.
e.g., TMV-3 of groundnut.

(132) (C). Hirudin is an anticoagulant protein found in leech (*Hirudinaria*). It is now produced through genetic engineering from seeds of *Brassica napus*. The gene encoding hirudin was transferred into *Brassica napus* where hirudin accumulates in seeds which is purified and used medicinally.

(133) (B). White revolution — Milk production
Golden revolution — Egg production
Blue revolution — Fish production

(134) (D). Azadirachtin, meliantial and salanin obtained from *Azadirachta indica* (neem) are insect repellent as well as antifeedant. It is perhaps the first natural insecticide used by man, it's fruits are used as biofertilizer.

(135) (B). Yellow vein mosaic disease is caused by virus in ladyfinger. It is characterized by stunted growth of leaves, yellowing and vein clearing of leaves and malformed fruits which are distorted and yellow-green in colour.

(136) (C). Measles is a viral disease while diphtheria cholera and whooping cough are bacterial diseases.

(137) (A). In green manure quick growing crops cultivated and ploughed into the soil which increase crop yield by 30-50%, eg, *Sesbania aculiata*, *Crotalaria juncea*, *Vigna sinensis* etc.

(138) (A). Caffeine is an alkaloid derived from the leaves of tea plant (*Thea sinensis*), seeds of coffee and seeds of cacao plants. It increases alertness and thought.

(139) (B).

Drug	Plants	Part used
Quinine	*Cinchona officinale*	Bark
Sarpgandha	*Rauwolfia serpentina*	Roots
Isubgol	*Plantago ovata*	Fruits and seeds
Azadirachtin	*Azadirachta indica*	Bark and seeds

(140) (A). Human Immuno Deficiency virus has three main routes for transmission.
(i) Through sexual intercourse (65%).
(ii) Transmission through blood transfusion, blood products and contaminated equipments (10%).
(iii) Transmission from mother to baby (25%).

(141) (D). Mosquitoes are carriers of malaria, filaria and yellow fever.
Malaria — *Anopheles mosquito* (female)
Filariasis — *Culex* (female)
Yellow fever — *Aedes* (female)

(142) (A). *Triticale* is a man made cereal obtained by intergeneric cross between bread wheat (*Triticum* = 42) and rye (*Secale* = 14) followed by colchicine treatment.

(143) (D).

(144) (B).

(145) (D). Bovine means cow.
Bovine spongiform encephalopathy is mad cow disease.

(146) (C). In Type 1 diabetes, too little or no insulin is produced by the pancreas.

(147) (B). bacterium Helicobacter pylori causing peptic ulcer.

(148) (B). Muga silk by Antheraea assama
Eri silk by Philosamia ricini

(149) (D). Coconut milk contain cytokinin.

(150) (C).

(151) (B).

(152) (C). The malignant cells have no contact inhibition.

(153) (B).

(154) (B).

(155) (A). It is found from zygote by multiple fusion are found in the salivary glands of mosquito.

(156) (A). The cancerous cells have no contact inhibition. They spread from one part of body to other. Here proto-oncogene is activated into oncogene and tumour suppressor gene is inactivated by mutations.

(157) (B).

(158) (B).

(159) (C).

(160) (A). Virus-infected cells secrete proteins called interferons which protect non-infected cells from further viral infection.

(161) (D).

(162) (C). Hallucination means apparent perception of external objects or sounds not actually present. It is caused by psychedelic drugs or hallicinogens. The hallucinogens act mainly on CNS (central nervous system) and greatly alter one's thoughts, feelings and perceptions. Hashish is the example of hallucinogen.

(163) (B). Valium is a benzodiazephine (sedative) that gives a feeling of relaxation, calmness or drowsiness in the body. Morphine is the main opium alkaloid that depresses respiratory centre and contributes to the fall in blood pressure. Amphetamines are synthetic drugs and are stimulant in nature. Hashish is a hallucinogen.

(164) (A). The T-lymphocytes mediate cell-mediated immunity (CMI). The T-cells themselves do not secrete antibodies but help B cells produce them.

(165) (A). Borderline personality disorder (BPD) is a serious mental illness. Borderline describing a personality disorder characterized by unstable and intense relationships, exploiting and manipulating other people, rapidly changing moods, recurrent suicidal or self injuring acts & a prevasive inner feelings of emptiness & boredom. A mood disorder is a condition where the prevailing emotional moods are distorted or inappropriate to the circumstances. Addiction is a state of dependence produced by the habitual taking of drugs, alcohol etc. Schizophrenia is a group of severe mental disorders characterized by disturbances of languages and communications, thought disturbances that may involve distortion of reality, misperceptions, delusions and hallucination, mood changes etc.

(166) (A).

(167) (C). *Entamoeba histolytica* is a protozoan parasite in the large intestine of human which causes amoebiasis (amoebic dysentery).
Streptococcus pneumoniae and *Haemophilus influenzae* are responsible for the disease pneumonia in humans which infects the alveoli (air filled sacs) of the lungs. *Plasmodium*, a tiny protozoan is responsible for malaria. Typhoid fever could be confirmed by Widal test.
Wuchereria (*W. bancrofti* and *W. malayi*), the filarial worms cause a slowly developing chronic inflammation of the organs in which they live for many years, usually the lymphatic vessels of the lower limbs and the disease is called elephantiasis or filariasis.

(168) (D).

(169) (B). All cyanophyceae member's are biofertilizers because they has fixing of N_2 *e.g. Nostoc, Rebulla, Rhizobia* etc.

(170) (D).

(171) (B).

(172) (D). *Papaver somniferum* and *Erythroxylon coca*. Smack (Diacetyl morphine) obtained from poppy plant (*Papaver somniferum*)coke, (crack) is obtained from coca plant (*Erythroxylum coca*).

(173) (C). Sonalika and Kalyan Sona wheat varieties introduced to India in 1963.

(174) (B)

(175) (A)

(176) (C)

(177) (D)

(178) (C). Inbreeding involves mating of males and females of the same breeds closely related to each other. Cross breeding involves mating of males and females of two different breeds. Inter-specific hybridization mating of males and females of two different species.

(179) (C). *Ascaris* infects intestine. *Wuchereria* causes filariasis. *Trichophyton* causes ringworm. *Plasmodium* causes malaria.

(180) (A).