1. (c)

Sol. Maximum KE of emitted electron only depends on frequency.

2. (d)

Sol. $\nu = 1.5\ \nu_0$

if it is halved then $\nu' = 0.75\ \nu_0$

Which is less than ν_0.

So current should be zero.

3. (b)

Sol. $E = \frac{12420}{3500} = 3.54$ eV

So electron will be emitted only from B.

4. (c)

Sol. No. of photons are used for emission of e^-.

5. (b)

Sol. $E = \phi + eV_0$

$E = 6.2$ eV + 5eV = 11.2 eV

$\lambda = \frac{12420}{11.2} = 1108\ .\ 9$eV

Which lies in U.V. region.

6. (a)

Sol. $P = \frac{I}{C} = \frac{1.4\times10^3}{3\times10^8}$

Force = P × A

7. (b)

Sol. $E = \phi + K_{max}$

$K_{max} = 4\ h\nu - h\nu = 3h\nu$

8. (a)

Sol. By using $\lambda = \frac{h}{mv} \Rightarrow \lambda = \frac{\lambda}{1\times1} = h.$

9. (c)

Sol. By using Einstein's equation $E = W_0 + K_{max}$

$\Rightarrow \quad 6 = 2.1 + K_{max} \quad \Rightarrow K_{max} = 3.9\, eV$

Also $V_0 = -\frac{K_{max}}{\rho} = -3.9\, V.$

10. (a)

Sol. $\lambda_{min} = \frac{12375}{40 \times 10^3} = 0.309\, \mathring{A} \approx 0.31\ \mathring{A}$

11. (c)

Sol. Using $\frac{1}{\lambda} = RZ^2\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right) \Rightarrow \lambda \propto \frac{1}{Z^2}$

$\Rightarrow \lambda_{Li} : \lambda_{He^+} : \lambda_H = \frac{1}{9} : \frac{1}{4} : \frac{1}{1} = 4 : 9 : 36$

12. (d)

Sol. ${}_{Z=90}Th^{A=228} \rightarrow {}_{Z'=83}Bi^{A'=212}$

Number of α-particles emitted

$n_\alpha = \frac{A - A'}{4} = \frac{228 - 212}{4} = 4$

Number of β-particles emitted

$n_\beta = 2n_\alpha - Z + Z' = 2 \times 4 - 90 + 83 = 1.$

13. (a)

Sol. $\frac{1}{\lambda} = R\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)$

$\frac{1}{\lambda_1} = R\left[\frac{1}{2^2} - \frac{1}{3^2}\right]$

$= R\left(\frac{1}{4} - \frac{1}{9}\right) = \frac{5R}{36}$

$\frac{1}{\lambda_2} = R\left[\frac{1}{1} - \frac{1}{4}\right]$

$= R\left(\frac{3}{4}\right) = \frac{3}{4}R$

$\therefore \quad \frac{\lambda_2}{\lambda_1} = \frac{5/36}{3/4} = \frac{5}{36} \times \frac{4}{3} = \frac{5}{27}$

$\lambda_2 = \frac{5}{27}\lambda_1$

$\lambda_2 = \frac{5}{27} \times 6563\text{Å} = 1215.4\text{Å}$

14. (a)

Sol. The energy difference between the energy levels in an atom remains fixed. Hence wavelength remains fixed.

$$\boxed{\lambda = \frac{hc}{\Delta E} \Big| = \frac{hc}{E_f - E_i}}$$

Increasing number of atoms would increase the intensity absorbed.

15. (a)

Sol. $\frac{e}{m}$ should be same.

16. (a)

Sol. $\frac{1}{2} mv^2 = \frac{9\times10^9 (Ze)(Ze)}{r}$

17. (a)

Sol. When no. of electrons increase then number of photons emitted also increase thereby increasing the intensity.

Energy, wavelength and frequency of photon are related to potential difference.

18. (a)

Sol. Mass of nucleus should be less than mass of nucleons.

19. (a)

Sol. $E = mc^2 \Rightarrow E = \left(\frac{0.1}{100} \times 1\right) \times (3 \times 10^8)^2$ joule

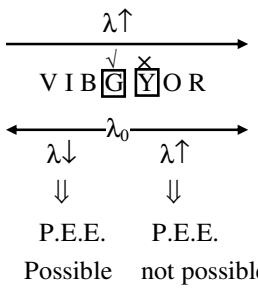
20. (a)

Sol. $eV_S = h\nu - \phi = K_{max}$

$V_S = 3$ eV

21. (d)

Sol.



*Green is a threshold of metal

So it is not possible from red light.

22. (b)

Sol. $V_0 = \frac{h}{e}\nu - \frac{W}{e}$

V_0 → y, ν → x

y = mx – c (straight line).

23. (b)

Sol. Photoelectric effect.

24. (a)

Sol. As the source is taken away, the intensity of light reaching the target decreases and hence the photo current decreases. But as motion of the source does not affect frequency of light, the stopping potential given by $V_0 = \frac{h\nu}{e} - \frac{\phi}{e}$, remain the same.

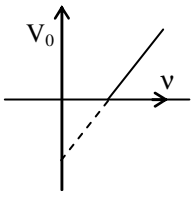
25. (c)

Sol. Density is independent of mass number

26. (b)

Sol. Use $eV_0 = h\nu - \phi$

or $V_0 = \frac{h}{e}\nu - \frac{\phi}{e}$



27. (d)

Sol. $0 \le K.E. \le K_{Max}$

28. (c)

Sol. $\phi = \frac{hc}{\lambda_0}$

$\phi = \frac{20\times10^{-26}}{5000\times10^{-10}} = 4 \times 10^{-19}$ Joule

29. (a)

Sol. $K.E._{max} = 4h\nu_0 - h\nu_0$

$K.E._{max} = 3\ h\nu_0$

30. (a)

Sol. $\lambda_{th} = \frac{hc}{\phi} = \frac{12400}{4}$ Å $= 3100$ Å $= 310$ nm

$\lambda \leq \lambda_{th}$

$\Rightarrow \lambda \leq 310$ nm

31. (a)

Sol. Intensity $\propto$ Number of photons $\propto$ Number of emitted electrons

32. (d)

Sol. $\lambda_R > \lambda_Y > \lambda_g$

$E_R < E_Y < E_g$

So electrons will not be emitted.

33. (b)

Sol. $E = \frac{12400}{\lambda_{(Å)}}$ eV

$E = \frac{12400}{8000Å} = 1.6$ eV

34. (a)

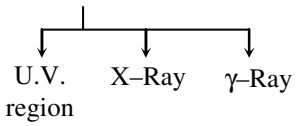
Sol. Diffraction shows wave nature and photoelectric effect shows particle nature.

35. (c)

Sol. $\lambda_0 = 5200$ Å [visible range]

$\lambda \leq \lambda_0$ [for photo electron emission]

$\lambda \leq$ visible range



36. (b)

Sol. $E = \phi + eV$

$eV = \frac{hc}{\lambda} - \phi$

$V = \frac{hc}{e} \times \frac{1}{\lambda} - \frac{\phi}{e}$

Slope = $\frac{hc}{e}$

37. (c)

Sol. $L = mvr = \frac{nh}{2\pi}$

38. (b)

Sol. $\lambda = h/p$ is correct for photon as well as for physical particle

39. (c)

Sol. $P = E/c = mv$

40. (a)

Sol. $\lambda_{Green} < \lambda_{Yellow} < \lambda_{Red}$

According to the question λ_{Green} is the maximum wavelength for which photoelectric emission takes place. Hence no emission takes place with red light

41. (b)

Sol. The mean ionization potential is a defined as the average energy needed to produce a pair of positive and negative ions, which the average of molecular binding energies.

42. (a)

Sol. $mvr = \frac{nh}{2\pi}$

$\therefore \frac{h}{mv} = \frac{(2\pi r)}{n}$

$\frac{h}{mv}$ = de-Broglie wavelength

43. (a)

Sol. $E = \frac{hc}{\lambda}$

44. (b)

Sol. $T \propto n^3 \quad (r \propto n^2)$

$T \propto r^{3/2}$

45. (c)

Sol. Photon travels with speed of light

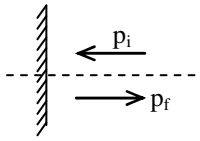
46. (b)

Sol. $E = mc^2 = h\nu$

$p = mc = \frac{h\nu}{c}$

47. (b)

Sol.



let $p = E/c$

$\Delta p = \frac{E}{c} - \left(-\frac{E}{c}\right) = \frac{2E}{c}$

48. (c)

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

$\lambda \propto E^{-1/2}$

49. (c)

Sol. $p = \frac{E}{c} = \frac{h\nu}{c} = \frac{h}{\lambda} = \frac{6.63\times10^{-34}}{10^{-8}}$

$= 6.63 \times 10^{-26}$ kg-m /s

50. (a)

Sol. $\frac{0.287\text{Å}}{\sqrt{V}} = 0.4\text{Å}$

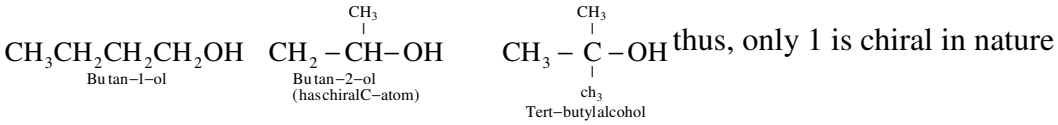
$V = 0.51$ volt

$E = 0.51$ eV

SECTION-A

51. (a)

Sol. Possible structures of alcohols with molecular formula $C_4H_{10}O$ are



thus, only 1 is chiral in nature

52. (b)

Sol. The process of converting alkyl halides into alcohols involves substitution reaction.

53. (a)

Sol. A repulsion between the two bulky R groups.

54. (c)

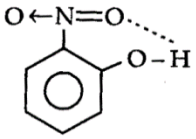
Sol. In Lucas test, turbidity appears immediately with tertiary alcohol by S_N1 mechanism

55. (b)

Sol. 2, 4, 6-Trinitrophenol is commonly known as picric acid.

56. (a)

Sol. o-Nitrophenol is stable due to intramolecular hydrogen bonding.



It is difficult to break the H-bonding when dissolved in water thus less soluble.

57. (c)

Sol. More the number of methyl groups (electron releasing) lesser will be the acidity. Hence the reactivity towards sodium metal will be tert. <sec. < pri.

58. (b)

Sol. Presence of electron releasing group decreases the acidity of the alcohols hence t<s<p

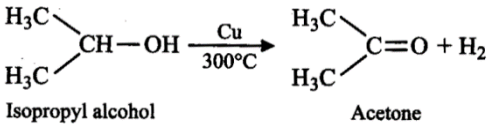
Hence

$CH_3OH > C_2H_5OH > (CH_3)_2CHOH > (CH_3)_3COH$

59. (a)

Sol. (a) Phenol $\xrightarrow[300°C]{Cu}$ benzyl alcohol is not true.

(b) Secondary alocohol $\xrightarrow[500°C]{Cu}$ keton is true

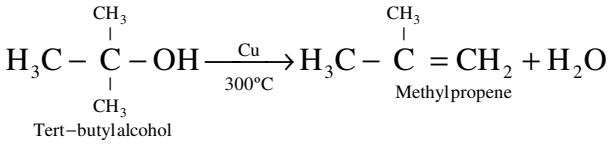


(c) Primary alcohol $\xrightarrow[300°C]{Cu}$ aldehyde is true

$C_2H_5OH \xrightarrow[300°C]{Cu} CH_3CHO + H_2$

Ethanol — Acetaldehyde

(d) Tertiary alcohol $\longrightarrow$ olefin is true.



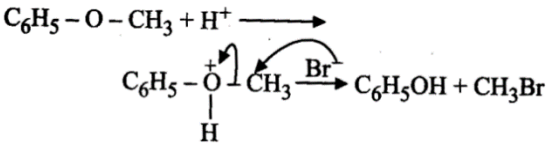
Tert–butylalcohol — Methylpropene

60. (b)

Sol. $CH_3-CH_2-OH \xrightarrow[KMnO_4]{[O]} CH_3-CHO$(oxidation)

61. (d)

Sol.

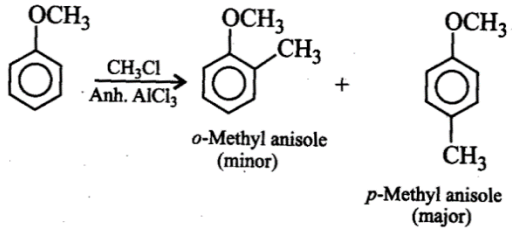


62. (a)

Sol. Ethers have lower boiling points than the corresponding isomeric alcohols because of absence of hydrogen bonding in ethers.

63. (c)

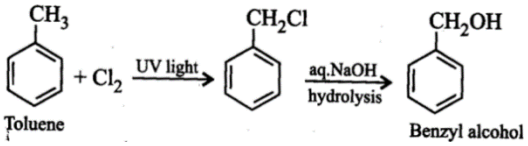
Sol.



o-Methyl anisole (minor) + *p*-Methyl anisole (major)

64. (d)

Sol.



Toluene — Benzyl alcohol

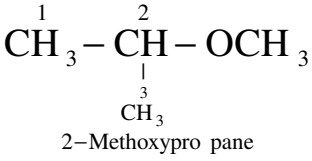
65. (c)

Sol. Pyridinium chorochromate (PCC), a complex of chromium trioxide with pyridine and HCl gives good yield of aldehydes and prevents further oxidation to carboxylic acids

$CH_3CH_2OH \xrightarrow{PCC} CH_3CHO$

66. (c)

Sol.



2–Methoxypro pane

67. (b)

Sol. Weakest acid has the strongest conjugate base since ROH is the weakest acid, therefore RO^- is the strongest base.

68. (a)

Sol. Boiling point increases with increase in molecular mass and decreases with increase in branching.

69. (a)

Sol. (i) $CH_3CH_2CH_2CH_2CH_2OH$ and

$CH_3\underset{\underset{CH_3}{|}}{CH}CH_2CH_2OH$

chain isomersim

(ii) CH_3CH_2OH and CH_3OCH_3

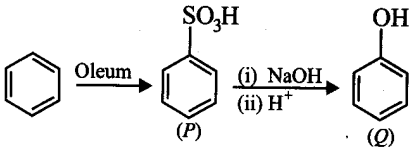
functional isomersim

(iii) $CH_3CH_2CH_2CH_2OH$ and $CH_3\underset{\underset{OH}{|}}{CH}-CH_2CH_3$

Position isomersim

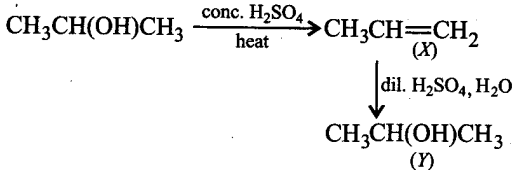
70. (b)

Sol.



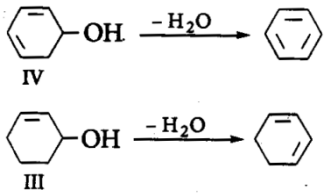
71. (a)

Sol.

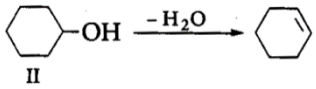


72. (a)

Sol. Dehydration of IV is most facile since, it gives an aromatic compound. Dehydration of III gives a conjugated diene which is stablilized by resonance.



Dehydration of II gives only cyclohexene which is not stabilized by resonance.

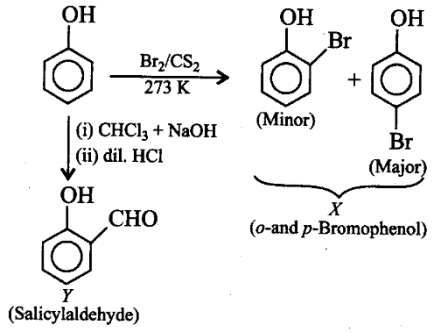


In contrast phenol (I) does not undergo dehydration this the ease of dehydration is:

IV > III > II I

73. (b)

Sol.



74. (a)

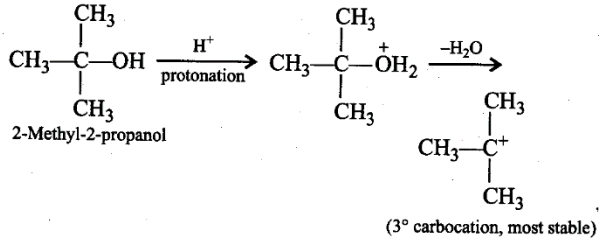
Sol. (A) → (ii), (B) → (iii), (C) → (iv), (D) → (i)

75. (d)

Sol. Chlorobenzene does not undergo hydrolysis on treatment with aqueous NaOH at 298 K

76. (b)

Sol. The tertiary carbocation formed during dehydration of 2-methyl-2-propanol is most stable.

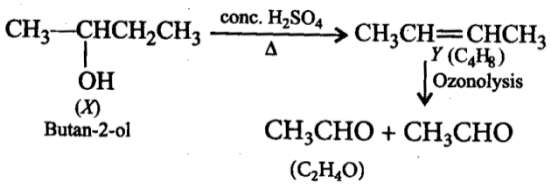


77. (c)

Sol. $\underset{(X)}{CH_3CH_2CH_2OH} \xrightarrow{[O]} \underset{(Y)}{CH_3CH_2COOH}$

78. (b)

Sol.

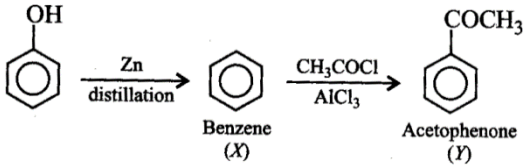


79. (d)

Sol. Presence of electron withdrawing groups such as nitro group enhances the acidic strength of phenol and the presence of electron releasing groups such as alkyl group decrease the acidic strength of phenol.

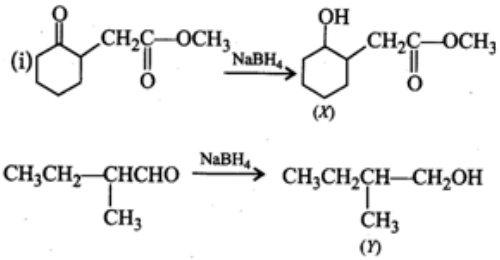
80. (b)

Sol.



81. (c)

Sol.



82. (c)

Sol. 2-Chloroethanol is more acidic due to –I effect of chlorine.

83. (b)

Sol. $\underset{(A)}{CH_3CH_2CH_2OH} \xrightarrow[H_2SO_4]{\Delta} CH_3CH=\underset{(B)}{CH_2} + H_2O$

$\underset{(B)}{CH_3CH=CH_2} + HCl \longrightarrow CH_3\underset{\underset{(C)}{Cl}}{CH}-CH_3$

$CH_3-\underset{\underset{(C)}{Cl}}{CH}-CH_3 + KOH_{(aq)} \longrightarrow CH_3-\underset{\underset{(D)}{OH}}{CH}-CH_3$

A and D are position isomers.

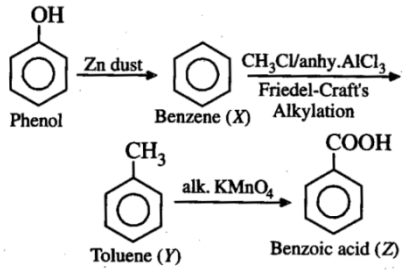
84. (b)

Sol. $CH_3CH_2CH_2OH \xrightarrow{HBr} CH_3CH_2CH_2Br$

$\xrightarrow[\text{Wurtz reaction}]{Na/\text{ether}} \underset{n-\text{hexane}}{CH_3(CH_2)_4CH_3}$

85. (b)

Sol.

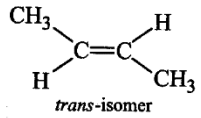


SECTION-B

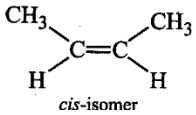
86. (a)

Sol.

$$\underset{(X)}{CH_3CH_2CH(OH)CH_3} \xrightarrow[H_2SO_4]{Conc} \underset{(Y)}{CH_3CH=CHCH_3}$$



trans-isomer



cis-isomer

87. (c)

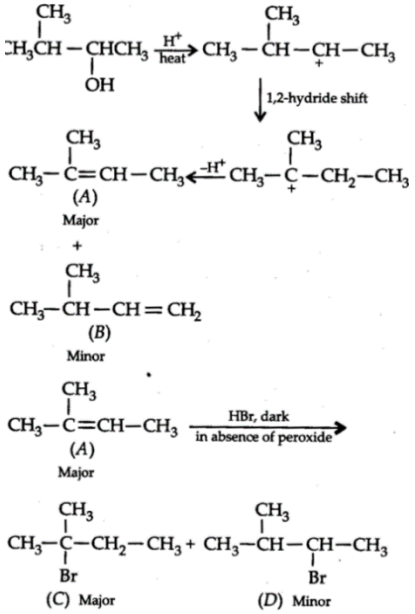
Sol. The organic liquid A is C_2H_5OH

(i) Ethyl alcohol is a colourless liquid with a characteristic pleasant smell, having boiling point 78.1^oC

(ii) $C_2H_5OH \xrightarrow{Conc.H_2SO_4} \underset{\text{Decolourises } Br_2 \text{ watter and alkaline } KMnO_4}{CH_2=CH_2}$

88. (b)

Sol.



89. (d)

Sol.

$$\underset{(X)}{CH_3CHBrCH_3} \xrightarrow{alc.KOH} \underset{(X)}{CH_3CH=CH_2}$$

$$\downarrow HBr, peroxide$$

$$\underset{(Z)}{CH_3CH_2CH_2OCH_3} \xleftarrow{CH_3ONa} \underset{(Y)}{CH_3CH_2CH_2Br}$$

90. (c)

Sol. (A) $\rightarrow$ (iv), (B) $\rightarrow$ (i), (C) $\rightarrow$ (vi), (D) $\rightarrow$ (v), (E) $\rightarrow$ (iii), (F) $\rightarrow$ (ii)

91. (a)
Sol. Chlorofluoro carbons (CFC's) come in contact with
atmospheric gases and enventually reach stratosphere where they cause depletion in ozoen layer.

$CF_2Cl_2(g) \xrightarrow{uv} \dot{C}l(g) + \dot{C}F_2Cl(g)$; $\dot{C}l + O_3 \longrightarrow Cl\dot{O}(g) + O_2(g)$; $Cl(g)\dot{O} \longrightarrow \dot{C}l(g) + O_2(g)$

92. (b)
Sol. Classical smog contains smoke, fog and sulpher dioxide. It occures in cool and humid climate.

93. (c)
Sol. During photosynthesis CO_2 is used by plants to make
food for their growth.

94. (a)
Sol. Drained sewags has BOD value more than 17 ppm while
clean water has less than 5 ppm.

95. (a)
Sol. Micro-organisms oxidise the organic contents of sewage water. Thus sewage water becomes free from organic
substances.

96. (a)
Sol. Domestic waste generally contains organic matter which
is biodegradable.

97. (d)
Sol. The presence of fertilizers and household wastes in water enhances the growth of algae. This algae cover the surface of water and reduces the oxygen concentration in water, thus fishes die in water bodies due to the lack of oxygen gas.

98. (c)
Sol. Photochemical smog is caused by oxides of sulphur and nitrogen.

99. (b)
Sol. Green chemistry involves such reactions which reduce
the use and production of hazardous or toxic chemical to reduce pollution from environment.

100. (d)
Sol. Ozone is present in stratosphere (about 20 km above the surface of the earth)

EDT-18 (NEET) SOLUTIONS

BOTANY	
Q. NO.	[ANS]
101	B
102	B
103	D
104	A
105	C
106	D
107	A
108	C
109	D
110	A
111	D
112	B
113	B
114	B
115	D
116	A
117	D
118	B
119	B
120	D
121	D
122	B
123	C
124	C
125	D

ZOOLOGY	
Q. NO.	[ANS]
151	B
152	C
153	C
154	B
155	C
156	D
157	A
158	C
159	D
160	B
161	B
162	A
163	D
164	D
165	D
166	B
167	A
168	A
169	B
170	C
171	C
172	B
173	B
174	B
175	A

BOTANY	
126	C
127	B
128	D
129	B
130	A
131	C
132	A
133	C
134	B
135	B
136	C
137	C
138	B
139	B
140	D
141	C
142	C
143	A
144	B
145	D
146	C
147	B
148	A
149	C
150	D

ZOOLOGY	
176	A
177	A
178	D
179	B
180	B
181	A
182	D
183	B
184	A
185	B
186	D
187	C
188	B
189	C
190	D
191	C
192	C
193	D
194	B
195	C
196	C
197	C
198	B
199	C
200	B