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(PG-EE-2016: CHEMISTRY)

Sr. No	120	69
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Time: 11/4 Hour	Max. Marks : 100	Total Questions: 100
Roll No.	(in figure)	(in words)
Name :	Father's Na	me :
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(Signature of the candid	ate)	Signature of the Invigilator

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- The candidates must return the Question book-let as well as OMR answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / misbehaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated
- In case there is any discrepancy in any question(s) in the Question Booklet, the same may be brought to the notice of the Controller of Examinations in writing within two hours after the test is over. No such complaint(s) will be entertained thereafter.
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Question No.	Questions
1.	$Y \xleftarrow{\operatorname{Br}_2} \underbrace{\bigcirc \operatorname{COOH}} \xrightarrow{\operatorname{HNO}_3} X$
	X and Y are
	<ul> <li>(1) Picric acid, 2, 4, 6 – tribromophenol</li> <li>(2) 4-nitro salicylic acid, 4-bromo salicylic acid</li> </ul>
	(3) o-nitrophenol, o-bromophenol
	(4) None is correct
2.	$ \begin{array}{c c} OCH_3 \\ \hline O \\ Br \end{array} $ NaNH <sub>2</sub> A
	Ais
d system	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
3.	$O \longrightarrow NO_2$ $O_2$ $O_2$ $O_2$ $O_3$ $O_4$ $O_4$ $O_4$ $O_5$ $O_4$ $O_5$ $O_4$ $O_5$
	A and B are
	(1) O-NHOH, HO-O-NH <sub>2</sub>
	(2) $\bigcirc$ NH-NH $\bigcirc$ , $H_2$ N $\bigcirc$ $\bigcirc$ NH <sub>2</sub>
	(3) $\bigcirc N = N - \bigcirc \rangle$ , $\bigcirc N = N - \bigcirc \rangle$
	(4) None is correct

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Question No.	Questions
No. 4.	$\begin{array}{c} \boxed{\bigcirc} + \mathrm{HC}\ell + \frac{1}{2} \ \mathrm{O}_2 & \longrightarrow \boxed{\bigcirc} - \mathrm{C}\ell \\ \\ \mathrm{This} \ \mathrm{is} \ \mathrm{called} \ \ \mathrm{reaction} \\ \mathrm{(1)} \ \ \mathrm{Sandmeyer} & \mathrm{(2)} \ \ \mathrm{Raschig} \\ \mathrm{(3)} \ \ \mathrm{Gatterman} & \mathrm{(4)} \ \ \mathrm{Hofmann} \\ \end{array}$
5.	$(1)  HO \longrightarrow (CH_3)_2 \xrightarrow{(i)  HNO_2} A + B$ $(1)  HO \longrightarrow (CH_3)_2 NH$ $(2)  HO \longrightarrow OH,  (CH_3)_2 NH$ $(3)  HO \longrightarrow NO,  CH_3 CH_2 NH_2$ $(4)  None \text{ is correct}$
6.	In the reaction sequence $C_6H_6\xrightarrow{CH_3C\ell}\xrightarrow{A\ellC\ell_3}$ (X) $\xrightarrow{KMnO_4}$ (Y)  The product (Y) is  (1) Chlorobenzene (2) Benzaldehyde  (3) Benzoic acid (4) Benzene
7.	HCHO in presence of aqueous HCl to give

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Question No.	Questions		
8.	Which is weaker base than aniline		
	(1) $\bigcirc$ NH <sub>2</sub> (2) $\bigcirc$ NHCOCH <sub>3</sub>		
	(3) $H_2N \longrightarrow C - CH_3$ (4) All		
9.	End product of following reaction is		
	O = C = O + HBr		
	(1) $O = \bigcirc = O$ (2) $HO = \bigcirc OH$ $Br$		
	(3) Br—OH (4) Br—OH Br		
10.	The reagent with which both aldehydes and ketones react easily is		
	(1) Fehling's reagent (2) Schiff's reagent		
	(3) Tollen's reagent (4) Grignard reagent		
11.	Which of the following compounds will exhibit geometrical isomerism		
	(1) 1, 1-diphenyl-1-propene (2) 3-phenyl-1-butene		
	(3) 2-phenyl-1-butene (4) 1-phenyl-2-butene		
12.	Propyne and propene can be distinguished by		
	(1) Conc. $H_2SO_4$ (2) $Br_2$ in $CCl_4$		
	(1) Conc. $H_2SO_4$ (2) $Br_2$ in $CCl_4$ (3) Dil. $KMnO_4$ (4) Ag $NO_3$ in ammonia		

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Question No.	Questions	
13.	Which of the following has the most acidic hydrogen  (1) 3-Hexanone (2) 2, 4-hexanedione (3) 2, 5-hexanedione (4) 2, 3-hexanedione	
14.	Ammonia can be dried by $ (1)  \text{Conc. H}_2 \text{SO}_4 \qquad \qquad (2)  \text{P}_4  \text{O}_{11} \\ (3)  \text{CaO} \qquad \qquad (4)  \text{Anhydrous CaC} l_2 $	
15.	Amongst H <sub>2</sub> O, H <sub>2</sub> S, H <sub>2</sub> Se and H <sub>2</sub> Te, the one with the highest boiling point is  (1) H <sub>2</sub> O because of hydrogen bonding  (2) H <sub>2</sub> S because of hydrogen bonding  (3) H <sub>2</sub> Te because of higher molecular weight  (4) H <sub>2</sub> Se because of lower molecular weight	
16.	When a mixture of one mole of C <sub>6</sub> H <sub>5</sub> COOH and one mole of C <sub>6</sub> H <sub>5</sub> OH is treated with one mole of NaHCO <sub>3</sub> , the product formed will consist of  (1) C <sub>6</sub> H <sub>5</sub> COOH, C <sub>6</sub> H <sub>5</sub> ONa  (2) C <sub>6</sub> H <sub>5</sub> COONa, C <sub>6</sub> H <sub>5</sub> ONa  (3) C <sub>6</sub> H <sub>5</sub> COONa, C <sub>6</sub> H <sub>5</sub> OH  (4) None	
17	Addition of ethanol to aqueous hydrolysis of O—CH <sub>2</sub> Cl does not increase the rate of hydrolysis but changes only the composition of final products. This indicates that reaction is proceeding through  (1) SN <sup>2</sup> (2) SN <sup>1</sup> (3) SE <sup>2</sup> (4) SE <sup>1</sup>	
18	Which one of the following is the best method for the preparation of acetophenone  (1) Ph COOEt + CH <sub>3</sub> MgBr  (2) Ph COCl + CH <sub>3</sub> Mg Br  (3) Ph CONH <sub>2</sub> + CH <sub>3</sub> Mg Br  (4) PhCN + CH <sub>3</sub> Mg Br	

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Question No.	Questions
19.	$ \begin{array}{c c} O \\ II \\ C \\ NK + \alpha - \text{haloester} \\ O \\ A) \end{array} $ $ \begin{array}{c} \text{Gabriel} \\ NH_2 \end{array} $
	Required product is obtained when A is
	(1) Ethyl-3-Chlorobutyrate (2) Ethyl-3-Chloropropionate
	(3) Ethyl-2-Chloropropionate (4) Ethyl Chloroacetate
20.	$C_6H_{10} \xrightarrow{Ozonolysis} HCHO + CH_3CHO + CH_2(CHO)_2C_6H_{10}$ is
	(1) 1, 2-hexadiene (2) 1, 3-hexadiene
	(3) 1, 4-hexadiene (4) 2-methyl-1, 3-pentadiene
21.	Reagent which can convert an alkyl amine into alkyl chloride
	(1) Hinsberg's reagent (2) Lucas reagent
	(3) Tilden reagent (4) None
22.	Which is/are acid salt
	$(1) \bigcirc \stackrel{\text{NH}_2}{\bigcirc} \text{COONa} $ $(2) \bigcirc \stackrel{\text{COOH}}{\bigcirc} $
	(3) $NaH_2PO_2$ (4) $Na_2HPO_3$
23.	Index of unsaturation of C <sub>8</sub> H <sub>10</sub> in six membered structure is
	(1) $4$ , $C = CH$ (2) $4$ , $CH = CH_2$ (3) $4$ , $CH = CH_3$ (4) All true
	(3) $4, \stackrel{\frown}{=} CH = CH_3$ (4) All true

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Question No.	Questions
24.	The mononitration of acetanilide ( $C_6H_5NHCOCH_3$ ) gives predominantly
	(1) 3-nitroacetanilide (2) 2-nitroacetanilide
	(3) 2-, and 3-nitroacetanilide (4) 4-nitroacetanilide
25.	The most unlikely representation of resonance structures of
	p-nitrophenoxide ion is
	$\Theta_{0} = 0$ $\Theta_{0} \oplus \Theta$
	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
	$0 \\ N=0$ $0 \\ 0 \\ N=0$
	$(3) \qquad (4) \qquad (4) \qquad (6)$
26.	Chirality is lost when
	(1) CH <sub>3</sub> -CH-COOH is heated (2) CH <sub>3</sub> is heated CH <sub>3</sub> COOH
	(3) $CH_3$ - $CH$ - $CH_2$ COOH is heated (4) $CH_3$ - $CH$ -COOH is heated $CH_2$ COOH
1	

Question No.	Questions	
27.	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
	Trans A	
	which is true statement  (1) A is formed by anti addition and is meso	
	(2) A is formed by syn addition and is meso	
	(3) A is formed by anti addition and is racemic	
	(4) A is formed by syn addition and is racemic	
28.	$B \xleftarrow{BH_3/THF} CH_2 \xrightarrow{H_3O^{\bigoplus}} A$	
	A and B are	
	(1) Both $\bigcirc$ CH <sub>2</sub> OH (2) Both $\bigcirc$ CH <sub>3</sub> OH	
	(3) $\bigcirc$ - CH <sub>2</sub> OH, $\bigcirc$ CH <sub>3</sub> (4) $\bigcirc$ CH <sub>3</sub> , $\bigcirc$ - CH <sub>2</sub> OH	
29.	$CH \equiv C - COOH \xrightarrow{Hg SO_4/H_2SO_4} Product$	
	(1) $CH_3$ - $C$ - $COOH$ (2) $OHC CH_2 COOH$	
	(3) $CH_2 = C - COOH$ (4) $HO - CH = CH - COOH$ OH	

PG-EE-2016 (Chemistry) Code-A (7)

Questions
$ \frac{H_2}{1 \text{ equiv}} A \xrightarrow{O_3/H_2O} B $
$ \begin{array}{c}                                     $
(3) OHC CHO (4) None is correct
Maximum dehydration takes place of $ \begin{array}{cccc} CH_{3} & & & & & & & & & \\ CH_{3} & & & & & & & & \\ \end{array} $ (1) $H_{3}C-C-C+OH$ (2) $CH_{3}-C-CH-CH_{3}$ OH
(3) $\bigcirc$ OH (4) $\bigcirc$ $\bigcirc$ $\bigcirc$ C $\bigcirc$ CH <sub>3</sub>
$ \begin{array}{c cccc}  & Ph \\  & H & Br \\  & Acetone \\ \hline  & Ph \\ \hline  & Ph \\ \end{array} $
A is $H$ $Ph$ $H$ $Ph$ $H$ $Ph$ $H$ $Ph$ $H$ $Ph$ $H$ $Ph$ $H$

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Question No.	Questions
33.	$\mathbf{B} \xleftarrow{\mathbf{CH_3OH}}  \mathbf{CH_3} - \overset{\mathbf{CH_3}}{\overset{\mathbf{CH_3}}{\overset{\mathbf{CH_2}}{\overset{\mathbf{CH_2}}{\overset{\mathbf{CH_2}}{\overset{\mathbf{CH_2}}{\overset{\mathbf{CH_3}}}{\overset{\mathbf{CH_3}}{\overset{\mathbf{CH_3}}{\overset{\mathbf{CH_3}}}{\overset{\mathbf{CH_3}}}{\overset{\mathbf{CH_3}}{\overset{\mathbf{CH_3}}}{\overset{\mathbf{CH_3}}}{\overset{\mathbf{CH_3}}{\overset{\mathbf{CH_3}}{\overset{\mathbf{CH_3}}}{\overset{\mathbf{CH_3}}{\overset{\mathbf{CH_3}}}{\overset{\mathbf{CH_3}}}{\overset{\mathbf{CH_3}}{\overset{\mathbf{CH_3}}}{\overset{\mathbf{CH_3}}{\overset{\mathbf{CH_3}}}{\overset{\mathbf{CH_3}}{\overset{\mathbf{CH_3}}}{\overset{\mathbf{CH_3}}{\overset{\mathbf{CH_3}}}}{\overset{\mathbf{CH_3}}{\overset{\mathbf{CH_3}}}{\overset{\mathbf{CH_3}}}{\overset{\mathbf{CH_3}}}{\overset{\mathbf{CH_3}}}{\overset{\mathbf{CH_3}}}{\mathbf$
	A and B are
	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
, ,	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
	(3) Both are correct
	(4) None is correct
34.	Glycerol + KHSO <sub>4</sub> $\longrightarrow$ A $\xrightarrow{\text{HC}\ell\text{O}}$ B A and B are
	(1) $CH_2 = CH - CHO$ , $CH_2 - CH - CHO$ $C\ell$ OH
	(2) $CH_2 = CH - CHO$ , $CH_2 - CH - CHO$ OH $C\ell$
	(3) $CH_2 = CH - CHO$ , $CH_3 - CH - CHO$ $OC\ell$
	(4) None is correct

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Question No.	Q	uestions
35.	The quantum numbers, for the outer electrons of an atom are given by	
	$n = 2$ ; $\ell = 0$ ; $m = 0$ ; $s = +1/2$	
	(1) Lithium	(2) Beryllium
	(3) Hydrogen	(4) Boron
36.	"The exact path of electron 2p-o	orbital cannot be determined" The abov
	statement is based upon	
	(1) Hund's rule	(2) Bohr's rule
	(3) Uncertainty principle	(4) Aufbau principle
37.	The ground state configurat	tion of Fe <sup>3+</sup> ion in gaseous state is
	(At. No. of Fe = $26$ )	
	(1) $[Ar]^{18} 3d^3 4s^2$	(2) $[Ar]^{18} 3d^6 4s^2$
	(3) $[Ar]^{18} 3d^5$	(4) $[Ar]^{18} 3d^6$
38.	Which of the following is the sn	nallest in size
	(1) N <sup>3-</sup> (2) O <sup>2-</sup>	(3) $F^{-}$ (4) $Na^{+}$
39.	The electronegativity of the following	lowing elements increases in the order
×	(1) C, N, Si, P	(2) N, Si, C, P
	(3) Si, P, C, N	(4) P, Si, N, C
40.	In ClF <sub>3</sub> , Chlorine is	
	(1) sp² hybridized	(2) sp <sup>3</sup> hybridized
	(3) sp³d hybridized	(4) sp <sup>3</sup> d <sup>2</sup> hybridized
41.	The angles between covalent bo	onds is maximum in
	(1) $CH_4$ (2) $BF_3$	(3) PF <sub>3</sub> (4) NH <sub>3</sub>

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Question No.	Questions					
42.	Ionic solids with Schottky defects contain in their structure					
	(1) equal number of cation and anion vacancies					
	(2) interstitial anions and anion vacancies					
	(3) cation vacancies only					
	(4) cation vacancies and interstitial cations					
43.	The H-Bonds in solid HF can be best represented as					
	$(1)  H \longrightarrow F \longrightarrow H \longrightarrow F \longrightarrow F$					
	(2) H H F H					
	(3) H F H					
	(4) F H. F					
44.	In which of the following molecules the van der Wall's forces is likely to					
2	be the most important in determining the m.pt. and b.pt.					
	(1) CO (2) $H_2S$ (3) $Br_2$ (4) $HCl$					
45.	Alkali metal hydrides react with water to give					
	(1) Acidic solution (2) Basic solution					
	(3) Neutral solution (4) Hydride ion					
46.	Which is a planar molecule					
	$(1) \text{ XeO}_4$ $(2) \text{ XeF}_4$					
	$(3)  XeOF_4 \qquad (4)  XeO_2F_2$					

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Question No.	Questions					
47.	A silicate used in talcum powder  (1) consists of planar sheets which can slip over another  (2) is known as talc  (3) is a pure magnesium silicate of the form 3 MgO.4 SiO <sub>2</sub> . H <sub>2</sub> O  (4) All of these					
48.	Which of the following has the stronger bond (1) $F-B$ (2) $F-Cl$ (3) $F-Br$ (4) $Cl-Br$					
49.	Which one of the following metal ions is coloured (1) $Cu^+$ (2) $Zn^{2+}$ (3) $Sc^{3+}$ (4) $V^{4+}$					
50.	Among the lanthanides the one obtained by synthetic method is  (1) Lu (2) Pm (3) Pr (4) Gd					
51.	Thorium element belongs to  (1) Alkali metal  (2) Transition elements  (3) Lanthanides  (4) Actinides					
52.	$H_2S$ would separate the following at pH < 7 (1) $Zn^{2+}$ , $Co^{2+}$ (2) $Cu^{2+}$ , $Cd^{2+}$ (3) $Cu^{2+}$ , $Cr^{3+}$ (4) $Cu^{2+}$ , $As^{3+}$					
53.	Nitrite (NO <sub>2</sub> ) interferes in the 'ring-test' of nitrate (NO <sub>3</sub> ). Some of the following reagents can be used for the removal of nitrite  (I) NH <sub>4</sub> Cl (II) (NH <sub>2</sub> ) <sub>2</sub> CS thiourea  (III) NH <sub>2</sub> SO <sub>3</sub> H (sulphamic acid) (IV) Sulphanilic acid  Correct choice is  (1) I, II (2) I, II, IV  (3) I, II, III (4) II, III, IV					

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Question No.	Questions				
54.	The oxidation number of Fe in $K_4$ [Fe $(CN)_6$ ] is				
	(1) 3 (2) 2 (3) 0 (4) 1				
55.	CFSE value for an octahedral low spin d <sup>6</sup> metal ion complex will be				
	(1) 20 Dq (2) 24 Dq				
	(3) 12 Dq (4) 6 Dq				
56.	The number of unpaired electrons in a d <sup>7</sup> tetrahedral complex				
	(1) 3 (2) 2 (3) 1 (4) 7				
57.	E.A.N in [Ni $(NH_3)_6$ ] <sup>2+</sup> is				
	(1) 38 (2) 36 (3) 40 (4) 37				
58.	Term symbol for ground state V <sup>3+</sup> is				
	(1) ${}^{3}F_{2}$ (2) ${}^{4}S_{3/2}$ (3) ${}^{3}P_{0}$ (4) ${}^{3}P_{2}$				
59.	How many geometrical isomers are possible for [Co (NH $_3$ ) $_4$ C $l_2$ ]				
	(1) two (2) three				
	(3) four (4) six				
60.	Which of the following metal-carbonyls is paramagnetic				
	(1) $\text{Fe (CO)}_5$ (2) $\text{Ni (CO)}_4$ (3) $\text{V (CO)}_6$ (4) $\text{Cr (CO)}_6$				
	(3) $V(CO)_6$ (4) $Cr(CO)_6$				
61.	Which of the following carbonyls does not possess bridged CO				
	(1) $\operatorname{Fe}_{2}(CO)_{9}$ (2) $\operatorname{Fe}_{3}(CO)_{12}$				
	(1) $\operatorname{Fe}_{2}(\operatorname{CO})_{9}$ (2) $\operatorname{Fe}_{3}(\operatorname{CO})_{12}$ (3) $\operatorname{Ru}_{3}(\operatorname{CO})_{12}$ (4) $\operatorname{Co}_{2}(\operatorname{CO})_{8}$				

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Question No.	Questions				
62.	$\mathrm{CH_{3}HgOH}$ is classified as				
	(1) Soft-Soft (2) Hard-Hard				
	(3) Soft-Hard (4) Hard-Soft				
63.	Which of the following is not border line acid				
	(1) $Bi^{3+}$ (2) $BMe_3$ (3) $SO_2$ (4) $CO_2$				
64.	According to spectrochemical series which ligand will produce greate				
	crystal field splitting				
	(1) $F^-$ (2) $NH_8$ (3) $NO_2^-$ (4) $CO$				
65.	The transition in [Cu (H <sub>2</sub> O) <sub>6</sub> ] <sup>2+</sup> complexes is due to				
	) Presence of water molecules				
	(2) Intermolecular vibrations				
	Promotion of an electron from $T_{2g}$ to Eg level as the transfer of holes.				
	from Eg to $T_{2g}$ level				
	(4) Excitation of electron from 3d to 4s energy level				
66.	Vitamin B <sub>12</sub> contains				
	(1) Selenium (2) Zinc				
	(3) Cobalt (4) Iron				
67.	Which complex ion is thermodynamically stable and kinetically labile				
	(1) $\left[ \text{Cu (NH}_3)_4 \right]^{2+}$ (2) $\left[ \text{Cr (CN)}_6 \right]^{3-}$ (3) $\left[ \text{Mn (CN)}_6 \right]^{3-}$ (4) $\left[ \text{Ni (CN)}_4 \right]^{2-}$				
	(3) $\left[ \text{Mn (CN)}_{6} \right]^{3-}$ (4) $\left[ \text{Ni (CN)}_{4} \right]^{2-}$				

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Question No.	Questions				
68.	Radioactivity of a sample (Z = 22) decreases 90% after 10 years. What				
	will be the half life of the sample				
	(1) 5 years (2) 2 years				
	(3) 3 years (4) 10 years				
69.	A catalyst is a substance which				
	(1) Supplies energy to the reaction				
	(2) Shortens the time to reach the equilibrium				
	(3) Increases the equilibrium constant of the reaction				
	(4) Increases the equilibrium concentration of the product				
70.	The temperature of the system decreases in an				
	(1) Adiabatic compression (2) Isothermal expansion				
-	(3) Isothermal compression (4) Adiabatic expansion				
71.	Consider a pure crystalline solid that is heated from absolute zero to a				
2	temperature above the boiling point of the liquid. Which of the following				
	processes produces the greatest increase in entropy of the substance				
	(1) Vaporizing the liquid (2) Melting the solid				
	(3) Heating the liquid (4) Heating the gas				
72.	Elastic deformation in polymers is due to				
	(1) Slight adjustment of molecular chains				
	(2) Slippage of molecular chains				
	(3) Straightening of molecular chains				
	(4) Severe of covalent bonds				

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Question No.	Questions				
73.	Which of the following process is responsible for the formation of delta				
	a place where rivers meet the sea				
	(1) Emulsification (2) Coagulation				
	(3) Colloid formation (4) Peptization				
74.	Which of the following is correct for lyophillic sols				
	(1) They are Irreversible				
,	(2) They are formed by inorganic substances				
	(3) They are self stabilized				
	(4) They are readily coagulated by addition of electrolytes				
75.	Buffer solutions have constant acidity and alkalinity because				
	(1) They have large excess of H <sup>+</sup> or OH <sup>-</sup> ions				
	(2) They have fixed value of pH				
	(3) Acids and Alkalies in these solutions are shielded from attack be other ions				
	(4) These give unionized acid or base on reaction with added aci				
	or alkali				
76.	Automobile steering wheels are normally made of				
1	(1) High density polythene (2) Cellulose acetate				
(	(3) Cellulose nitrate (4) PVC				
77.	The de Broglie wavelength of an electron with kinetic energy of 1.0 eV is				
	1) 28.7 pm (2) 2.87 pm				
(	3) 12.3 nm (4) 1.23 nm				

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Question No.	Questions				
78.	If moisture and dirt entrapment is a major problem, it would be a good				
	practice to				
	(1) Butt weld (2) Stop weld				
	(3) Skip weld (4) Stitch weld				
79.	Iron crystallises in a b.c.c system with a = $2.86\text{Å}$ . The density of Iron is				
	(1) $79.2 \text{ g cm}^{-3}$ (2) $7.92 \text{ g cm}^{-3}$				
	(3) $0.79 \text{ g cm}^{-3}$ (4) $792 \text{ g cm}^{-3}$				
80.	The Born Lande equation for the estimation of lattice energy of an ionic crystal is				
	(1) $U_0 = \frac{MN_AZ_e}{4\pi \in_0 r_0} \left(1 - \frac{1}{n}\right)$ (2) $U_0 = \frac{MN_AZ_e}{4\pi \in_0 r_0} \left(1 - \frac{1}{n}\right)$				
	(3) $U_0 = \frac{MN_AZ_+Ze^2}{4\pi \in_0 r_0} \left(1 - \frac{1}{n}\right) $ (4) None of these				
81.	Polydispersity index (P.D.I) of a polymer sample is given by				
	(1) $P.D.I = \overline{M}_m - \overline{M}_n$ (2) $P.D.I = \overline{M}_m + \overline{M}_n$				
	(3) $P.D.I = \overline{M}_m \overline{M}_n$ (4) $P.D.I = \overline{M}_m / \overline{M}_n$				
	where $\overline{\boldsymbol{M}}_{m}, \overline{\boldsymbol{M}}_{n}$ are mass average and number-average molar masses respectively				
82.	The coefficient of thermal expansion, α, is expressed as				
	(1) $\alpha = -\frac{1}{V} \left( \frac{\partial V}{\partial T} \right)_{P}$ (2) $\alpha = \frac{1}{V} \left( \frac{\partial V}{\partial T} \right)_{P}$				
	(3) $\alpha = \frac{1}{T} \left( \frac{\partial V}{\partial T} \right)_{P}$ (4) $\alpha = -\frac{1}{T} \left( \frac{\partial V}{\partial T} \right)_{P}$				

Question No.	Questions					
83.	In B.E.T equation, which of the following statements is not true					
	(1) It does not use the concept of saturated vapour pressure					
	(2) It considers the multilayer adsorption					
	(3) It is not valid for porous adsorbent					
	(4) It uses the concept of latent heat of condensation					
84.	Entropy is related to thermodynamic probability, W, by relation					
	$(1)  \mathbf{S} = \mathbf{R} \ell \mathbf{n} \mathbf{W} \qquad (2)  \mathbf{S} = \mathbf{R} - \ell \mathbf{n} \mathbf{W}$					
	(3) $S = k \ell nW$ (4) $S = k + \ell nW$					
85.	The number of macro states for the distribution of three atoms (having total energy = 3 quanta) among ground, first, second states (possessing zero, one and two quanta of Energy respectively) are					
	(1) one (2) six					
	(3) ten (4) three					
86.	The Ilkovic equation for diffusion current is given by					
	(1) $\vec{i}_d = 607 \text{ nDC m}^{2/3} t^{1/2}$ (2) $\vec{i}_d = 607 \text{ nD}^{1/2} \text{C m}^{2/3} t^{1/6}$					
	(1) $\vec{i}_d = 607 \text{ nDC m}^{2/3} t^{1/2}$ (2) $\vec{i}_d = 607 \text{ nD}^{1/2} \text{C m}^{2/3} t^{1/6}$ (3) $\vec{i}_d = 607 \text{ nDC}^{1/2} \text{ m}^{2/3} t^{1/6}$ (4) $\vec{i}_d = 607 \text{ nD}^{1/2} \text{ m}^{2/3} t^{1/6}$					
	All notations have their usual meanings					
87.	In the lead acid battery during charging the cathode reaction is					
	(1) Reduction of Pb <sup>2+</sup> to Pb (2) Formation of PbSO <sub>4</sub>					
	(3) Formation of PbO <sub>2</sub> (4) None of these					

PG-EE-2016 (Chemistry) Code-A (18)

Question No.	Questions			
88.	The fundamental vibrational frequency of carbon mono oxide (CO) molecule is 2050 cm <sup>-1</sup> . The force constant of CO molecule will be			
	(1) $4\pi^2 c \mu (2050)^2 \times 10^4$			
	(2) $4\pi^2 c^2 \mu^2 (2150) \times 10^{-4}$			
	(3) $4\pi^2 c^2 \mu (2050)^2 \times 10^4$			
	(4) $4\pi^2 c^2 \mu (2050) \times 10^2$			
89.	The operator for linear momentum of a particle moving in a direction parallel to x-axis is given by			
	(1) $\hat{p}_x = ih \frac{\partial}{\partial x}$ (2) $\hat{p}_x = -ih \frac{\partial}{\partial x}$			
	(3) $\hat{p}_x = -ih \frac{\partial^2}{\partial x^2}$ (4) $\hat{p}_x = -i \frac{h}{2\pi} \cdot \frac{\partial}{\partial \pi}$			
90.	The average of an observable quantity, x, is obtained by			
	(1) $\hat{\mathbf{x}} = \frac{\langle \psi \mathbf{x} \psi^{@} \rangle}{\langle \psi \psi^{@} \rangle}$ (2) $\hat{\mathbf{x}} = \frac{\langle \psi \psi^{@} \mathbf{x} \rangle}{\langle \psi \psi^{@} \rangle}$ (3) $\hat{\mathbf{x}} = \frac{\langle \psi \mathbf{x}^{2} \psi^{@} \rangle}{\langle \psi \psi^{@} \rangle}$ (4) $\hat{\mathbf{x}} = \frac{\langle \psi \psi^{@} \mathbf{x}^{2} \rangle}{\langle \psi \psi^{@} \rangle}$			
	(3) $\hat{\mathbf{x}} = \frac{\langle \psi \mathbf{x}^2 \psi^@ \rangle}{\langle \psi \psi^@ \rangle}$ (4) $\hat{\mathbf{x}} = \frac{\langle \psi \psi^@ \mathbf{x}^2 \rangle}{\langle \psi \psi^@ \rangle}$			
	where $\psi$ is the wave function			
91.	Chromatography is based on			
	(1) Physical absorption of the solute			
	(2) Differential adsorption of different components			
	(3) Chemisorption of the solute			
	(4) Solubility of the solute			

PG-EE-2016 (Chemistry) Code-A  $\,$  (19)

0	Code				
Question No.	Questions				
92.	A hydrogen electrode and a normal calomel electrode had a volta				
	$0.435~ m V$ when placed in a certain solution at $298~ m K$ . What will be the pH $_{ m C}$				
	the solution				
	$(1)  2.125 \qquad (2)  2.205$				
	(3) 2.622 (4) 2.014				
93.	A photon in 'X' region is more energetic than in the visible region. The				
	'X' is				
	(1) Micro wave (2) Radio wave				
	(3) IR (4) UV				
94.	Select the correct statement				
	(1) Composit reactions differ from complex reactions				
	(2) Composit reactions involes more than one elementary reaction				
	(3) Composit reactions involes only one elementary reaction				
	(4) None of the above				
95.	The values of van der Waal's constant "a" for gases $O_2$ , $N_2$ , $NH_3$ and $CH_4$				
	are 1.36, 1.39, 4.17 and 2.253 litre <sup>2</sup> atm mole <sup>-2</sup> respectively. The gas which				
	can most easily be liquified is				
	(1) $NH_3$ (2) $O_2$ (3) $N_2$ (4) $CH_4$				
96.	Frenkel defect appear in crystal in which				
	(1) Size of anion is equal to size of cation				
	(2) Size of anion is less than size of cation				
	(3) Size of anion is much larger than cation				
	(4) None of the above				
0 555					

PG-EE-2016 (Chemistry) Code-A  $\,$  (20)

Molar polarizatio	Questions				
Molar polarization, $P_m$ , is independent of					
1) Pressure		(2)	Temperature		
3) Concentrati	on	(4)	None of these		
At temperature near absolute zero gaseous molecules possess only					
1) Translation	al energy		er er		
2) Rotational e	energy		,		
(3) Rotational a	and translational e	enei	rgy		
(4) Vibrational	energy				
The molecule which is IR inactive but Raman active is					
(1) $HCl$	2	(2)	$\mathrm{N_2}$		
$SO_2$		(4)	Protein		
The cell potential is a					
(1) Intensive p	roperty	(2)	Extensive property		
(3) Thermodyn	amic property	(4)	Colligative property		
1					
			i -		
	**				
	3) Concentration (1) Translation (2) Rotational (3) Rotational (4) Vibrational (1) HCl (3) SO <sub>2</sub> The cell potential (1) Intensive paragraphs (2)	At temperature near absolute zero  At temperature near absolute zero  Translational energy  Rotational energy  Rotational and translational energy  Vibrational energy  The molecule which is IR inactive  The MCl  SO <sub>2</sub> The cell potential is a  Intensive property	At temperature near absolute zero gas  1) Translational energy  2) Rotational energy  3) Rotational and translational energy  4) Vibrational energy  The molecule which is IR inactive but  1) HCl  2)  3) SO <sub>2</sub> (4)  The cell potential is a  (1) Intensive property  (2)		

Opent for Embulon luepera

(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

## CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

1. All questions are compulsory.

(Signature of the candidate)

- 2. The candidates must return the Question book-let as well as OMR answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / misbehaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
- 3. In case there is any discrepancy in any duestion(s) in the Question Booklet, the same may be brought to the notice of the Controller of Examinations in writing within two hours after the test is over. No such complaint(s) will be entertained thereafter.
- 4. The candidate MUST NOT do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself. Answers MUST NOT be ticked in the Question book-let.
- 5. There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
- 6. Use only Black or Blue BALL POINT PEN of good quality in the OMR Answer-Sheet.
- 7. BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE BOOK-LET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION.

SE.

(Signature of the Invigilator)

Question No.	Questions				
1.	Which of the following compounds will exhibit geometrical isomerism				
	(1) 1, 1-diphenyl-1-propene (2) 3-phenyl-1-butene				
	(3) 2-phenyl-1-butene (4) 1-phenyl-2-butene				
2.	Propyne and propene can be distinguished by				
	(1) Conc. $H_2SO_4$ (2) $Br_2$ in $CCl_4$				
	(3) Dil. KMnO <sub>4</sub> (4) Ag NO <sub>3</sub> in ammonia				
3.	Which of the following has the most acidic hydrogen				
	(1) 3-Hexanone (2) 2, 4-hexanedione				
	(3) 2, 5-hexanedione (4) 2, 3-hexanedione				
4.	Ammonia can be dried by				
	(1) Conc. $H_2SO_4$ (2) $P_4O_{11}$				
A	(3) CaO (4) Anhydrous $CaCl_2$				
5.	Amongst H <sub>2</sub> O, H <sub>2</sub> S, H <sub>2</sub> Se and H <sub>2</sub> Te, the one with the highest boiling				
	point is				
	(1) H <sub>2</sub> O because of hydrogen bonding				
	(2) H <sub>2</sub> S because of hydrogen bonding				
	(3) H <sub>2</sub> Te because of higher molecular weight				
	(4) H <sub>2</sub> Se because of lower molecular weight				
6.	When a mixture of one mole of C <sub>6</sub> H <sub>5</sub> COOH and one mole of C <sub>6</sub> H <sub>5</sub> OH is				
	treated with one mole of NaHCO <sub>3</sub> , the product formed will consist of				
	(1) $C_6H_5COOH$ , $C_6H_5ONa$ (2) $C_6H_5COONa$ , $C_6H_5ONa$				
	(3) C <sub>6</sub> H <sub>5</sub> COONa, C <sub>6</sub> H <sub>5</sub> OH (4) None				

PG-EE-2016 (Chemistry) Code-B (1)

Question No.	Questions
7.	Addition of ethanol to aqueous hydrolysis of $\bigcirc$ — $CH_2$ $C\ell$ does not increase the rate of hydrolysis but changes only the composition of final products. This indicates that reaction is proceeding through
	(1) $SN^2$ (2) $SN^1$ (3) $SE^2$ (4) $SE^1$
8.	Which one of the following is the best method for the preparation of acetophenone
	(1) Ph COOEt + $CH_3$ MgBr (2) Ph $COCl + CH_3$ Mg Br
	(3) Ph CONH <sub>2</sub> + CH <sub>3</sub> Mg Br (4) PhCN + CH <sub>3</sub> Mg Br
9.	$ \begin{array}{c} O \\ C \\ C \\ NK + \alpha - \text{haloester} \\ C \\ O \end{array} $ (A) $ \begin{array}{c} Gabriel \\ NH_2 \end{array} $
	Required product is obtained when A is
	(1) Ethyl-3-Chlorobutyrate (2) Ethyl-3-Chloropropionate
	(3) Ethyl-2-Chloropropionate (4) Ethyl Chloroacetate
10.	$C_6H_{10} \xrightarrow{Ozonolysis} HCHO + CH_3CHO + CH_2(CHO)_2C_6H_{10}$ is
	(1) 1, 2-hexadiene (2) 1, 3-hexadiene
	(3) 1, 4-hexadiene (4) 2-methyl-1, 3-pentadiene
11.	Chromatography is based on
	(1) Physical absorption of the solute
	(2) Differential adsorption of different components
	(3) Chemisorption of the solute
	(4) Solubility of the solute

PG-EE-2016 (Chemistry) Code-B (2)

Question No.	Questions	
12.	A hydrogen electrode and a normal calomel electrode had a voltage	
	0.435 V when placed in a certain solution at 298 K. What will be the pH of	
	the solution (1) 0.105	
	(1) 2.125 (2) 2.205 (2) 2.205	
	(3) 2.622 (4) 2.014	
13.	A photon in 'X' region is more energetic than in the visible region. The	
	'X' is	
	(1) Micro wave (2) Radio wave	
	(3) IR (4) UV	
14.	Select the correct statement	
	(1) Composit reactions differ from complex reactions	
	(2) Composit reactions involes more than one elementary reaction	
	(3) Composit reactions involes only one elementary reaction	
	(4) None of the above	
15.	The values of van der Waal's constant "a" for gases $O_2$ , $N_2$ , $NH_3$ and $CH_4$	
	are 1.36, 1.39, 4.17 and 2.253 litre <sup>2</sup> atm mole <sup>-2</sup> respectively. The gas which	
	can most easily be liquified is	
	(1) $NH_3$ (2) $O_2$ (3) $N_2$ (4) $CH_4$	
16.	Frenkel defect appear in crystal in which	
	(1) Size of anion is equal to size of cation	
	(2) Size of anion is less than size of cation	
	(3) Size of anion is much larger than cation	
	(4) None of the above	

PG-EE-2016 (Chemistry) Code-B (3)

Question No.	Questions	
17.	Molar polarization, P <sub>m</sub> , is independent of	
	(1) Pressure (2) Temperature	
	(3) Concentration (4) None of these	
18.	At temperature near absolute zero gaseous molecules possess only	
10.	(1) Translational energy	
	(2) Rotational energy	
	(3) Rotational and translational energy	
	(4) Vibrational energy	
19.	The molecule which is IR inactive but Raman active is	
	(1) $HCl$ (2) $N_2$	
	(3) SO <sub>2</sub> (4) Protein	
20.	The cell potential is a	
	(1) Intensive property (2) Extensive property	
	(3) Thermodynamic property (4) Colligative property	
21.	Consider a pure crystalline solid that is heated from absolute zero to a temperature above the boiling point of the liquid. Which of the following processes produces the greatest increase in entropy of the substance  (1) Vaporizing the liquid  (2) Melting the solid  (3) Heating the liquid  (4) Heating the gas	
	(b) Heating the Hatti	
22.	Elastic deformation in polymers is due to	
	(1) Slight adjustment of molecular chains	
	(2) Slippage of molecular chains	
	(3) Straightening of molecular chains	
	(4) Severe of covalent bonds	

PG-EE-2016 (Chemistry) Code-B (4)

Question No.	Questions	
23.	Which of the following process is responsible for the formation of delta at a place where rivers meet the sea	
	(1) Emulsification (2) Coagulation	
	(3) Colloid formation (4) Peptization	
24.	Which of the following is correct for lyophillic sols	
	(1) They are Irreversible	
	(2) They are formed by inorganic substances	
	(3) They are self stabilized	
	(4) They are readily coagulated by addition of electrolytes	
25.	Buffer solutions have constant acidity and alkalinity because	
	(1) They have large excess of H <sup>+</sup> or OH <sup>-</sup> ions	
	(2) They have fixed value of pH	
	(3) Acids and Alkalies in these solutions are shielded from attack by	
	other ions	
Ü	(4) These give unionized acid or base on reaction with added acid or alkali	
26.	Automobile steering wheels are normally made of	
	(1) High density polythene (2) Cellulose acetate	
	(3) Cellulose nitrate (4) PVC	
27.	The de Broglie wavelength of an electron with kinetic energy of 1.0 eV is	
	(1) 28.7 pm (2) 2.87 pm	
	(3) 12.3 nm (4) 1.23 nm	
28.	If moisture and dirt entrapment is a major problem, it would be a good	
A Control of the	practice to	
	(1) Butt weld (2) Stop weld	
	(3) Skip weld (4) Stitch weld	

PG-EE-2016 (Chemistry) Code-B (5)

Question No.	Questions
29.	Iron crystallises in a b.c.c system with $a = 2.86 \text{ Å}$ . The density of Iron (1) $79.2 \text{ g cm}^{-3}$ (2) $7.92 \text{ g cm}^{-3}$ (3) $0.79 \text{ g cm}^{-3}$ (4) $792 \text{ g cm}^{-3}$
30.	The Born Lande equation for the estimation of lattice energy of an ion crystal is $ (1)  U_0 = \frac{MN_AZ_+e}{4\pi \in_0 r_0} \left(1 - \frac{1}{n}\right) \qquad (2)  U_0 = \frac{MN_AZe}{4\pi \in_0 r_0} \left(1 - \frac{1}{n}\right) $ (3) $ U_0 = \frac{MN_AZ_+Ze^2}{4\pi \in_0 r_0} \left(1 - \frac{1}{n}\right) \qquad (4)  \text{None of these} $
	4π ∈ <sub>0</sub> r <sub>0</sub> (n) (1) None of these  Thorium element belongs to  (1) Alkali metal (2) Transition elements  (3) Lanthanides (4) Astinia
32.	$H_2S$ would separate the following at pH < 7 1) $Zn^{2+}$ , $Co^{2+}$ (2) $Cu^{2+}$ , $Cd^{2+}$ 3) $Cu^{2+}$ , $Cr^{3+}$ (4) $Cu^{2+}$ , $As^{3+}$
(I) (I)	Vitrite $(NO_2^-)$ interferes in the 'ring-test' of nitrate $(NO_3^-)$ . Some of the ollowing reagents can be used for the removal of nitrite
(3)	(2) I, II, IV

PG-EE-2016 (Chemistry) Code-B (6)

Question No.	Questions
34.	The oxidation number of Fe in $K_4$ [Fe (CN) <sub>6</sub> ] is
	(1) 3 (2) 2 (3) 0 (4) 1
35.	CFSE value for an octahedral low spin d <sup>6</sup> metal ion complex will be
	(1) 20 Dq (2) 24 Dq
858	(3) 12 Dq (4) 6 Dq
36.	The number of unpaired electrons in a d <sup>7</sup> tetrahedral complex
**************************************	(1) 3 (2) 2 (3) 1 (4) 7
37.	E.A.N in [Ni (NH <sub>3</sub> ) <sub>6</sub> ] <sup>2+</sup> is
	(1) 38 (2) 36 (3) 40 (4) 37
38.	Term symbol for ground state V <sup>3+</sup> is
	(1) ${}^{3}F_{2}$ (2) ${}^{4}S_{3/2}$ (3) ${}^{3}P_{0}$ (4) ${}^{3}P_{2}$
39.	How many geometrical isomers are possible for [Co (NH $_3$ ) $_4$ C $l_2$ ]
	(1) two (2) three
	(3) four (4) six
40.	Which of the following metal-carbonyls is paramagnetic
	(1) $\operatorname{Fe}\left(\operatorname{CO}\right)_{5}$ (2) $\operatorname{Ni}\left(\operatorname{CO}\right)_{4}$
	(3) V (CO) <sub>6</sub> (4) Cr (CO) <sub>6</sub>
41.	Maximum dehydration takes place of
-	CH <sub>3</sub>
di di	(1) $H_3C - C - OH$ (2) $CH_3 - C - CH - CH_3$
	CH <sub>3</sub> OH
	OH <sub>3</sub>
	$(3) \qquad (4) \qquad (\bigcirc) - \ddot{\mathbf{C}} - \mathbf{CH}_{g}$
	ОН

PG-EE-2016 (Chemistry) Code-B (7)

Question		Cad
No.	Questions	Code
42.	$\frac{Na\ I}{Acetone} \rightarrow A$	
(1) Ph Ph H Ph (3) H Br	(2) H Ph Ph Ph H Br H Br	, s
43. B $\leftarrow \frac{\text{CH}_3\text{OH}}{\text{CH}_3\text{ONa}}$ CH.  A and B are	$ \begin{array}{ccc} & & & & CH_3 & & \\ & & & & & & & \\ & & & & & & & \\ & & & & $	
CH <sub>3</sub> (1) CH <sub>3</sub> -C - CH <sub>2</sub> 18 OH OH  CH <sub>3</sub> (2) CH <sub>3</sub> -C - CH <sub>2</sub> OH 18 OH  (3) Both are correct (4) None is correct		
To 15 correct		
PG-EE-2016 (Chemistry) Cod	e-B (a)	

Question No.	Questions
44.	Glycerol + K $HSO_4 \longrightarrow A \xrightarrow{HC\ell O} B$
	A and B are
	(1) $CH_2 = CH - CHO$ , $CH_2 - CH - CHO$
	(2) $CH_2 = CH - CHO$ , $CH_2 - CH - CHO$ OH $C\ell$
	(3) $CH_2 = CH - CHO$ , $CH_3 - CH - CHO$ $OC\ell$
	OCl
	(4) None is correct
45.	The quantum numbers, for the outer electrons of an atom are given by
	$n = 2$ ; $\ell = 0$ ; $m = 0$ ; $s = +1/2$
	(1) Lithium (2) Beryllium
	(3) Hydrogen (4) Boron
46.	"The exact path of electron 2p-orbital cannot be determined" The above
	statement is based upon
	(1) Hund's rule (2) Bohr's rule
	(3) Uncertainty principle (4) Aufbau principle
47.	The ground state configuration of Fe <sup>3+</sup> ion in gaseous state is:
	(At. No. of Fe = $26$ )
	(1) $[Ar]^{18} 3d^3 4s^2$ (2) $[Ar]^{18} 3d^6 4s^2$
	(3) $[Ar]^{18} 3d^5$ (4) $[Ar]^{18} 3d^6$

PG-EE-2016 (Chemistry) Code-B (9)

Questic No.	Questions	Code
-101		
48.	Which of the following is the smallest in size	
	$(1)$ $N^{3-}$ $(2)$ $O^{2-}$ $(3)$ $F^{-}$ $(4)$ $Na^{+}$	
49.	The electronegativity of the following elements increases in t	the order
	(2) N, Si, C, P	are order
	(3) Si, P, C, N (4) P, Si, N, C	
50.	In $ClF_3$ , Chlorine is	
	(1) sp <sup>2</sup> hybridized (2) sp <sup>3</sup> hybridized	
	(3) sp <sup>3</sup> d hybridized (4) sp <sup>3</sup> d <sup>2</sup> hybridized	
51.	Reagent which can convert an alkyl amine into alkyl chloride	
	(1) Hinsberg's reagent (2) Lucas reagent	
	(3) Tilden reagent (4) None	
<b>52.</b>	Which is/are acid salt	
	NH <sub>2</sub> COONa	
	(1) O COONa (2) O COOH	
	(3) NoH DO	
53.	$\frac{1}{2}$ $\frac{1}$	
	Index of unsaturation of $C_8H_{10}$ in six membered structure is	
	1) $4$ , $C = CH$ (2) $4$ , $CH = CH2$	
(3	3) $4, \stackrel{\frown}{=} CH = CH_3$ (4) All true	
EE_20	16 (Chemistry) Code D	

PG-EE-2016 (Chemistry) Code-B (10)

Question No.	Questions		
54.	The mononitration of acetanilide (C <sub>6</sub> H <sub>5</sub> NHCOCH <sub>3</sub> ) gives predominantly		
	(1) 3-nitroacetanilide (2) 2-nitroacetanilide		
	(3) 2-, and 3-nitroacetanilide (4) 4-nitroacetanilide		
55.	The most unlikely representation of resonance structures of p-nitrophenoxide ion is		
	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		
	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		
56.	Chirality is lost when (1) $CH_3$ - $CH$ - $COOH$ is heated (2) $CH_3$ - $COOH$		
	(3) $CH_3-CH-CH_2COOH$ is heated (4) $CH_3-CH-COOH$ is heated $CH_2COOH$		

PG-EE-2016 (Chemistry) Code-B (11)

Questio	Code
No.	Questions
57.	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
	<ol> <li>A is formed by anti addition and is meso</li> <li>A is formed by syn addition and is meso</li> <li>A is formed by anti addition and is racemic</li> <li>A is formed by syn addition and is racemic</li> <li>A is formed by syn addition and is racemic</li> </ol>
58.	B $\leftarrow \frac{BH_3/THF}{H_2O_2/OH}$ $\rightleftharpoons$ CH <sub>2</sub> $\xrightarrow{H_3O^{\oplus}}$ A
	A and B are
	(1) Both $\bigcirc$ CH <sub>2</sub> OH (2) Both $\bigcirc$ CH <sub>3</sub> OH
	$C(3)$ $CH_2OH$ , $CH_3$ $CH_3$ $CH_3$ $CH_3$ $CH_3$ $CH_2OH$
59.	$CH = C - COOH \xrightarrow{\text{Hg SO}_4/\text{H}_2SO_4} \text{Product}$
	CH <sub>3</sub> -C-COOH (2) OHC CH <sub>2</sub> COOH
3)	CH <sub>2</sub> =C-COOH OH $(4) HO-CH=CH-COOH$

PG-EE-2016 (Chemistry) Code-B (12)

Question No.	Questions
60.	$\longrightarrow \frac{H_g}{1 \text{ equiv}} A \xrightarrow{O_g/H_2O} B$
	A and B are
	(1) (2) (2) not formed
	(3) OHC CHO (4) None is correct
61.	The angles between covalent bonds is maximum in
	(1) $CH_4$ (2) $BF_3$ (3) $PF_3$ (4) $NH_3$
62.	Ionic solids with Schottky defects contain in their structure
	(1) equal number of cation and anion vacancies
	(2) interstitial anions and anion vacancies
	<ul><li>(3) cation vacancies only</li><li>(4) cation vacancies and interstitial cations</li></ul>
63.	The H-Bonds in solid HF can be best represented as
	(1) H—FH—F
	(2) H H F H
	(3) H F. H
	(4) F H. F

PG-EE-2016 (Chemistry) Code-B (13)

estion	Questions
No. 64.	In which of the following molecules the van der Wall's forces is likely to be the most important in determining the m.pt. and b.pt.  (1) CO (2) $H_2S$ (3) $Br_2$ (4) $HCl$
65.	Alkali metal hydrides react with water to give  (1) Acidic solution (2) Basic solution (3) Neutral solution (4) Hydride ion
66.	Which is a planar molecule $ (1)  \text{XeO}_4 \qquad \qquad (2)  \text{XeF}_4 \\ (3)  \text{XeOF}_4 \qquad \qquad (4)  \text{XeO}_2 F_2 $
67.	A silicate used in talcum powder  (1) consists of planar sheets which can slip over another  (2) is known as talc  (3) is a pure magnesium silicate of the form 3 MgO.4 SiO <sub>2</sub> . H <sub>2</sub> O  (4) All of these
68.	Which of the following has the stronger bond  (1) $F - B$ (2) $F - Cl$ (3) $F - Br$ (4) $Cl - Br$
69	Which one of the following metal ions is coloured  (1) $Cu^{+}$ (2) $Zn^{2+}$ (3) $Sc^{3+}$ (4) $V^{4+}$
70	Among the lanthanides the one obtained by synthetic method is  (1) Lu (2) Pm (3) Pr (4) Gd
7	The following carbonyls does not possess bridged CO

PG-EE-2016 (Chemistry) Code-B (14)

PG-E

Question No.	Questions	
72.	CH <sub>3</sub> HgOH is classified as	
	(1) Soft-Soft (2) Hard-Hard	
	(3) Soft-Hard (4) Hard-Soft	
73.	Which of the following is not border line acid	
	(1) $\mathrm{Bi^{3+}}$ (2) $\mathrm{BMe}_{3}$ (3) $\mathrm{SO}_{2}$ (4) $\mathrm{CO}_{2}$	
74.	According to spectrochemical series which ligand will produce greater	
- X - x	crystal field splitting	
	(1) $F^-$ (2) $NH_3$ (3) $NO_2^-$ (4) $CO$	
75.	The transition in [Cu (H <sub>2</sub> O) <sub>6</sub> ] <sup>2+</sup> complexes is due to	
	(1) Presence of water molecules	
-	(2) Intermolecular vibrations	
	(3) Promotion of an electron from $T_{2g}$ to Eg level as the transfer of hole	
	from Eg to $T_{2g}$ level	
	(4) Excitation of electron from 3d to 4s energy level	
76.	Vitamin B <sub>12</sub> contains	
	(1) Selenium (2) Zinc	
	(3) Cobalt (4) Iron	
77.	Which complex ion is thermodynamically stable and kinetically labile	
	(1) $\left[ \text{Cu (NH}_3)_4 \right]^{2+}$ (2) $\left[ \text{Cr (CN)}_6 \right]^{3-}$	
	(1) $\left[ \text{Cu (NH}_3)_4 \right]^{2^+}$ (2) $\left[ \text{Cr (CN)}_6 \right]$ (3) $\left[ \text{Mn (CN)}_6 \right]^{3^-}$ (4) $\left[ \text{Ni (CN)}_4 \right]^{2^-}$	

PG-EE-2016 (Chemistry) Code-B (15)

Question	Questions
No. 78.	Radioactivity of a sample ( $Z=22$ ) decreases 90% after 10 years. What will be the half life of the sample
	(1) 5 years (2) 2 years
	(3) 3 years (4) 10 years
79.	A catalyst is a substance which  (1) Supplies energy to the reaction  (2) Shortens the time to reach the equilibrium  (3) Increases the equilibrium constant of the reaction
	(4) Increases the equilibrium concentration of the product
80.	The temperature of the system decreases in an  (1) Adiabatic compression  (2) Isothermal expansion  (3) Isothermal compression  (4) Adiabatic expansion
81.	$Y \xleftarrow{\operatorname{Br}_2} \xrightarrow{\operatorname{OH}} \xrightarrow{\operatorname{COOH}} \xrightarrow{\operatorname{HNO}_3} X$
<i>y</i>	X and Y are  (1) Picric acid, 2, 4, 6 – tribromophenol  (2) 4-nitro salicylic acid, 4-bromo salicylic acid  (3) o-nitrophenol, o-bromophenol  (4) None is correct
82.	$ \begin{array}{c} OCH_3 \\ \hline ORDER \\ Br \end{array} $ NaNH <sub>2</sub> A
	A is $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$

PG-EE-2016 (Chemistry) Code-B (16)

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PG-EE-2016 (Chemistry) Code-B (17)

	Questions
Question No.	
86.	In the reaction sequence $C_{6}H_{6} \xrightarrow{CH_{3}C\ell} (X) \xrightarrow{KMnO_{4}} (Y)$ $C_{6}H_{6} \xrightarrow{A\ell C\ell_{3} \text{ (anhy)}} (X)$
	The product (Y) is  (1) Chlorobenzene (3) Benzoic acid  (4) Benzene (5) Thiophene reacts with HCHO in presence of aqueous HCl to give
87	$(1)  \langle S \rangle - CHO $ $(3)  \langle S \rangle - CH_3 $ $(4)  \langle S \rangle - C\ell$
	Which is weaker base than aniline  (1) $\bigcirc NH_2$ (2) $\bigcirc NHCOCH_3$
	(3) $H_2N$ — $\bigcirc$ — $C$ — $CH_3$ (4) All
	89. End product of following reaction is $ 0 =                                  $
	OH (18)

PG-EE-2016 (Chemistry) Code-B (18)

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Question No.	Questions
90.	The reagent with which both aldehydes and ketones react easily is  (1) Fehling's reagent  (2) Schiff's reagent  (3) Tollen's reagent  (4) Grignard reagent
91.	Polydispersity index (P.D.I) of a polymer sample is given by $ (1)  P.D.I = \overline{M}_m - \overline{M}_n $ $ (2)  P.D.I = \overline{M}_m + \overline{M}_n $ $ (3)  P.D.I = \overline{M}_m \overline{M}_n $ $ (4)  P.D.I = \overline{M}_m / \overline{M}_n $ where $\overline{M}_m, \overline{M}_n$ are mass average and number-average molar masses respectively
92.	The coefficient of thermal expansion, $\alpha$ , is expressed as $(1)  \alpha = -\frac{1}{V} \left( \frac{\partial V}{\partial T} \right)_P \qquad \qquad (2)  \alpha = \frac{1}{V} \left( \frac{\partial V}{\partial T} \right)_P$ $(3)  \alpha = \frac{1}{T} \left( \frac{\partial V}{\partial T} \right)_P \qquad \qquad (4)  \alpha = -\frac{1}{T} \left( \frac{\partial V}{\partial T} \right)_P$
93	<ul> <li>In B.E.T equation, which of the following statements is not true</li> <li>(1) It does not use the concept of saturated vapour pressure</li> <li>(2) It considers the multilayer adsorption</li> <li>(3) It is not valid for porous adsorbent</li> <li>(4) It uses the concept of latent heat of condensation</li> </ul>

PG-EE-2016 (Chemistry) Code-B (19)

uestion No.	Questions
94.	Entropy is related to thermodynamic probability, W, by relation
	(1) $S = R \ln W$ (2) $S = R - \ln W$
	(3) $S = k \ell nW$ (4) $S = k + \ell nW$
95.	The number of macro states for the distribution of three atoms (having total energy = 3 quanta) among ground, first, second states (possessing zero, one and two quanta of Energy respectively) are
	(1) one (2) six
	(3) ten (4) three
96.	The Ilkovic equation for diffusion current is given by $ (1)  \vec{i}_d = 607 \text{ nDC m}^{2/3} \text{ t}^{1/2} \qquad (2)  \vec{i}_d = 607 \text{ nD}^{1/2} \text{C m}^{2/3} \text{ t}^{1/6} $ $ (3)  \vec{i}_d = 607 \text{ nDC}^{1/2} \text{ m}^{2/3} \text{ t}^{1/6} \qquad (4)  \vec{i}_d = 607 \text{ nD}^{1/2} \text{ m}^{2/3} \text{ t}^{1/6} $ All notations have their usual meanings
97.	In the lead acid battery during charging the cathode reaction is  (1) Reduction of Pb <sup>2+</sup> to Pb  (2) Formation of PbSO <sub>4</sub> (3) Formation of PbO <sub>2</sub> (4) None of these
98.	The fundamental vibrational frequency of carbon mono oxide (CO) molecule is $2050 \text{ cm}^{-1}$ . The force constant of CO molecule will be $ (1)  4\pi^2 \text{ c}  \mu  (2050)^2 \times 10^4 $ (2) $4\pi^2 \text{ c}^2  \mu^2  (2150) \times 10^{-4} $ (3) $4\pi^2  \text{c}^2  \mu  (2050)^2 \times 10^4 $ (4) $4\pi^2  \text{c}^2  \mu  (2050) \times 10^2 $

PG-EE-2016 (Chemistry) Code-B  $\,$  (20)

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Question No.	Questions
99.	The operator for linear momentum of a particle moving in a direction parallel to x-axis is given by
<i>y</i> 1	(1) $\hat{p}_{x} = ih \frac{\partial}{\partial x}$ (2) $\hat{p}_{x} = -ih \frac{\partial}{\partial x}$ (3) $\hat{p}_{x} = -ih \frac{\partial^{2}}{\partial x^{2}}$ (4) $\hat{p}_{x} = -i \frac{h}{2\pi} \cdot \frac{\partial}{\partial \pi}$
	(3) $\hat{p}_x = -ih \frac{\partial^2}{\partial x^2}$ (4) $\hat{p}_x = -i \frac{h}{2\pi} \cdot \frac{\partial}{\partial \pi}$
100.	The average of an observable quantity, x, is obtained by
,	(1) $\hat{\mathbf{x}} = \frac{\langle \psi \mathbf{x} \psi^{@} \rangle}{\langle \psi \psi^{@} \rangle}$ (2) $\hat{\mathbf{x}} = \frac{\langle \psi \psi^{@} \mathbf{x} \rangle}{\langle \psi \psi^{@} \rangle}$
	(1) $\hat{\mathbf{x}} = \frac{\langle \psi \mathbf{x} \psi^{@} \rangle}{\langle \psi \psi^{@} \rangle}$ (2) $\hat{\mathbf{x}} = \frac{\langle \psi \psi^{@} \mathbf{x} \rangle}{\langle \psi \psi^{@} \rangle}$ (3) $\hat{\mathbf{x}} = \frac{\langle \psi \mathbf{x}^{2} \psi^{@} \rangle}{\langle \psi \psi^{@} \rangle}$ (4) $\hat{\mathbf{x}} = \frac{\langle \psi \psi^{@} \mathbf{x}^{2} \rangle}{\langle \psi \psi^{@} \rangle}$
	where $\psi$ is the wave function
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PG-EE-2016 (Chemistry) Code-B (21)

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(DO NOT OPEN THIS QUESTION BOOKLET BEFORETIME OR UNTIL YOU ARE ASKEDT

(PC	G-EE-2016: CHEMISTRY)	1	M	-
Sr. No		Code		-
Time: 1¼ Hour	Max. Marks: 100	Total Questi	ons: 100	
Roll No	(in figure)		(in words)	
Name:	Father's Name	:		

(Signature of the Invigilator) (Signature of the candidate)

Mother's Name: \_\_\_\_\_ Date of Examination: \_\_\_\_\_

CANDIDATES MUST READ THE FOLLOWING INFORMATION/ INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

All questions are compulsory.

The candidates must return the Question book-let as well as OMR answer-sheet 2. to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / misbehaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.

In case there is any discrepancy in any question(s) in the Question Booklet, the same may be brought to the notice of the Controller of Examinations in writing within two hours after the test is over. No such complaint(s) will be entertained thereafter.

The candidate MUST NOT do and rough work or writing in the OMR Answer-Sheet. Rough work, if any, way be done in the question book-let itself. Answers MUST NOT be ticked in the Question book-let.

There will be no negative marking. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer/Sheet will be treated as incorrect answer.

Use only Black/or Blue BALL POINT PEN of good quality in the OMR Answer-Sheet.

BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE BOOK-LET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION.

Question No.	Questions
1.	Consider a pure crystalline solid that is heated from absolute zero to a
	temperature above the boiling point of the liquid. Which of the following
	processes produces the greatest increase in entropy of the substance
	(1) Vaporizing the liquid (2) Melting the solid
	(3) Heating the liquid (4) Heating the gas
2.	Elastic deformation in polymers is due to
	(1) Slight adjustment of molecular chains
	(2) Slippage of molecular chains
	(3) Straightening of molecular chains
	(4) Severe of covalent bonds
3.	Which of the following process is responsible for the formation of delta at
	a place where rivers meet the sea
	(1) Emulsification (2) Coagulation
	(3) Colloid formation (4) Peptization
4.	Which of the following is correct for lyophillic sols
	(1) They are Irreversible
	(2) They are formed by inorganic substances
	(3) They are self stabilized
	(4) They are readily coagulated by addition of electrolytes
5.	Buffer solutions have constant acidity and alkalinity because
	(1) They have large excess of H <sup>+</sup> or OH <sup>-</sup> ions
	(2) They have fixed value of pH
	(3) Acids and Alkalies in these solutions are shielded from attack by other ions
	(4) These give unionized acid or base on reaction with added acid or alkali

Question No.	Questions	
6.	Automobile steering wheels are normally made of	
,	(1) High density polythene (2) Cellulose acetate	
	(3) Cellulose nitrate (4) PVC	
7.	The de Broglie wavelength of an electron with kinetic energy of 1.0 eV is	
	(1) 28.7 pm (2) 2.87 pm	
	(3) 12.3 nm (4) 1.23 nm	
8.	If moisture and dirt entrapment is a major problem, it would be a good	
	practice to	
	(1) Butt weld (2) Stop weld	
	(3) Skip weld (4) Stitch weld	
9.	Iron crystallises in a b.c.c system with a = $2.86\text{Å}$ . The density of Iron is	
	(1) $79.2 \text{ g cm}^{-3}$ (2) $7.92 \text{ g cm}^{-3}$	
	(3) $0.79 \text{ g cm}^{-3}$ (4) $792 \text{ g cm}^{-3}$	
10.	The Born Lande equation for the estimation of lattice energy of an ionic	
	crystal is	
	(1) $U_0 = \frac{MN_AZ_+e}{4\pi \in_0 r_0} \left(1 - \frac{1}{n}\right)$ (2) $U_0 = \frac{MN_AZe}{4\pi \in_0 r_0} \left(1 - \frac{1}{n}\right)$	
a	(3) $U_0 = \frac{MN_AZ_+Ze^2}{4\pi \in_0 r_0} \left(1 - \frac{1}{n}\right)$ (4) None of these	
11.	Thorium element belongs to	
	(1) Alkali metal (2) Transition elements	
	(3) Lanthanides (4) Actinides	

PG-EE-2016 (Chemistry) Code-D (2)

Question	n Code-1
No.	Questions
12.	$H_2S$ would separate the following at pH < 7
	(1) $Zn^{2+}$ , $Co^{2+}$ (2) $Cu^{2+}$ , $Cd^{2+}$
	(3) $Cu^{2+}$ , $Cr^{3+}$ (4) $Cu^{2+}$ , $As^{3+}$
13.	Nitrite (NO <sub>2</sub> ) interferes in the 'ring-test' of nitrate (NO <sub>3</sub> ). Some of the
	following reagents can be used for the removal of nitrite
	(I) NH <sub>4</sub> Cl (II) (NH <sub>2</sub> ) <sub>2</sub> CS thiourea
	(III) NH <sub>2</sub> SO <sub>3</sub> H (sulphamic acid) (IV) Sulphanilic acid
	Correct choice is
	(1) I, II (2) I, II, IV
	(3) I, II, III (4) II, III, IV
14.	The oxidation number of Fe in $K_4$ [Fe (CN) $_6$ ] is
	(1) 3 $(2)$ 9 $(2)$ 0
15.	(5) 0 (4) 1
10.	CFSE value for an octahedral low spin d <sup>6</sup> metal ion complex will be
	(1) 20 Dq (2) 24 Dq
	(3) $12 \mathrm{Dq}$ (4) $6 \mathrm{Dq}$
16.	The number of unpaired electrons in a d <sup>7</sup> tetrahedral complex
	(1) 3 (2) 2 (3) 1 (4) 7
17.	E.A.N in [Ni (NH <sub>3</sub> ) <sub>6</sub> ] <sup>2+</sup> is
	(1) 38 (2) 36 (3) 40 (4) 37
18.	Term symbol for ground state V <sup>3+</sup> is
	(1) ${}^{3}F_{2}$ (2) ${}^{4}S_{3/2}$ (3) ${}^{3}P_{0}$ (4) ${}^{3}P_{2}$

PG-EE-2016 (Chemistry) Code-D (3)

Question No.	Questions
19.	How many geometrical isomers are possible for $[Co\ (NH_3)_4\ Cl_2]$ (1) two
	(3) four (4) six
20.	Which of the following metal-carbonyls is paramagnetic
	(1) $\text{Fe (CO)}_5$ (2) $\text{Ni (CO)}_4$ (3) $\text{V (CO)}_6$ (4) $\text{Cr (CO)}_6$
21.	Maximum dehydration takes place of
	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$
	(3) $\bigcirc$ = 0 OH (4) $\bigcirc$ $\bigcirc$ $\bigcirc$ C $\bigcirc$ CH <sub>3</sub>
22.	$ \begin{array}{c c} Ph \\ H \longrightarrow Br \\ H \longrightarrow Br \\ \hline Ph \end{array} $ $ \begin{array}{c} Na I \\ Acetone \end{array} $ A
	A is  (1)  H Ph (2) H Ph (3) H Br (4) H Br

PG-EE-2016 (Chemistry) Code-D (4)

Question No.	Questions		
23.	$\mathbf{B} \xleftarrow{\mathbf{CH_3OH}}_{\mathbf{CH_3ONa}}  \mathbf{CH_3} - \overset{\mathbf{CH_3}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}}{\overset{\mathbf{C}}}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}}{\overset{\mathbf{C}}}}{\overset{\mathbf{C}}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}}{\overset{\mathbf{C}}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}}{\overset{\mathbf{C}}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}}{\overset{\mathbf{C}}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}}{\overset{\mathbf{C}}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}{\overset{\mathbf{C}}}}{\overset{\mathbf{C}}}}{\overset{\mathbf{C}}}}}{\overset{\mathbf{C}}}}{\mathbf{$		
	A and B are		
	$\begin{array}{cccccccccccccccccccccccccccccccccccc$		
	$\begin{array}{cccccccccccccccccccccccccccccccccccc$		
	(3) Both are correct		
	(4) None is correct		
24.	$Glycerol + KHSO_4 \longrightarrow A \xrightarrow{HC\ell O} B$		
	A and B are		
	(1) $CH_2 = CH - CHO$ , $CH_2 - CH - CHO$ $C\ell$ OH		
	(2) $CH_2 = CH - CHO$ , $CH_2 - CH - CHO$ OH $C\ell$		
	(3) $CH_2 = CH - CHO$ , $CH_3 - CH - CHO$ $OC\ell$		
	(4) None is correct		

PG-EE-2016 (Chemistry) Code-D (5)

Question No.	Questions		
25.	The quantum numbers, for the outer electrons of an atom are given by		
	$n = 2$ ; $\ell = 0$ ; $m = 0$ ; $s = +1/2$		
	(1) Lithium (2) Beryllium		
	(3) Hydrogen (4) Boron		
26.	"The exact path of electron 2p-orbital cannot be determined" The above		
	statement is based upon		
	(1) Hund's rule (2) Bohr's rule		
	(3) Uncertainty principle (4) Aufbau principle		
27.	The ground state configuration of Fe <sup>3+</sup> ion in gaseous state is:		
	(At. No. of Fe = $26$ )		
	(1) $[Ar]^{18} 3d^3 4s^2$ (2) $[Ar]^{18} 3d^6 4s^2$		
	(3) $[Ar]^{18} 3d^5$ (4) $[Ar]^{18} 3d^6$		
28.	Which of the following is the smallest in size		
	(1) $N^{3-}$ (2) $O^{2-}$ (3) $F^{-}$ (4) $Na^{+}$		
29.	The electronegativity of the following elements increases in the order		
	(1) C, N, Si, P (2) N, Si, C, P		
	(3) Si, P, C, N (4) P, Si, N, C		
30.	In $ClF_3$ , Chlorine is		
	(1) sp <sup>2</sup> hybridized (2) sp <sup>3</sup> hybridized		
	(3) sp <sup>3</sup> d hybridized (4) sp <sup>3</sup> d <sup>2</sup> hybridized		
31.	Which of the following compounds will exhibit geometrical isomerism		
	(1) 1, 1-diphenyl-1-propene (2) 3-phenyl-1-butene		
	(3) 2-phenyl-1-butene (4) 1-phenyl-2-butene		

PG-EE-2016 (Chemistry) Code-D (6)

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Question No.		Questions		
32.	Pro	Propyne and propene can be distinguished by		
	(1)	Conc. $H_2SO_4$	(2)	$\operatorname{Br}_{\scriptscriptstyle 2} \operatorname{in} \operatorname{CC} l_{\scriptscriptstyle 4}$
	(3)	Dil. KMnO <sub>4</sub>	(4)	Ag NO $_3$ in ammonia
33.	Wh	ich of the following has	the most a	cidic hydrogen
	(1)	3-Hexanone	(2)	2, 4-hexanedione
	(3)	2, 5-hexanedione	(4)	2, 3-hexanedione
34.	Amı	monia can be dried by		
	(1)	Conc. $H_2SO_4$	(2)	$P_4 O_{11}$
	(3)	CaO	(4)	${\rm Anhydrous}{\rm CaC}l_2$
35.	Amo	Amongst H <sub>2</sub> O, H <sub>2</sub> S, H <sub>2</sub> Se and H <sub>2</sub> Te, the one with the highest boiling		
	poin	t is		
	(1)	H <sub>2</sub> O because of hydrog	gen bonding	r S
	(2)	H <sub>2</sub> S because of hydrog	gen bonding	
	(3)	$H_2$ Te because of higher	er molecula:	r weight
	(4)	H <sub>2</sub> Se because of lower	molecular	weight
36.	Whe	When a mixture of one mole of $C_6H_5COOH$ and one mole of $C_6H_5OH$ is		
	treat	ted with one mole of N	$\mathrm{aHCO}_3$ , the	product formed will consist of
	(1)	$C_6H_5COOH, C_6H_5ONa$	(2)	$C_6H_5COONa, C_6H_5ONa$
	(3)	$C_6H_5COONa, C_6H_5OH$	(4)	None
37.	Addi	tion of ethanol to aqu	ıeous hydr	olysis of O-CH, Cl does not
		increase the rate of hydrolysis but changes only the composition of final		
		products. This indicates that reaction is proceeding through		
		$SN^2$ (2) $SN^1$	(3)	1

PG-EE-2016 (Chemistry) Code-D (7)

Question No.	Questions		
38.	Which one of the following is the best method for the preparation of acetophenone		
	(1) $Ph COOEt + CH_3 MgBr$ (2) $Ph COCl + CH_3 Mg Br$		
	(3) $Ph CONH_2 + CH_3 Mg Br$ (4) $PhCN + CH_3 Mg Br$		
39.	$ \begin{array}{c c} O \\ C \\ C \\ NK + \alpha - \text{haloester} \\ C \\ C$		
1	Required product is obtained when A is		
	(1) Ethyl-3-Chlorobutyrate (2) Ethyl-3-Chloropropionate		
,	(3) Ethyl-2-Chloropropionate (4) Ethyl Chloroacetate		
40.	$C_6H_{10} \xrightarrow{Ozonolysis} HCHO + CH_3CHO + CH_2(CHO)_2C_6H_{10}$ is		
	(1) 1, 2-hexadiene (2) 1, 3-hexadiene		
	(3) 1, 4-hexadiene (4) 2-methyl-1, 3-pentadiene		
41.	Chromatography is based on		
	(1) Physical absorption of the solute		
	(2) Differential adsorption of different components		
	(3) Chemisorption of the solute		
	(4) Solubility of the solute		
42.	A hydrogen electrode and a normal calomel electrode had a voltage of 0.435 V when placed in a certain solution at 298 K. What will be the pH of the solution		
	(1) 2.125 (2) 2.205		
	(3) 2.622 (4) 2.014		

PG-EE-2016 (Chemistry) Code-D (8)

Question No.	Questions		
43.	A photon in 'X' region is more energetic than in the visible region. The		
	'X' is		
	(1) Micro wave (2) Radio wave		
	(3) IR (4) UV		
44.	Select the correct statement		
	(1) Composit reactions differ from complex reactions		
	(2) Composit reactions involes more than one elementary reaction		
	(3) Composit reactions involes only one elementary reaction		
	(4) None of the above		
45.	The values of van der Waal's constant "a" for gases $O_2$ , $N_2$ , $NH_3$ and $CH_4$		
	are 1.36, 1.39, 4.17 and 2.253 litre $^2$ atm mole $^{-2}$ respectively. The gas which		
	can most easily be liquified is		
	(1) $NH_3$ (2) $O_2$ (3) $N_2$ (4) $CH_4$		
46.	Frenkel defect appear in crystal in which		
	(1) Size of anion is equal to size of cation		
	(2) Size of anion is less than size of cation		
	(3) Size of anion is much larger than cation		
	(4) None of the above		
47.	Molar polarization, $P_m$ , is independent of		
	(1) Pressure (2) Temperature		
	(3) Concentration (4) None of these		
48.	At temperature near absolute zero gaseous molecules possess only		
	(1) Translational energy		
	(2) Rotational energy		
	(3) Rotational and translational energy		
	(4) Vibrational energy		

PG-EE-2016 (Chemistry) Code-D (9)

Question No.	Questio	ons	
49.	The molecule which is IR inactive but Raman active is		
	$(1)  HCl \qquad (2)$	$N_2$	
	(3) SO2 (4)	Protein	
50.	The cell potential is a		
	(1) Intensive property (2)	Extensive property	
p) 21	(3) Thermodynamic property (4)	Colligative property	
51.	Which of the following carbonyls does	not possess bridged CO	
	(1) $\text{Fe}_{2}(\text{CO})_{9}$ (2)	Fe <sub>3</sub> (CO) <sub>12</sub>	
	(3) $Ru_3 (CO)_{12}$ (4)	Co <sub>2</sub> (CO) <sub>8</sub>	
52.	CH <sub>3</sub> HgOH is classified as	<b>1</b> .	
		Hard-Hard	
	(3) Soft-Hard (4)	Hard-Soft	
53.	Which of the following is not border li	ne acid	
	(1) $Bi^{3+}$ (2) $BMe_3$ (3)	SO <sub>2</sub> (4) CO <sub>2</sub>	
54.	According to spectrochemical series v	which ligand will produce greater	
	crystal field splitting		
	(1) $F^{-}$ (2) $NH_{3}$ (3)	$NO_2^-$ (4) CO	
55.	The transition in $[Cu (H_2O)_6]^{2+}$ comple	exes is due to	
	(1) Presence of water molecules		
	(2) Intermolecular vibrations		
	(3) Promotion of an electron from T <sub>2</sub>	g to Eg level as the transfer of hole	
	from Eg to $T_{2g}$ level		
	(4) Excitation of electron from 3d to	4s energy level	

PG-EE-2016 (Chemistry) Code-D (10)

Question No.	Questions		
56.	$Vitamin B_{12}$ contains		
	(1) Selenium (2) Zinc		
	(3) Cobalt (4) Iron		
57.	Which complex ion is thermodynamically stable and kinetically labile		
	(1) $\left[ \text{Cu (NH}_3)_4 \right]^{2+}$ (2) $\left[ \text{Cr (CN)}_6 \right]^{3-}$ (3) $\left[ \text{Mn (CN)}_6 \right]^{3-}$ (4) $\left[ \text{Ni (CN)}_4 \right]^{2-}$		
	(1) $\left[ \text{Cu (NH}_3)_4 \right]^{2+}$ (2) $\left[ \text{Cr (CN)}_6 \right]^{6}$ (3) $\left[ \text{Mn (CN)}_6 \right]^{3-}$ (4) $\left[ \text{Ni (CN)}_4 \right]^{2-}$		
58.	Radioactivity of a sample (Z = $22$ ) decreases 90% after 10 years. What will		
	be the half life of the sample		
# F.	(1) 5 years (2) 2 years		
	(3) 3 years (4) 10 years		
59.	A catalyst is a substance which		
	(1) Supplies energy to the reaction		
	(2) Shortens the time to reach the equilibrium		
	(3) Increases the equilibrium constant of the reaction		
120	(4) Increases the equilibrium concentration of the product		
60.	The temperature of the system decreases in an		
	(1) Adiabatic compression		
	(2) Isothermal expansion		
	(3) Isothermal compression		
	(4) Adiabatic expansion		

PG-EE-2016 (Chemistry) Code-D (11)

Question No.	Questions		
61.	Polydispersity index (P.D.I) of a polymer sample is given by		
	(1) $P.D.I = \overline{M}_m - \overline{M}_n$ (2) $P.D.I = \overline{M}_m + \overline{M}_n$		
	(3) $P.D.I = \overline{M}_m \overline{M}_n$ (4) $P.D.I = \overline{M}_m / \overline{M}_n$		
	where $\overline{M}_{m}, \overline{M}_{n}$ are mass average and number-average molar masses respectively		
62.	The coefficient of thermal expansion, $\alpha$ , is expressed as		
	(1) $\alpha = -\frac{1}{V} \left( \frac{\partial V}{\partial T} \right)_{P}$		
	(2) $\alpha = \frac{1}{V} \left( \frac{\partial V}{\partial T} \right)_{P}$		
	(3) $\alpha = \frac{1}{T} \left( \frac{\partial V}{\partial T} \right)_{P}$		
	(4) $\alpha = -\frac{1}{T} \left( \frac{\partial V}{\partial T} \right)_{P}$		
63.	In B.E.T equation, which of the following statements is not true		
	(1) It does not use the concept of saturated vapour pressure		
	(2) It considers the multilayer adsorption		
	(3) It is not valid for porous adsorbent		
	(4) It uses the concept of latent heat of condensation		
64.	Entropy is related to thermodynamic probability, W, by relation		
	$(1)  S = R \ln W \qquad (2)  S = R - \ln W$		
	(3) $S = k \ln W$ (4) $S = k + \ln W$		

PG-EE-2016 (Chemistry) Code-D (12)

Question No.	Questions		
65.	The number of macro states for the distribution of three atoms (having total energy = 3 quanta) among ground, first, second states (possessing zero, one and two quanta of Energy respectively) are		
	(1) one (2) six		
	(3) ten (4) three		
66.	The Ilkovic equation for diffusion current is given by		
	(1) $\vec{i}_d = 607 \text{ nDC m}^{2/3} t^{1/2}$ (2) $\vec{i}_d = 607 \text{ nD}^{1/2} \text{C m}^{2/3} t^{1/6}$		
	(3) $\vec{i}_d = 607 \text{ nDC}^{1/2} \text{ m}^{2/3} \text{ t}^{1/6}$ (4) $\vec{i}_d = 607 \text{ nD}^{1/2} \text{ m}^{2/3} \text{ t}^{1/6}$		
	All notations have their usual meanings		
67.	In the lead acid battery during charging the cathode reaction is		
	(1) Reduction of Pb <sup>2+</sup> to Pb (2) Formation of PbSO <sub>4</sub>		
	(3) Formation of PbO <sub>2</sub> (4) None of these		
68.	The fundamental vibrational frequency of carbon mono oxide (CO) molecule is $2050 \text{ cm}^{-1}$ . The force constant of CO molecule will be $ (1)  4\pi^2 \text{ c}  \mu \left(2050\right)^2 \times 10^4 $ (2) $4\pi^2 \text{ c}^2 \mu^2 \left(2150\right) \times 10^{-4} $ (3) $4\pi^2 \text{ c}^2 \mu \left(2050\right)^2 \times 10^4 $ (4) $4\pi^2 \text{ c}^2 \mu \left(2050\right) \times 10^2 $		
69.	The operator for linear momentum of a particle moving in a direction parallel to x-axis is given by		
	(1) $\hat{p}_{x} = ih \frac{\partial}{\partial x}$ (2) $\hat{p}_{x} = -ih \frac{\partial}{\partial x}$ (3) $\hat{p}_{x} = -ih \frac{\partial^{2}}{\partial x^{2}}$ (4) $\hat{p}_{x} = -i \frac{h}{2\pi} \cdot \frac{\partial}{\partial \pi}$		
	(3) $\hat{p}_x = -ih \frac{\partial^2}{\partial x^2}$ (4) $\hat{p}_x = -i \frac{h}{2\pi} \cdot \frac{\partial}{\partial \pi}$		

PG-EE-2016 (Chemistry) Code-D (13)

PG-EE-2016 (Chemistry) Code-D (14)

Question No.	Questions		
74.	In which of the following molecules the van der Wall's forces is likely to be the most important in determining the m.pt. and b.pt.		
	(1) CO (2) H <sub>2</sub> S (3) Br <sub>2</sub> (4) HCl		
75.	Alkali metal hydrides react with water to give		
	(1) Acidic solution (2) Basic solution		
	(3) Neutral solution (4) Hydride ion		
76.	Which is a planar molecule		
	(1) XeO <sub>4</sub> (2) XeF <sub>4</sub>		
	(3) $XeOF_4$ (4) $XeO_2F_2$		
77.	A silicate used in talcum powder		
	(1) consists of planar sheets which can slip over another		
	(2) is known as talc		
,	(3) is a pure magnesium silicate of the form $3 \text{ MgO.4 SiO}_2$ . $\text{H}_2\text{O}$		
	(4) All of these		
78.	Which of the following has the stronger bond		
	(1) $F - B$ (2) $F - Cl$ (3) $F - Br$ (4) $Cl - Br$		
79.	Which one of the following metal ions is coloured		
	(1) $Cu^+$ (2) $Zn^{2+}$ (3) $Sc^{3+}$ (4) $V^{4+}$		
80.	Among the lanthanides the one obtained by synthetic method is		
	(1) Lu (2) Pm (3) Pr (4) Gd		
81.	Reagent which can convert an alkyl amine into alkyl chloride		
	(1) Hinsberg's reagent (2) Lucas reagent		
	(3) Tilden reagent (4) None		

PG-EE-2016 (Chemistry) Code-D (15)

Question	Questions		
No. 82.	Which is/are acid salt		
	$(1) \bigcirc \begin{matrix} NH_2 \\ COONa \end{matrix} $ (2) $\bigcirc \begin{matrix} COOH \\ COONa \end{matrix}$		
	(3) NaH <sub>2</sub> PO <sub>2</sub> (4) Na <sub>2</sub> HPO <sub>3</sub>		
83.	Index of unsaturation of C <sub>8</sub> H <sub>10</sub> in six membered structure is		
	(1) $4$ , $C = CH$ (2) $4$ , $CH = CH_2$ (3) $4$ , $CH = CH_3$ (4) All true		
	(3) $4, \stackrel{\frown}{=} CH = CH_3$ (4) All true		
84.	The mononitration of acetanilide ( $C_6H_5NHCOCH_3$ ) gives predominantly  (1) 3-nitroacetanilide (2) 2-nitroacetanilide  (3) 2-, and 3-nitroacetanilide (4) 4-nitroacetanilide		
85.	The most unlikely representation of resonance structures of p-nitrophenoxide ion is		
	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		
	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		

PG-EE-2016 (Chemistry) Code-D (16)

Question No.	Questions
86.	Chirality is lost when
	(1) CH <sub>3</sub> -CH-COOH is heated (2) CH <sub>3</sub> COOH
	(3) CH <sub>3</sub> -CH-CH <sub>2</sub> COOH is heated (4) CH <sub>3</sub> -CH-COOH is heated CH <sub>2</sub> COOH
87.	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
	$ m CH_3$
	Trans
	which is true statement (1) A is formed by anti addition and is meso
	(1) A is formed by anti addition and is meso (2) A is formed by syn addition and is meso
	(3) A is formed by anti addition and is racemic
	(4) A is formed by syn addition and is racemic
88.	$B \xleftarrow{BH_3/THF} CH_2 \xrightarrow{H_3O^{\bigoplus}} A$
	A and B are
	(1) Both $\bigcirc$ CH <sub>2</sub> OH (2) Both $\bigcirc$ CH <sub>3</sub> OH
	(3) $\bigcirc$ CH <sub>2</sub> OH, $\bigcirc$ CH <sub>3</sub> (4) $\bigcirc$ CH <sub>3</sub> , $\bigcirc$ CH <sub>2</sub> OH

PG-EE-2016 (Chemistry) Code-D (17)

Question No.	Questions		
89.	$CH = C - COOH \xrightarrow{\text{Hg SO}_4/\text{H}_2\text{SO}_4} \text{Product}$		
	(1) $CH_3 - C - COOH$ (2) $OHC CH_2 COOH$		
	(3) $CH_2 = C - COOH$ (4) $HO - CH = CH - COOH$ OH		
90.	$ \begin{array}{ccc} & \frac{H_2}{1 \text{ equiv}} & A & \xrightarrow{O_3/H_2O} & B \end{array} $		
	A and B are		
	(1) O , (2) , not formed		
	(3) OHC CHO (4) None is correct		
91.	$Y \leftarrow \frac{Br_2}{water} \xrightarrow{OH} \frac{OH}{OOH} \xrightarrow{HNO_3} X$		
	X and Y are		
	(1) Picric acid, 2, 4, 6 – tribromophenol		
	(2) 4-nitro salicylic acid, 4-bromo salicylic acid		
	(3) o-nitrophenol, o-bromophenol		
	(4) None is correct		

PG-EE-2016 (Chemistry) Code-D (18)

Question No.	Questions	
92.	$ \begin{array}{c} OCH_3 \\ OCH_3 \\ Br \end{array} $ A is	
	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
93.	$\bigcirc$ NO <sub>2</sub> $\xrightarrow{\text{Zn/NaOH}}$ A $\xrightarrow{\text{Cold conc.} HC\ell}$ B	
	A and B are	
	(1) O-NHOH, HO-O-NH <sub>2</sub>	
	(2) $\bigcirc$ NH-NH $\bigcirc$ , $H_2$ N $\bigcirc$ $\bigcirc$ NH <sub>2</sub>	
	(3) $\bigcirc N = N - \bigcirc \bigcirc$ , $\bigcirc N = N - \bigcirc$	
	(4) None is correct	
94.	$\bigcirc$ + HC $\ell$ + $\frac{1}{2}$ O <sub>2</sub> $\longrightarrow$ $\bigcirc$ C $\ell$	
	This is called reaction	
	(1) Sandmeyer (2) Raschig	
	(3) Gatterman (4) Hofmann	

PG-EE-2016 (Chemistry) Code-D (19)

0	Code-L	
Question No.	Questions	
95.	$\bigcirc - N (CH_3)_2 \xrightarrow{\text{(i)} HNO_2} A + B$	
*	(1) $HO \longrightarrow NO$ , $(CH_3)_2 NH$	
	(2) $HO \longrightarrow OH$ , $(CH_3)_2 NH$	
	(3) HO—O—NO, CH <sub>3</sub> CH <sub>2</sub> NH <sub>2</sub> (4) None is correct	
96.	,	
90.	In the reaction sequence $C_6 H_6 \xrightarrow{CH_3 C\ell} (X) \xrightarrow{KMnO_4} (Y)$ The product (Y) is	
	(1) Chlorobenzene (2) Benzaldehyde (3) Benzoic acid (4) Benzene	
97.	Thiophene reacts with HCHO in presence of aqueous $HC\ell$ to give	
	(1) $\langle S \rangle$ —CHO (2) $\langle S \rangle$ —CH <sub>2</sub> C $\ell$	
	(3) $\langle S \rangle$ CH <sub>3</sub> (4) $\langle S \rangle$ C $\ell$	
98.	Which is weaker base than aniline	
	(1) $\bigcirc$ NH <sub>2</sub> (2) $\bigcirc$ NHCOCH <sub>3</sub>	
C FF o	(3) $H_2N = \bigcirc C - CH_3$ (4) All	

PG-EE-2016 (Chemistry) Code-D  $\,$  ( 20 )

Question No.	Questions		
99.	End product of following reaction is		
	$O = \bigcirc O + HBr$		
	(1) $O = \underbrace{\begin{array}{c} = O \\ Br \end{array}}$ (2) $HO = \underbrace{\begin{array}{c} O \\ Br \end{array}}$ CH		
÷ or	(3) Br—OH (4) Br—OH Br		
100.	The reagent with which both aldehydes and ketones react easily is		
-	(1) Fehling's reagent (2) Schiff's reagent		
	(3) Tollen's reagent (4) Grignard reagent		
	in the state of th		

PG-EE-2016 (Chemistry) Code-D (21)

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(PG-	-EE-2010: CHEIVIIS INT)	
sr. No <b>12063</b>		Code
Time: 1¼ Hour	Max. Marks: 100	<b>Total Questions: 100</b>
Roll No	(in figure)	(in words)
Name :	Father's Name	:
Mother's Name :	Date of Examin	nation:
(Signature of the candidate)	(Sig	nature of the Invigilator)

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Question No.	Questions
1.	The angles between covalent bonds is maximum in (1) $CH_4$ (2) $BF_3$ (3) $PF_3$ (4) $NH_3$
2.	Ionic solids with Schottky defects contain in their structure  (1) equal number of cation and anion vacancies  (2) interstitial anions and anion vacancies  (3) cation vacancies only  (4) cation vacancies and interstitial cations
3.	The H-Bonds in solid HF can be best represented as  (1) H—F H—F H — F  (2) H  F  (3) H  F  (4) F  H  (4) F  (5) H  (6) H  (7) H  (8) H  (9) H  (9) H  (10) H  (11) H  (11) H  (12) H  (13) H  (14) F  (15) H  (15) H  (16) H  (17) H  (17) H  (18) H
4.	In which of the following molecules the van der Wall's forces is likely to be the most important in determining the m.pt. and b.pt.  (1) CO (2) H <sub>2</sub> S (3) Br <sub>2</sub> (4) HCl
5.	Alkali metal hydrides react with water to give  (1) Acidic solution  (2) Basic solution  (3) Neutral solution  (4) Hydride ion
6.	Which is a planar molecule $ (1)  \text{XeO}_4 \qquad (2)  \text{XeF}_4 \qquad (3)  \text{XeOF}_4 \qquad (4)  \text{XeO}_2 \text{F}_2 $

PG-EE-2016 (Chemistry) Code-C (1)

estion No.	Questions		
	A silicate used in talcum powder  (1) consists of planar sheets which can slip over another  (2) is known as talc  (3) is a pure magnesium silicate of the form 3 MgO.4 SiO <sub>2</sub> . H <sub>2</sub> O  (4) All of these		
8.	Which of the following has the stronger bond (1) $F-B$ (2) $F-Cl$ (3) $F-Br$ (4) $Cl-Br$		
9.	Which one of the following metal ions is coloured  (1) Cu <sup>+</sup> (2) Zn <sup>2+</sup> (3) Sc <sup>3+</sup> (4) V <sup>4+</sup>		
10.	Among the lanthanides the one obtained by synthetic method is  (1) Lu (2) Pm (3) Pr (4) Gd		
11.	Reagent which can convert an alkyl amine into alkyl chloride  (1) Hinsberg's reagent  (2) Lucas reagent  (3) Tilden reagent  (4) None		
13.	OTT OTT		
	(1) $4$ , $C = CH$ (2) $4$ , $CH = CH_2$ (3) $4$ , $CH = CH_3$ (4) All true		

PG-EE-2016 (Chemistry) Code-C (2)

Question No.	Questions	
14.	The mononitration of acetanilide ( $C_6H_5NHCOCH_3$ ) gives predominantly	
	(1) 3-nitroacetanilide (2) 2-nitroacetanilide	
	(3) 2-, and 3-nitroacetanilide (4) 4-nitroacetanilide	
15.	The most unlikely representation of resonance structures of p-nitrophenoxide ion is	
	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	
	$0 \qquad 0 \qquad$	
	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	
16.	Chirality is lost when	
	(1) CH <sub>3</sub> -CH-COOH is heated (2) CH <sub>3</sub> COOH	
	(3) $CH_3 - CH - CH_2 COOH$ is heated (4) $CH_3 - CH - COOH$ is heated $CH_2 COOH$	

PG-EE-2016 (Chemistry) Code- $\hat{C}$  (3)

		Questions	
Que N	stion No.	01011	
	17.	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
		Trans	
		which is true statement	
		(1) A is formed by anti addition and is meso	
		(2) A is formed by syn addition and is meso	
		(3) A is formed by anti addition and is racemic	
		(4) A is formed by syn addition and is racemic	
	18.	$B \xleftarrow{BH_3/THF} CH_2 \xrightarrow{H_3O^{\bigoplus}} A$	
		A and B are	
		(1) Both $\bigcirc$ CH <sub>2</sub> OH (2) Both $\bigcirc$ CH <sub>3</sub>	
		(3) $\bigcirc$ CH <sub>2</sub> OH, $\bigcirc$ CH <sub>3</sub> (4) $\bigcirc$ CH <sub>3</sub> , $\bigcirc$ CH <sub>2</sub> OH	
+		Hg SO <sub>4</sub> /H <sub>2</sub> SO <sub>4</sub>	
	19	. $CH \equiv C - COOH \xrightarrow{q_1 \longrightarrow q_2} Product$	
		(1) $CH_3$ - $C$ - $COOH$ (2) $OHC CH_2 COOH$	
		$CH = C - COOH \xrightarrow{Hg SO_4/H_2SO_4} Product$ $(1) CH_3 - C - COOH \qquad (2) OHC CH_2 COOH$ $(3) CH_2 = C - COOH \qquad (4) HO - CH = CH - COOH$ $OH$	
		OII	

PG-EE-2016 (Chemistry) Code-C (4)

	0040-0	
Question No.	Questions	
20.	$\langle \rangle \xrightarrow{H_2} A \xrightarrow{O_3/H_2O} B$	
	A and B are	
	(1) $\bigoplus$ , $\bigoplus$ (2) $\bigoplus$ , not formed	
	(3) OHC CHO (4) None is correct	
21.	$Y \leftarrow \frac{Br_2}{water} \longrightarrow COOH \xrightarrow{HNO_3} X$	
1	X and Y are	
	(1) Picric acid, 2, 4, 6 – tribromophenol	
	(2) 4-nitro salicylic acid, 4-bromo salicylic acid	
	<ul><li>(3) o-nitrophenol, o-bromophenol</li><li>(4) None is correct</li></ul>	
22.	$OCH_3$ $OCH_$	
	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
	$\begin{array}{c c} \text{OCH}_3 & \text{OCH}_3 \\ \text{(3)} & \bigcirc & \text{(4)} & \bigcirc \end{array}$	

PG-EE-2016 (Chemistry) Code-C (5)

Question	Questions
No. 23.	$O \longrightarrow NO_2$ $C_2H_5OH \longrightarrow A$ $Cold conc : HC\ell \longrightarrow B$
	A and B are  (1) $\bigcirc -NHOH$ , $HO -\bigcirc -NH_2$ (2) $\bigcirc -NH-NH -\bigcirc -\bigcirc + H_2N -\bigcirc -NH_2$ (3) $\bigcirc -N = N -\bigcirc + \bigcirc + O - N = N -\bigcirc + O$
	(4) None is correct
24.	$\bigcirc + HC\ell + \frac{1}{2} O_2 \longrightarrow \bigcirc -C\ell$
	This is called reaction  (1) Sandmeyer  (2) Raschig  (3) Gatterman  (4) Hofmann
25	
	(1) HO → O → NO, (CH <sub>3</sub> ) <sub>2</sub> NH  (2) HO → O → OH, (CH <sub>3</sub> ) <sub>2</sub> NH  (3) HO → NO, CH <sub>3</sub> CH <sub>2</sub> NH <sub>2</sub> (4) None is correct

PG-EE-2016 (Chemistry) Code-C (6)

Question No.	Questions
26.	In the reaction sequence
	$C_6H_6\xrightarrow{CH_3C\ell}\xrightarrow{A\ell C\ell_3 \text{ (anhy)}} (X) \xrightarrow{KMnO_4} (Y)$
	The product (Y) is
	(1) Chlorobenzene (2) Benzaldehyde
	(3) Benzoic acid (4) Benzene
27.	Thiophene reacts with HCHO in presence of aqueous $HC\ell$ to give
	(1) $\langle S \rangle$ CHO (2) $\langle S \rangle$ CH <sub>2</sub> C $\ell$
	(3) $\langle S \rangle$ CH <sub>3</sub> (4) $\langle S \rangle$ C $\ell$
28.	Which is weaker base than aniline
	(1) $\bigcirc$ NH <sub>2</sub> (2) $\bigcirc$ NHCOCH <sub>3</sub>
	$(3)  H_2N - \bigcirc - C - CH_3 \qquad (4)  All$
29.	End product of following reaction is
	$0 = \bigcirc = 0 + HBr$ $(1)  0 = \bigcirc = 0$ $(2)  HO - \bigcirc O + OH$
	$(1) O = \underbrace{}_{Br} = O $ $(2) HO - \underbrace{}_{O} - OH$
	(3) Br—OH (4) Br—OH OH

PG-EE-2016 (Chemistry) Code-C (7)

Ques		Questions
	30.	The reagent with which both aldehydes and ketones react easily is  (1) Fehling's reagent  (2) Schiff's reagent  (3) Tollen's reagent  (4) Grignard reagent
	31.	Chromatography is based on  (1) Physical absorption of the solute  (2) Differential adsorption of different components  (3) Chemisorption of the solute  (4) Solubility of the solute
	32.	A hydrogen electrode and a normal calomel electrode had a voltage of 0.435 V when placed in a certain solution at 298 K. What will be the pH of the solution  (1) 2.125  (2) 2.205  (3) 2.622  (4) 2.014
	33.	(X' is (1) Micro wave (2) Radio wave (3) IR (4) UV
	34	<ol> <li>Select the correct statement</li> <li>Composit reactions differ from complex reactions</li> <li>Composit reactions involes more than one elementary reaction</li> <li>Composit reactions involes only one elementary reaction</li> <li>None of the above</li> </ol>

Question No.	Questions	
35.	The values of van der Waal's constant "a" for gases $\rm O_2$ , $\rm N_2$ , $\rm NH_3$ and $\rm CH_4$ are 1.36, 1.39, 4.17 and 2.253 litre² atm mole⁻² respectively. The gas which can most easily be liquified is	
	(1) $NH_3$ (2) $O_2$ (3) $N_2$ (4) $CH_4$	
36.	Frenkel defect appear in crystal in which	
	(1) Size of anion is equal to size of cation	
	(2) Size of anion is less than size of cation	
	(3) Size of anion is much larger than cation	
	(4) None of the above	
37.	Molar polarization, $P_m$ , is independent of	
	(1) Pressure (2) Temperature	
	(3) Concentration (4) None of these	
38.	At temperature near absolute zero gaseous molecules possess only	
	(1) Translational energy	
	(2) Rotational energy	
	(3) Rotational and translational energy	
	(4) Vibrational energy	
39.	The molecule which is IR inactive but Raman active is	
	(1) $HCl$ (2) $N_2$	
	(3) SO <sub>2</sub> (4) Protein	
40.	The cell potential is a	
	(1) Intensive property (2) Extensive property	
	(3) Thermodynamic property (4) Colligative property	

 $PG ext{-EE-2016}$  (Chemistry) Code-C (9)

Que N	estion No.	Questions
	41.	Which of the following carbonyls does not possess bridged CO
		(1) $\text{Fe}_{2} (\text{CO})_{9}$ (2) $\text{Fe}_{3} (\text{CO})_{12}$
		(3) $Ru_3 (CO)_{12}$ (4) $Co_2 (CO)_8$
	42.	CH <sub>3</sub> HgOH is classified as
		(1) Soft-Soft (2) Hard-Hard
		(3) Soft-Hard (4) Hard-Soft
-	43.	Which of the following is not border line acid
		(1) $Bi^{3+}$ (2) $BMe_3$ (3) $SO_2$ (4) $CO_2$
-	44.	According to spectrochemical series which ligand will produce greater
	7.40	crystal field splitting
		(1) $F^-$ (2) $NH_3$ (3) $NO_2^-$ (4) $CO$
	45.	The transition in $[Cu (H_2O)_6]^{2+}$ complexes is due to
	40.	(1) Presence of water molecules
		(2) Intermolecular vibrations
		(3) Promotion of an electron from $T_{2g}$ to Eg level as the transfer of hole
		from Eg to T <sub>2g</sub> level
		(4) Excitation of electron from 3d to 4s energy level
İ	46	Vitamin B <sub>12</sub> contains
	<del>55</del> 5,039	(1) Selenium (2) Zinc
		(3) Cobalt (4) Iron

PG-EE-2016 (Chemistry) Code-C (10)

Question No.	,	Questions
47.	Which complex ion is there	nodynamically stable and kinetically labile
	(1) $\left[ \text{Cu} \left( \text{NH}_3 \right)_4 \right]^{2+}$	(2) $\left[ \text{Cr} \left( \text{CN} \right)_{6} \right]^{3-}$
	(1) $\left[ \text{Cu} \left( \text{NH}_3 \right)_4 \right]^{2+}$ (3) $\left[ \text{Mn} \left( \text{CN} \right)_6 \right]^{3-}$	(4) $[Ni(CN)_4]^{2-}$
48.	Radioactivity of a sample	(Z=22) decreases 90% after 10 years. What will
	be the half life of the sam	ple
	(1) 5 years	(2) 2 years .
	(3) 3 years	(4) 10 years
49.	A catalyst is a substance v	vhich
	(1) Supplies energy to th	ne reaction
	(2) Shortens the time to	reach the equilibrium
	(3) Increases the equilib	rium constant of the reaction
	(4) Increases the equilib	rium concentration of the product
50.	The temperature of the system decreases in an	
	(1) Adiabatic compression	on (2) Isothermal expansion
	(3) Isothermal compress	sion (4) Adiabatic expansion
51.	Maximum dehydration ta	akes place of
	$(1)  \begin{array}{c} \operatorname{CH_3} \\   \\ \operatorname{CH_3} \\ \operatorname{CH_3} \end{array}$	(2) $CH_3 - C - CH - CH_3$ OH
	(3) OH	$(4)  \bigcirc - C - CH_3$

PG-EE-2016 (Chemistry) Code-C (11)

Т	Questions
Question No.	Questions
52.	$ \begin{array}{c c}  & \text{Ph} \\  & \text{H} \longrightarrow \text{Br} \\  & \text{H} \longrightarrow \text{Br} \\  & \text{Ph} \end{array} $ $ \begin{array}{c}  & \text{Na I} \\  & \text{Acetone} \end{array} $ $ \begin{array}{c}  & \text{A} \end{array} $
	A is  (1)  Ph  H  Ph  (2)  H  Ph  H  Br  (4)  H  Br
53	B. B $CH_3OH$ $CH_3-C-CH_2$ $H_2O^{18}$ $H^{\oplus}$ A
	A and B are $ \begin{array}{ccccccccccccccccccccccccccccccccccc$
	(3) Both are correct  (4) None is correct  (5) Chemistry Code-C (12)

PG-EE-2016 (Chemistry) Code-C (12)

Question No.	Questions
54.	Glycerol + KHSO $_4$ $\longrightarrow$ A $\xrightarrow{\text{HC}\ell\text{O}}$ B A and B are
	(1) $CH_2 = CH - CHO$ , $CH_2 - CH - CHO$ $C\ell$ OH
	(2) $CH_2 = CH - CHO$ , $CH_2 - CH - CHO$ OH $C\ell$
	(3) $CH_2 = CH - CHO$ , $CH_3 - CH - CHO$ $\begin{matrix} & & & \\ $
	(4) None is correct
55.	The quantum numbers, for the outer electrons of an atom are given by
	$n = 2$ ; $\ell = 0$ ; $m = 0$ ; $s = +1/2$
	(1) Lithium (2) Beryllium
	(3) Hydrogen (4) Boron
56.	"The exact path of electron 2p-orbital cannot be determined" The above
× -	statement is based upon
2.	(1) Hund's rule (2) Bohr's rule
	(3) Uncertainty principle (4) Aufbau principle
57.	The ground state configuration of Fe3+ ion in gaseous state is:
	(At. No. of Fe = $26$ )
	(1) $[Ar]^{18} 3d^3 4s^2$ (2) $[Ar]^{18} 3d^6 4s^2$
	(3) $[Ar]^{18} 3d^5$ (4) $[Ar]^{18} 3d^6$

PG-EE-2016 (Chemistry) Code-C (13)

Question No.	Questions		
58.	Which of the following is the smallest in size		
	(1) $N^{3-}$ (2) $O^{2-}$ (3) $F^{-}$ (4) $Na^{+}$		
59.	The electronegativity of the following elements increases in the order		
00.	(1) C, N, Si, P (2) N, Si, C, P		
	(3) Si, P, C, N (4) P, Si, N, C		
60.	In $ClF_3$ , Chlorine is		
00.	(1) sp <sup>2</sup> hybridized (2) sp <sup>3</sup> hybridized		
	(3) sp <sup>3</sup> d hybridized (4) sp <sup>3</sup> d <sup>2</sup> hybridized		
0.1	Consider a pure crystalline solid that is heated from absolute zero to a		
61.	temperature above the boiling point of the liquid. Which of the following		
	processes produces the greatest increase in entropy of the substance		
	(1) Vaporizing the liquid (2) Melting the solid		
	(3) Heating the liquid (4) Heating the gas		
62.	Elastic deformation in polymers is due to		
	(1) Slight adjustment of molecular chains		
	(2) Slippage of molecular chains		
	(3) Straightening of molecular chains		
	(4) Severe of covalent bonds		
63.	Which of the following process is responsible for the formation of delta		
	at a place where rivers meet the sea		
e l	(1) Emulsification (2) Coagulation		
	(3) Colloid formation (4) Peptization		

PG-EE-2016 (Chemistry) Code-C  $\,$  (14)

uestion No.	Questions	
64.	Which of the following is correct for lyophillic sols	
	(1) They are Irreversible	
	(2) They are formed by inorganic substances	
	(3) They are self stabilized	
	(4) They are readily coagulated by addition of electrolytes	
65.	Buffer solutions have constant acidity and alkalinity because	
	(1) They have large excess of H <sup>+</sup> or OH <sup>-</sup> ions	
	(2) They have fixed value of pH	
	(3) Acids and Alkalies in these solutions are shielded from attack by	
	other ions	
	(4) These give unionized acid or base on reaction with added acid	
	or alkali	
66.	Automobile steering wheels are normally made of  (1) High density polythene (2) Cellulose acetate	
	(1) High dollars, 1	
	(3) Cellulose nitrate (4) PVC	
67.	The de Broglie wavelength of an electron with kinetic energy of 1.0 eV is	
	(1) 28.7 pm (2) 2.87 pm	
	(3) 12.3 nm (4) 1.23 nm	
68.	If moisture and dirt entrapment is a major problem, it would be a good	
	practice to	
	(1) Butt weld (2) Stop weld	
	(3) Skip weld (4) Stitch weld	
69.	Iron crystallises in a b.c.c system with $a = 2.86 \text{Å}$ . The density of Iron is	
	(1) $79.2 \text{ g cm}^{-3}$ (2) $7.92 \text{ g cm}^{-3}$	
	(3) $0.79 \text{ g cm}^{-3}$ (4) $792 \text{ g cm}^{-3}$	

PG-EE-2016 (Chemistry) Code-C (15)

Que	estion	Questions
	70.	The Born Lande equation for the estimation of lattice energy of an ionic crystal is
		(1) $U_0 = \frac{MN_AZ_+e}{4\pi \in_0 r_0} \left(1 - \frac{1}{n}\right)$ (2) $U_0 = \frac{MN_AZe}{4\pi \in_0 r_0} \left(1 - \frac{1}{n}\right)$
		(3) $U_0 = \frac{MN_AZ_+Ze^2}{4\pi \in_0 r_0} \left(1 - \frac{1}{n}\right)$ (4) None of these
-	71.	Polydispersity index (P.D.I) of a polymer sample is given by
	, 1.	(1) $P.D.I = \overline{M}_m - \overline{M}_n$ (2) $P.D.I = \overline{M}_m + \overline{M}_n$
		$(1)  P.D.I = \overline{M}_{m} - \overline{M}_{n}$ $(2)  P.D.I = \overline{M}_{m} + \overline{M}_{n}$ $(3)  P.D.I = \overline{M}_{m} \overline{M}_{n}$ $(4)  P.D.I = \overline{M}_{m} / \overline{M}_{n}$
		where $\overline{M}_m, \overline{M}_n$ are mass average and number-average molar masses
-		The coefficient of thermal expansion, $\alpha$ , is expressed as
	72.	(>
		(1) $\alpha = -\frac{1}{V} \left( \frac{\partial V}{\partial T} \right)_{P}$ (2) $\alpha = \frac{1}{V} \left( \frac{\partial V}{\partial T} \right)_{P}$
		(1) $\alpha = -\frac{1}{V} \left( \frac{\partial V}{\partial T} \right)_{p}$ (2) $\alpha = \frac{1}{V} \left( \frac{\partial V}{\partial T} \right)_{p}$ (3) $\alpha = \frac{1}{T} \left( \frac{\partial V}{\partial T} \right)_{p}$ (4) $\alpha = -\frac{1}{T} \left( \frac{\partial V}{\partial T} \right)_{p}$
	73.	
		(1) It does not use the concept of saturated vapour pressure
		(2) It considers the multilayer adsorption
		(3) It is not valid for porous adsorbent
		(4) It uses the concept of latent heat of condensation

Questions		
Entropy is related to thermodynamic probability, W, by relation		
(1) $S = R \ell nW$ (2) $S = R - \ell nW$		
(3) $S = k \ell nW$ (4) $S = k + \ell nW$		
The number of macro states for the distribution of three atoms (having		
total energy = 3 quanta) among ground, first, second states (possessing		
zero, one and two quanta of Energy respectively) are		
(1) one (2) six		
(3) ten (4) three		
The Ilkovic equation for diffusion current is given by		
(1) $\vec{i}_d = 607 \text{ nDC m}^{2/3} \text{ t}^{1/2}$ (2) $\vec{i}_d = 607 \text{ nD}^{1/2} \text{C m}^{2/3} \text{ t}^{1/6}$		
(3) $\vec{i}_d = 607 \text{ nDC}^{1/2} \text{ m}^{2/3} \text{ t}^{1/6}$ (4) $\vec{i}_d = 607 \text{ nD}^{1/2} \text{ m}^{2/3} \text{ t}^{1/6}$		
All notations have their usual meanings		
In the lead acid battery during charging the cathode reaction is		
(1) Reduction of Pb <sup>2+</sup> to Pb (2) Formation of PbSO <sub>4</sub>		
(3) Formation of PbO <sub>2</sub> (4) None of these		
The fundamental vibrational frequency of carbon mono oxide (CO) molecule		
is 2050 cm <sup>-1</sup> . The force constant of CO molecule will be		
(1) $4\pi^2 c \mu (2050)^2 \times 10^4$		
(2) $4\pi^2 c^2 \mu^2 (2150) \times 10^{-4}$		
(3) $4\pi^2 c^2 \mu (2050)^2 \times 10^4$		
(4) $4\pi^2 c^2 \mu (2050) \times 10^2$		

PG-EE-2016 (Chemistry) Code-C (17)

Question No.	Questions												
79.	The operator for linear momentum of a particle moving in a direction												
	parallel to x-axis is given by												
	(1) $\hat{p}_x = ih \frac{\partial}{\partial x}$ (2) $\hat{p}_x = -ih \frac{\partial}{\partial x}$												
	(1) $\hat{p}_{x} = ih \frac{\partial}{\partial x}$ (2) $\hat{p}_{x} = -ih \frac{\partial}{\partial x}$ (3) $\hat{p}_{x} = -ih \frac{\partial^{2}}{\partial x^{2}}$ (4) $\hat{p}_{x} = -i \frac{h}{2\pi} \cdot \frac{\partial}{\partial \pi}$												
80.	The average of an observable quantity, x, is obtained by												
	(1) $\hat{\mathbf{x}} = \frac{\langle \psi \mathbf{x} \psi^{@} \rangle}{\langle \psi \psi^{@} \rangle}$ (2) $\hat{\mathbf{x}} = \frac{\langle \psi \psi^{@} \mathbf{x} \rangle}{\langle \psi \psi^{@} \rangle}$												
	(1) $\hat{\mathbf{x}} = \frac{\langle \psi \mathbf{x} \psi^{@} \rangle}{\langle \psi \psi^{@} \rangle}$ (2) $\hat{\mathbf{x}} = \frac{\langle \psi \psi^{@} \mathbf{x} \rangle}{\langle \psi \psi^{@} \rangle}$ (3) $\hat{\mathbf{x}} = \frac{\langle \psi \mathbf{x}^{2} \psi^{@} \rangle}{\langle \psi \psi^{@} \rangle}$ (4) $\hat{\mathbf{x}} = \frac{\langle \psi \psi^{@} \mathbf{x}^{2} \rangle}{\langle \psi \psi^{@} \rangle}$												
	where $\psi$ is the wave function												
81.	Which of the following compounds will exhibit geometrical isomerism												
	(1) 1, 1-diphenyl-1-propene (2) 3-phenyl-1-butene												
	(3) 2-phenyl-1-butene (4) 1-phenyl-2-butene												
82													
	(1) Conc. $H_2SO_4$ (2) $Br_2$ in $CCl_4$												
	(3) Dil. $KMnO_4$ (4) Ag $NO_3$ in ammonia												
88													
	(1) 3-Hexanone (2) 2, 4-hexanedione												
	(3) 2, 5-hexanedione (4) 2, 3-hexanedione												

PG-EE-2016 (Chemistry) Code-C (18)

Question No.	Questions												
84.	Ammonia can be dried by												
	(1) Conc. $H_2SO_4$ (2) $P_4O_{11}$												
	(3) CaO (4) Anhydrous $CaCl_2$												
85.	Amongst H <sub>2</sub> O, H <sub>2</sub> S, H <sub>2</sub> Se and H <sub>2</sub> Te, the one with the highest boiling												
	point is												
	(1) H <sub>2</sub> O because of hydrogen bonding												
	(2) H <sub>2</sub> S because of hydrogen bonding												
	(3) H <sub>2</sub> Te because of higher molecular weight												
	(4) H <sub>2</sub> Se because of lower molecular weight												
86.	When a mixture of one mole of $C_6H_5COOH$ and one mole of $C_6H_5OH$ is treated with one mole of $NaHCO_3$ , the product formed will consist of												
	(1) $C_6H_5COOH$ , $C_6H_5ONa$ (2) $C_6H_5COONa$ , $C_6H_5ONa$												
	(3) C <sub>6</sub> H <sub>5</sub> COONa, C <sub>6</sub> H <sub>5</sub> OH (4) None												
87.	Addition of ethanol to aqueous hydrolysis of CH <sub>2</sub> Cl does not												
	increase the rate of hydrolysis but changes only the composition of final												
	products. This indicates that reaction is proceeding through  (3) $SE^2$ (4) $SE^1$												
	(1) $SN^2$ (2) $SN$												
88	. Which one of the following is the best method for the preparation of												
	acetophenone												
	(1) $Ph COOEt + CH_3 MgBr$ (2) $Ph COCl + CH_3 Mg Br$												
	(3) $Ph CONH_2 + CH_3 Mg Br$ (4) $PhCN + CH_3 Mg Br$												

PG-EE-2016 (Chemistry) Code-C (19)

Ammonia can be dried by  (1) Conc. H <sub>2</sub> SO <sub>4</sub> (2) P <sub>4</sub> O <sub>11</sub> (3) CaO (4) Anhydrous CaCl <sub>2</sub> Amongst H <sub>2</sub> O, H <sub>2</sub> S, H <sub>2</sub> Se and H <sub>2</sub> Te, the one with the highest boiling point is (1) H <sub>2</sub> O because of hydrogen bonding (2) H <sub>2</sub> S because of hydrogen bonding (3) H <sub>2</sub> Te because of higher molecular weight (4) H <sub>2</sub> Se because of lower molecular weight  When a mixture of one mole of C <sub>6</sub> H <sub>5</sub> COOH and one mole of C <sub>6</sub> H <sub>5</sub> OH is treated with one mole of NaHCO <sub>3</sub> , the product formed will consist of (1) CH COOH, C.H.ONa (2) C <sub>6</sub> H <sub>5</sub> COONa, C <sub>6</sub> H <sub>5</sub> ONa
(3) CaO  (4) Anhydrous CaCl <sub>2</sub> Amongst H <sub>2</sub> O, H <sub>2</sub> S, H <sub>2</sub> Se and H <sub>2</sub> Te, the one with the highest boiling point is  (1) H <sub>2</sub> O because of hydrogen bonding  (2) H <sub>2</sub> S because of hydrogen bonding  (3) H <sub>2</sub> Te because of higher molecular weight  (4) H <sub>2</sub> Se because of lower molecular weight  When a mixture of one mole of C <sub>6</sub> H <sub>5</sub> COOH and one mole of C <sub>6</sub> H <sub>5</sub> OH is treated with one mole of NaHCO <sub>3</sub> , the product formed will consist of
(3) CaO  (4) Anhydrous CaCl <sub>2</sub> Amongst H <sub>2</sub> O, H <sub>2</sub> S, H <sub>2</sub> Se and H <sub>2</sub> Te, the one with the highest boiling point is  (1) H <sub>2</sub> O because of hydrogen bonding  (2) H <sub>2</sub> S because of hydrogen bonding  (3) H <sub>2</sub> Te because of higher molecular weight  (4) H <sub>2</sub> Se because of lower molecular weight  When a mixture of one mole of C <sub>6</sub> H <sub>5</sub> COOH and one mole of C <sub>6</sub> H <sub>5</sub> OH is treated with one mole of NaHCO <sub>3</sub> , the product formed will consist of
<ul> <li>(1) H<sub>2</sub>O because of hydrogen bonding</li> <li>(2) H<sub>2</sub>S because of hydrogen bonding</li> <li>(3) H<sub>2</sub>Te because of higher molecular weight</li> <li>(4) H<sub>2</sub>Se because of lower molecular weight</li> <li>When a mixture of one mole of C<sub>6</sub>H<sub>5</sub>COOH and one mole of C<sub>6</sub>H<sub>5</sub>OH is treated with one mole of NaHCO<sub>3</sub>, the product formed will consist of</li> </ul>
<ul> <li>(1) H<sub>2</sub>O because of hydrogen bonding</li> <li>(2) H<sub>2</sub>S because of hydrogen bonding</li> <li>(3) H<sub>2</sub>Te because of higher molecular weight</li> <li>(4) H<sub>2</sub>Se because of lower molecular weight</li> <li>When a mixture of one mole of C<sub>6</sub>H<sub>5</sub>COOH and one mole of C<sub>6</sub>H<sub>5</sub>OH is treated with one mole of NaHCO<sub>3</sub>, the product formed will consist of</li> </ul>
<ol> <li>H<sub>2</sub>O because of hydrogen bonding</li> <li>H<sub>2</sub>S because of hydrogen bonding</li> <li>H<sub>2</sub>Te because of higher molecular weight</li> <li>H<sub>2</sub>Se because of lower molecular weight</li> <li>When a mixture of one mole of C<sub>6</sub>H<sub>5</sub>COOH and one mole of C<sub>6</sub>H<sub>5</sub>OH is treated with one mole of NaHCO<sub>3</sub>, the product formed will consist of</li> </ol>
<ul> <li>(2) H<sub>2</sub>S because of hydrogen bonding</li> <li>(3) H<sub>2</sub>Te because of higher molecular weight</li> <li>(4) H<sub>2</sub>Se because of lower molecular weight</li> <li>When a mixture of one mole of C<sub>6</sub>H<sub>5</sub>COOH and one mole of C<sub>6</sub>H<sub>5</sub>OH is treated with one mole of NaHCO<sub>3</sub>, the product formed will consist of</li> </ul>
<ul> <li>(3) H<sub>2</sub>Te because of higher molecular weight</li> <li>(4) H<sub>2</sub>Se because of lower molecular weight</li> <li>When a mixture of one mole of C<sub>6</sub>H<sub>5</sub>COOH and one mole of C<sub>6</sub>H<sub>5</sub>OH is treated with one mole of NaHCO<sub>3</sub>, the product formed will consist of</li> </ul>
(4) $H_2$ Se because of lower molecular weight When a mixture of one mole of $C_6H_5$ COOH and one mole of $C_6H_5$ OH is treated with one mole of NaHCO $_3$ , the product formed will consist of
When a mixture of one mole of $C_6H_5COOH$ and one mole of $C_6H_5OH$ is treated with one mole of NaHCO $_3$ , the product formed will consist of
(3) $C_6H_5COONa$ , $C_6H_5OH$ (4) None
Addition of ethanol to aqueous hydrolysis of $\bigcirc$ CH <sub>2</sub> C $\ell$ does not increase the rate of hydrolysis but changes only the composition of final products. This indicates that reaction is proceeding through
products. This indicates that redefine $(3)$ SE <sup>2</sup> $(4)$ SE <sup>1</sup>
Which one of the following is the best method for the preparation of acetophenone  (1) Ph COOEt + CH <sub>3</sub> MgBr  (2) Ph COCl + CH <sub>3</sub> Mg Br  (3) Ph CONH <sub>2</sub> + CH <sub>3</sub> Mg Br  (4) PhCN + CH <sub>3</sub> Mg Br

PG-EE-2016 (Chemistry) Code-C (19)

Question No.	Questions											
No. 89.	$ \begin{array}{c c} O \\ II \\ C \\ NK + \alpha - \text{haloester} \\ C \\ O \end{array} $ (A)											
	Required product is obtained when A is  (1) Ethyl-3-Chlorobutyrate (2) Ethyl-3-Chloropropionate  (3) Ethyl-2-Chloropropionate (4) Ethyl Chloroacetate											
90.	$C_6H_{10} \xrightarrow{\text{Ozonolysis}} \text{HCHO} + \text{CH}_3\text{CHO} + \text{CH}_2(\text{CHO})_2C_6H_{10} \text{ is}$ (1) 1, 2-hexadiene (2) 1, 3-hexadiene (3) 1, 4-hexadiene (4) 2-methyl-1, 3-pentadiene											
91.	lange to											
92.	$H_2S$ would separate the following at pH < 7 (1) $Zn^{2+}$ , $Co^{2+}$ (2) $Cu^{2+}$ , $Cd^{2+}$ (3) $Cu^{2+}$ , $Cr^{3+}$ (4) $Cu^{2+}$ , $As^{3+}$											
93.	<ul> <li>Nitrite (NO<sub>2</sub>) interferes in the 'ring-test' of nitrate (NO<sub>3</sub>). Some of the following reagents can be used for the removal of nitrite</li> <li>(I) NH<sub>4</sub>Cl (II) (NH<sub>2</sub>)<sub>2</sub> CS thiourea</li> <li>(III) NH<sub>2</sub>SO<sub>3</sub>H (sulphamic acid) (IV) Sulphanilic acid</li> <li>Correct choice is</li> <li>(1) I, II (2) I, II, IV</li> <li>(3) I, II, III (4) II, III, IV</li> </ul>											

PG-EE-2016 (Chemistry) Code-C (20)

Question No.	Questions													
94.	The oxidation number of Fe in $K_4$ [Fe (CN) <sub>6</sub> ] is													
	(1) 3 (2) 2 (3) 0 (4) 1													
95.	CFSE value for an octahedral low spin d <sup>6</sup> metal ion complex will be													
	(1) 20 Dq (2) 24 Dq													
	(3) 12 Dq (4) 6 Dq													
96.	The number of unpaired electrons in a d <sup>7</sup> tetrahedral complex													
	(1) 3 (2) 2 (3) 1 (4) 7													
97.	E.A.N in [Ni (NH <sub>3</sub> ) <sub>6</sub> ] <sup>2+</sup> is													
	(1) 38 (2) 36 (3) 40 (4) 37													
98.	Term symbol for ground state V <sup>3+</sup> is													
	(1) ${}^{3}F_{2}$ (2) ${}^{4}S_{3/2}$ (3) ${}^{3}P_{0}$ (4) ${}^{3}P_{2}$													
99.	How many geometrical isomers are possible for [Co $(NH_3)_4$ $Cl_2$ ]													
	(1) two (2) three													
	(3) four (4) six													
100.	Which of the following metal-carbonyls is paramagnetic													
	(1) $\operatorname{Fe}\left(\operatorname{CO}\right)_{5}$ (2) $\operatorname{Ni}\left(\operatorname{CO}\right)_{4}$													
	$(3)  V(CO)_6 \qquad \qquad (4)  Cr(CO)_6$													
	·													
	46													

SET : A

1.	1	16.	3	31.	3 '	46.	2	61.	3	76.	2	91.	2
2.	2	17.	2	32.	1	47.	4	62.	3	77.	4	92.	3
3.	2	18.	2	33.	1	48.	1	63.	4	78.	1	93.	4
4.	2	1.9.	3	34.	2	49.	4	64.	4	79.	2	94.	2
5.	1	20.	3	35.	1	50.	2	65.	3	80.	3	95.	1
6.	3	21.	3	36.	3	51.	4	66.	3	81.	4	96.	3
7.	2	22.	2	37.	3	52.	3	67.	4	82.	2	97.	2
8.	4	23.	4	38.	4	53.	3	68.	3 ·	83.	1	98.	4
9.	2	24.	4	39.	3	54.	2	69.	2	84.	3	99.	2
10.	4	25.	3	40.	3	55.	2	70.	4	85.	4	100.	1
11.	4	26.	1	41.	2	56.	1	71.	1	86.	2		
12.	4	27.	1	42.	1	57.	1	72.	1	87.	1		
13.	2	28.	4	43.	3	58.	1	73.	2	88.	3		
14.	3	29.	2	44.	3	59.	1	74.	3	89.	4		
15.	1	30.	1	45.	2	60.	3	75.	4	90.	1		

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4	-======	=======					SET : B
1.	16. 3		16	======		======	
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9. 3	24. 3	39. 1	54. 4	69. 4	84. 2	99. 4	
10. 3	25. 4	40. 3	55. 3	70. 2	85. 1		
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1.	1	16. 1		31.	4 ,	46.	3	61.	4	76.	2	91.	1
2.	1	17. 1		32.	4	47.	2	62.	2	77.	4	92.	2
3.	2	18. 1		33.	2	48.	4	63.	1	78.	1	93.	2
4.	3,	19. 1		34.	3	49.	2	64.	3	79.	4	94.	2
5.	4	20. 3		35.	1	50.	1	65.	4	80.	2	95.	1
6.	2	21. 3		36.	3	51.	3 .	66.	2	81.	3	96.	3
7.	4	22. 1		37.	2	52.	3	67.	1	82.	2	97.	2
8.	1	23. 1		38.	2	53.	4	68.	3	83.	4	98.	4
9.	2	24. 2		39.	3	54.	4	69.	4	84.	4	99.	2 ,
10.	3	25. 1		40.	3	55.	3	70.	1	85.	3	100.	4
11.	4	26. 3		41.	2	56.	3	71.	2	86.	1		
12.	3	27. 3		42.	3	57.	4	72.	1	87.	1		
13.	3	28. 4		43.	4	58.	3	73.	3	88.	4		
14.	2	29. 3		44.	2	59.	2	74.	3	89.	2		
15.	2	30, 3		45.	1	60.	4	75.	2	90.	1		

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3.	3	18. 4	33. 4	48. 3	63. 2	78. 3	93. 3	
4.	3	19. 2	34. 2	49. 2	64. 3	79. 4	94. 2	
5.	2	20. 1	35. 1	50. 4	65. 4	80. 1	95. 2	
6.	2	21. 1	36. 3	51. 3	66. 2	81. 4	96. 1	
7.	4	22. 2	37. 2	52. 1	67. 4	82. 4	97. 1	
8.	1	23. 2	38. 4	53. 1	68. 1	83. 2	98. 1	
9.	4	24. 2	39. 2	54. 2	69. 2	84. 3	99. 1	
10.	2	25. 1	40. 1	55. 1	70. 3	85. 1	100. 3	,
11.	3	26. 3	41. 3	56. 3	71. 4	86. 3		
12.	2	27. 2	42. 3	57. 3	72. 2	87. 2		
13.	4	28. 4	43. 4	58. 4	73. 1	88. 2		
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