Total No. of Printed Pages: 21

SET-Y

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PG-EE-2022

SUBJECT : Chemistry 1147

		Sr. No
Time: 11/4 Hours	Max. Marks: 100	Total Questions: 100
Roll No. (in figures)	(in words)	
Name	Father's Name	
Mother's Name	Date of Examination	
(Signature of the Candidate)		(Signature of the Invigilator)

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- 3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
- 4. Question Booklet along with answer key of all the A, B, C & D code will be got uploaded on the University website after the conduct of Entrance Examination. In case there is any discrepancy in the Question Booklet/Answer Key, the same may be brought to the notice of the Controller of Examinations in writing/through E.Mail within 24 hours of uploading the same on the University Website. Thereafter, no complaint in any case, will be considered.
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PG-EE-2022/(Chemistry)-(SET-Y)/(A)

 The strength of pπ-dπ bonding in 	n A-O (A = Si, P, S, C) follows the order:
(1) $Si - O > P - O > S - O > CI$	
(2) $P - O > Si - O > S - O > Cl$	

(3)
$$S - O > Cl - O > P - O > Si - O$$

(4)
$$CI - O > S - O > P - O > Si - O$$

The order of acidity in boron trihalides is:

- (1) $BF_3 > BCI_3 > BBr_3$
- $(2) BBr_3 > BCl_3 > BI_3$
- (3) $BF_3 > BBr_3 > BCl_3$ (4) $BBr_3 > BF_3 > BCl_3$

The stable oxidation state of Au is:

(1) I

- (2) III
- (3) V (4) -I

Xenon forms several fluorides and oxofluorides which exhibit acidic behavior. The correct sequence of descending Lewis acidity among the given species is represented by:

- (1) $XeF_6 > XeOF_4 > XeF_4 > XeO_2F_2$
- (2) $XeOF_4 > XeO_2F_2 > XeF_4 > XeF_6$
- (3) $XeF_4 > XeO_2F_2 > XeOF_4 > XeF_6$
- (4) $XeF_4 > XeF_6 > XeOF_4 > XeO_2F_2$

The spin only (μ_s) magnetic moment of $[CrCl_6]^{3-}$:

- (1) 3.87 BM (2) 2.84 BM
- (3) 6.87 BM
- (4) 5.20 BM

The total number of isomers of $Co(en)_2Cl_2$ (en = ethylenediamine) is:

- (2) 3
- (3) 6

(4) 5

The tripositive lanthanides ion which does not show sharp peak in its absorption spectrum:

- (1) Ce3+

- (2) Pr^{3+} (3) Gd^{3+} (4) Pm^{3+}

2		at a section of backs
8.		(ii) NH ₂ (iii) OH (iv) F, the order of basicity
	is:	(2) ii > i > iii > iv
	(1) i > ii > iii > iv	(2) ii > i > ii > iv (4) iii > i > ii > iv
	(3) iii > ii > i > iv	(4) iii > 1 > 11 > 1V
9.	The order of polarity of NH3, NF3 and	BF_3 is:
	(1) $NH_3 < NF_3 < BF_3$	(2) $BF_3 < NF_3 < NH_3$
	(3) $BF_3 \le NH_3 \le NF_3$	(4) $NF_3 \le BF_3 \le NH_3$
10.	Silicates with continuous 3D framework	c are:
	(1) Neso-Silicates	(2) Soro-Silicates
	(3) Phyllo-Silicates	(4) Tecto-Silicates
11.	Identify the strongest Bronsted acid:	
	(1) H ₂ SO ₄ (2) CH ₃ COOH	(3) HNO ₃ (4) H ₃ PO ₄
12.	Which of the following does not give fla	ame colourations 2
	(1) Ca^{2+} (2) Na^{+}	(3) Cu^{2+} (4) Cd^{2+}
13.	The structure of XeF2 and XeO2F2 respec	ctively are: X & A & A & A & A & A & A & A & A & A &
	(1) bent, tetrahedral	(2) linear, square planar
	(3) linear, see-saw	(4) bent, see-saw
14.	Among the following electronic config	urations, the one corresponding to the element
	with the highest ionization energy is:	and the one corresponding to the element
	(1) [Ne] $3s^23p^1$	(2) [Ar] $3d^{10}4s^24p^2$
	(3) [Ne] $3s^23p^2$	(4) [Ne] $3s^23p^3$
15.	The reaction in which the seal to g	
	called:	he solvent get attached to the solute species are
	(1) Solvation reaction	(2) Solvolytic reaction
	(3) Metathetical reaction	
		(4) Redox reaction
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(3) Independent of ring size

(4) Due to equal contribution of entropy and enthalpy change

		5
29.	. The red colour of oxyhaemoglobin is mainly due to the:	
	(1) d-d transition	
	(2) Metal to ligand charge transfer transition	
	(3) Intraligand $\pi - \pi^*$ transition	
	(4) Ligand to metal charge transfer transition	
30.	Which of the following does not obey 18 e rule?	
	(1) $[Cr(CO)_6]$ (2) $[Fe(CO)_5]$ (3) $[V(CO)_6]$ (4) $[Mn_2(CO)_{10}]$	
31.	Which of the following are arranged in order of increasing radius?	
	(1) $K^+(aq) < Na^+(aq) < Li^+(aq)$	
	(2) $K^+(aq) < Li^+(aq) < Na^+(aq)$	
	(3) Li^+ (aq) < K^+ (aq) < Na^+ (aq)	
	(4) Na^{+} (aq) < Li^{+} (aq) < K^{+} (aq)	
32.	The number of antibonding electrons in NO and CO according to MO theory	are
	respectively: (1) 1, 0 (2) 2, 2 (3) 3, 2 (4) 2, 3	
33.		
	In an inches proves the later to the fact that the provest to the province of	
	(2) due to its blue colour	
	(3) due to absorption of radiation of wavelength at 255 nm	
	(4) by destroying chlorofluoro carbons	
34.	The temperature at which RMS velocity of SO ₂ molecules is half that of IIe mole	cules

(1) 150 K (2) 600 K (3) 900 K (4) 1200 K

at 300 K is:

- The mean free path of oxygen molecules at 0°C and one atmospheric pressure will be equal to (molecular diameter of oxygen molecule is 2.0×10^{-8} cm):
 - (1) 2.1×10^{-5} cm

(2) 4.2×10^{-5} cm

(3) 2.9×10^{-5} cm

- (4) 1.0×10^{-8} cm
- What will be the Vander Waal's constant b for carbon dioxide in lit mol-1 (given that 36. $T_C = 304 \text{ K} \text{ and } P_C = 73 \text{ atm})$?

 - (1) 0.043 (2) 2.732

- What happens to the viscosity of liquid with the increase in temperature?
 - (1) It increases

- (2) It decreases
- (3) It may increase or decrease
- (4) No change
- Which of the following statements is *not* true about smectic liquid crystals? 38.
 - (1) They have limited mobility
 - (2) They do not flow as normal liquids
 - (3) The concept of viscosity is applicable to them
 - (4) They show X-ray diffraction patterns
- Rate constant of a reaction can be expressed by Arrhenius equation as: $k = Ae^{RT}$ this equation, E_a , represents:
 - (1) The energy above which all the colliding molecules will react
 - (2) The energy below which the colliding molecules will not react
 - (3) The total energy of the reacting molecules at a temperature T
 - (4) The fraction of molecules with energy greater than the activation energy

40	Which of the following statements is	true in the Transition State Theory (TST)?
	(1) TST fails for some reactions at hi	gh temperature
	(2) Activated complex is in quasi-equ	ailibrium with the reactants
	(3) TST is not applicable when the in	termediates are very short-lived
41.	Ostwald dilution law is applicable to:	48. For the reaction, Str. (b) is Str. (co. 1 2th. co.
	(1) Strong electrolytes only	(2) Weak electrolytes only
	(3) non electrolytes	(4) Strong as well as weak electrolytes
42.	Which of the following is not a type of	of acidic buffer solution ?
	$(1) Na_2HPO_4 + Na_3PO_4$	(2) $CH_3COOH + CH_3COONa$
	(3) $H_2CO_3 + Na_2CO_3$	(4) $H_3PO_4 + NaH_2PO_4$
43.	When a large ion is replaced by a sma	ll ion, the conductivity of the solution :
	(1) Decreases	(2) Increases
	(3) Remains unchanged	(4) None of the above
44.	All of the following are intensive prop	perties except :
	(1) Mass (2) Viscosity	(3) Density (4) Temperature
45.	In an isothermal process change in into	
	(1) Decreases	(2) Increases
	(3) Remains constant	(4) Becomes zero
46.	The ratio of the rise in temperature when compressed isothermally to the s	of a gas when compressed adiabatically to that same extent is:
	(1) Less than 1	(2) More than 1
	(3) Equal to 1	(4) Depends on the gas

at

47	and sink temperatures 400 K, 350 efficient?	K & 300 K respective		ne least
	(1) Engine A			
	(3) Engine C	(4) All have the	same efficiencies	
48.	For the reaction; $SBr_4(g) \rightarrow S(g)$ 25°C. ΔG° for the reaction at 25°C	will be .	5 kJ and $\Delta S^{\circ} = +125$	J/K at
	(1) +152.00kJ (2) -56.75 kJ	(3) +77.75 kJ		
49.	When pressure is applied to ice	water system, which of	the following will hap	pen ?
	(1) More ice is formed			
	(2) Water will evaporate			
	(3) The system will not be in equili	brium Hame a vel beseit		
	(4) More water is formed			
50.	The partition coefficient of iodine volume of carbon tetrachloride requirements 100 ml of aqueous solution will be experienced.	juired for 95% of the	iodine to be extracted	0. The from
	(1) 21.1 ml (2) 60.5 ml	(3) 95.0 ml	(4) 90.0 ml	
51.	Which of the following is false regard	rding galvanic cells?		
	(1) It converts chemical energy into	electrical energy		
	(2) The electrolytes taken in the two	beakers are different		
	(3) The reactions taking place are no			
	(4) To set up this cell, a salt bridge i			
	ap and con, a san bridge i	o docu		

52.	with a hydrogen e		on, at what pH of th	0.3 V. If this is combined e solution will the measured
	(1) 5.08	(2) 4.05	(3) 4.55	(4) 5.25
53.	Which electrode is	s used for pH measure	ement ?	
	(1) Silver electrod	le	(2) Glass electrod	le
	(3) Redox electro	de	(4) Calomel elect	rode
54.				ength of HCl are 1.02 D and er in the molecule will be
	(1) 100	(2) 13	(3) 81	(4) 17
55.	The zero point ene	ergy of a particle conf	ined to one dimensi	onal box of length L is:
	(1) 0	(2) $h^2/8mL^2$	$(3) 8h^2/mL^2$	(4) h ² /8m
56.	box is 12 units of			article in a one dimensional levels of $n = 3 & n = 2$ for
	(1) 8	(2) 5	(3) 20	(4) 10
57.		ition $J = 0 \rightarrow J = 1$ is		cm ⁻¹ . The frequency for the
	(1) 10.6 cm ⁻¹		(2) 21.2 cm ⁻¹	
	(3) 42.4 cm ⁻¹		(4) No absorption	n
58.	The fundamental molecule will be:	vibration frequency of	of N_2 is 2334 cm ⁻¹	. The force constant for the
	(1) 2250 Nm ⁻¹		(2) 2334 Nm ⁻¹	
	(3) 0.0004 Nm ⁻¹		(4) 83.36 Nm ⁻¹	
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59	. For a particular vibrational mode t	o appear in Raman spectrum, what must change?
	(1) Frequency of radiation	
	(2) Molecule's polarizability	
	(3) Intensity of radiation	
	(4) None of the above	
60.	Absorption of radiation in the UV characteristic of which of the follo	range attributable to $n \to \pi^*$ electronic transitions wing types of compounds?
	(1) Aromatic hydrocarbons	
	(2) Unsaturated carbonyl compour	nds
	(3) Non-conjugated polyenes	
	(4) Conjugated polyenes	
61.	A Spin inversion of electrons takes	place in which of the following?
	(1) Internal conversion	(2) Fluorescence
	(3) Phosphorescence	(4) None of the above
62.	If 1.5 grams of a non-volatile solu 1.3 g/cc) whose vapor pressure is 4 pressure of the dilute solution?	te ($M_w = 100$) is added to 200 ml of pure $CS_2(\rho)$ 00 mm of Hg at 27.0°C, what is the resulting vapo
	(1) 382.15 mm Hg	(2) 396.60 mm Hg
	(3) 401.75 mm Hg	(4) 398.25 mm Hg
63.	At 27°C the osmotic pressure of a Van't Hoff factor will be equal to:	0.01 M solution of a compound is 0.492 atm. Th
	(1) 1 (2) 2	(3) 3 (4) 4

- 64. Boiling point of chloroform is 61°C. After addition of 5.0 g of a non-volatile solute to 20 g chloroform the solution boils at 64.63°C. If $K_b = 3.63$ K kg mol⁻¹, what is the molecular weight of the solute?
 - (1) 320
- (2) 100
- (3) 250
- (4) 400
- 65. In which of the following equilibrium either P or T can be changed independently?
 - (1) Invariant
- (2) Univariant
- (3) Divariant
- (4) All of the above
- 66. Which is a metastable equilibrium in sulphur system?
 - $(1) S_r \rightleftarrows S_m \rightleftarrows S_v$

(2) $S_m \rightleftarrows S_l \rightleftarrows S_v$

(3) $S_m \rightleftarrows S_r \rightleftarrows S_l$

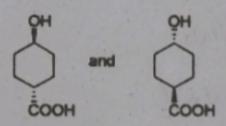
- (4) $S_r \rightleftarrows S_t \rightleftarrows S_v$
- 67. Number of hyperconjugation structures in isopropyl radical is:
 - (1) 3

(2) 6

(3)9

(4) 12

68. The given compounds are:



(1) Diastereomers

(2) Enantiomers

(3) Identical

- (4) Regioisomers
- 69. The statement that is true about the reaction given below is:

- (1) (A) and (B) both are R-isomers
- (2) (A) and (B) both are S-isomers
- (3) (A) is R-isomer and (B) is S-isomer
- (4) (A) is S-isomer and (B) is R-isomer

70. Which intermediate is involved in the following reaction?

(1) Free radical

(2) Carbocation

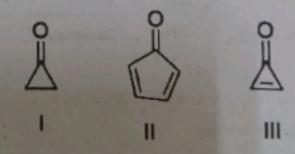
(3) Carbanion

- (4) Carbene
- 71. Identify the compound with highest ring strain?
 - (1) Cyclohexane

(2) Cyclopropane

(3) Cyclobutane

- (4) Cyclopentane
- 72. Which alkene on ozonolysis gives CH3CH2CHO and CH3COCH3?
 - (1) $CH_3CH_2CH = C(CH_3)_2$
 - (2) $CH_3CH_2CH = CHCH_2CH_3$
 - (3) $CH_3CH_2CH = CHCH_3$
 - (4) $(CH_3)_2 C = CHCH_3$
- 73. Arrange the following compounds in increasing order of polarity:



(1) I < II < III

(2) III < II < I

(3) II < I < III

(4) III < I < II

Majority of the alkynes are not prepared from/ by:

(1) Condensation

(2) Acetylene

(3) Dehydrohalogenation

(4) Hydrogenation

In S_N^2 reaction of cis-3-methylcyclopentyl bromide with aqueous alkali, the product formed is:

- (1) a cis-alcohol
- (2) a trans-alcohol
- (3) an equimolecular mixture of cis and trans-alcohols
- (4) there is no reaction

Product A in this reaction is:

The product obtained in the following reaction is:

(2)
$$RH_2C \xrightarrow{R'} OH$$
 (3) $R'CH_2 \xrightarrow{R} OH$ (4) $R''CH_2 \xrightarrow{R'} OH$

- (1) SOCl₂
- (2) CH₃COCI
- (3) (CH₃CO)₂O
- (4) CH3COOH

79.
$$CH_3CHO + HCN \rightarrow \xrightarrow{H_3O^+}$$

The product is a:

- (1) Mixture of 1:1 enantiomers of acid
- (2) Mixture of 1: 1 diastereomers of acid
- (3) Mixture of 1: 2 enantiomers of acid
- (4) Mixture of 1:1 enantiomers of aldehyde
- 80. The structure of the product X is:

81. X and Y respectively are:

X
$$ArN_{2}^{+}X^{-}$$

$$pH=5.7$$

$$NH_{2} OH$$

$$NH_{3} OH$$

$$NH_{4} OH$$

$$NH_{4} OH$$

$$NH_{5} OH$$

82. A nitrogen containing aromatic compound A reacts with Sn/HCl followed by HNO_2 to give an unstable compound B. B on treatment with phenol forms a coloured compound C with molecular formula $C_{12}H_{10}N_2O$. The structure of compound A is:

(1)
$$\bigcirc$$
 NH₂ (2) \bigcirc NO₂ (3) \bigcirc CN (4) \bigcirc CONH₂

- 83. Wolf-Kishner reduction is the reduction of:
 - (1) Carbonyl compounds into hydrocarbons
 - (2) Carbonyl compounds into alcohols
 - (3) Nitrobenzene into aniline
 - (4) Carbohydrates into alcohols
- 84. The product A formed in the following reaction is:

- (1) C₆H₅ NH(CH₃)₂+ CI
- (2) C₆H₅ NH(CH₃)₂+ Cr
- (3) CH₃ CH₂NH(CH₃)₂* CI
- (4) OCH3 CH2NH(CH3)2* CF

The major products A and B respectively for the following reaction are: 85.

A
$$\frac{i) \text{ NaBH}_4}{ii) \text{ H}_3\text{O}^+}$$
 $B = CH_2\text{OH}$

(2) $A = CH_2\text{OH}$
 $B = CH_2\text{OH}$
 $CH_2\text{OH}$
 $CH_2\text{OH}$
 $CH_2\text{OH}$
 $CH_2\text{OH}$

86.
$$\alpha$$
-D-(+)-glucose and β -D-(+)-glucose are :

(1) Anomers

- (2) Enantiomers
- (3) Geometrical isomers (4) Epimers

Which of the following statement is correct?

- (1) The Ruff procedure lengthens an aldose chain and gives a single product.
- (2) The Ruff procedure shortens an aldose chain and gives two epimers.
- (3) The Kiliani-Fisher procedure lengthens an aldose chain and gives two epimers.
- (4) The Kiliani-Fisher procedure shortens an aldose chain and gives a single product.
- Which of the following reagents, when treated with phenyl magnesium bromide 88. followed by acid workup, will yield 2-phenylethanol?
 - (1) Diethyl ether

(2) Ethanol

(3) Ethanal

(4) Oxirane

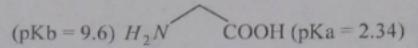
3			
89.	The order of aromaticity of furan, thiophe	ene and pyrrole is :	
	(1) Thiophene > furan > pyrrole		
	(2) Furan > pyrrole > thiophene		
	(3) Thiophene > pyrrole > furan		
	(4) Pyrrole > thiophene > furan		
90.	Thiophene reacts with HCHO in the prese	ence of aq. HCl to give:	
	(1) $\stackrel{S}{\triangleright}$ -CHO (2) $\stackrel{S}{\triangleright}$ -CH ₂ CI	(3) \bigcirc CH ₃ (4) \bigcirc CI	
91.	Sulphaguanidine, a sulpha drug is used for	r the treatment of:	
	(1) Eye diseases	(2) Bacillary dysentery	
	(3) Pneumonia	(4) Skin infections	
92.	Which of the following is a product former	ed in Claisen Condensation ?	
	(1) β-ester	(2) β-ketone	
	(3) β- keto ester	(4) γ-diketone	
3.	Bakelite is a condensation polymer of between two compounds is an example of	phenol and formaldehyde. The initial	step
	(1) Free radical reaction		

(2) Aldol condensation

(3) Aromatic nucleophilic substitution

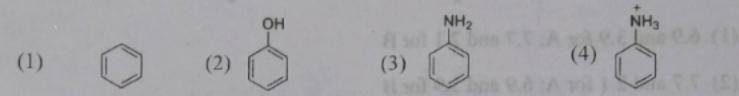
(4) Aromatic electrophilic substitution

94. The isoelectric point of the amino acid is:

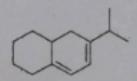


- (1) 3.35
- (2) 10.64 (3) 5.97

Which of the following absorbs at more wavelength?



Calculate the maximum wavelength of the following compound according to 96. Woodward Fieser rules:



- (1) 278 nm
- (2) 273 nm
- (3) 283 nm
- (4) 290 nm

What is the relation between restoring force, f to the displacement, q in the Hooke's law?

- (1) f = -kq (2) f = kq (3) $f = kq^2$ (4) $f = -kq^2$

What is the order of decreasing vibrational frequency for C-Cl, C-Br, C-C, C-O and 98. C-H?

- (1) C-Cl, C-Br, C-C, C-H, C-O
- (2) C-O, C-H, C-Br, C-Cl, C-C
- (3) C-Br, C-Cl, C-O, C-C, C-H
- (4) C-H, C-C, C-O, C-Cl, C-Br

How many methyl peaks would you expect to observe in the H NMR spectrum of cis-1,4- dimethylcyclohexane?

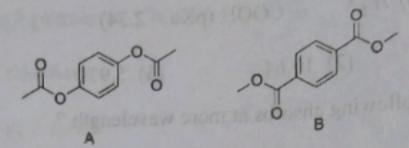
(1) 2

(2) 3

(3) 1

(4) 4

Compounds A and B exhibit two singlets, each in their 1H NMR spectra. The expected chemical shifts are at δ :



- (1) 6.9 and 3.9 for A; 7.7 and 2.1 for B
- (2) 7.7 and 2.1 for A; 6.9 and 3.9 for B
- (3) 7.7 and 3.9 for A; 6.9 and 2.1 for B
- (4) 6.9 and 2.1 for A; 7.7 and 3.9 for B

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PG-EE-2022

SET-Y

SUBJECT: Chemistry

11474

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Roll No. (in figures)	(in words)			
Name	Father's Name	· · · · · · · · · · · · · · · · · · ·		
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PG-EE-2022/(Chemistry)-(SET-Y)/(B)

24.	Identify the compound with highest ring	stra	in?//vita	n-8-215	lo noda	en ',?	l nî rocit	5.
	(1) Cyclohexane	(2)	Cyclopro	pane		7.1 LD 34.0	23111	
	(3) Cyclobutane	(4)	Cycloper	ntane	lorlos	le-u s	(1)	
2.	Which alkene on ozonolysis gives CH ₃ C	CH_2	CHO and	CH ₃ CC	OCH ₃ ?	a mons	(2)	
	(1) $CH_3CH_2CH = C(CH_3)_2$	din	ure of cis a	ar mixt	molecul	iupė na	(1)	
	(2) $CH_3CH_2CH = CHCH_2CH_3$			noit	no reas	diere is	(1)	
	(3) $CH_3CH_2CH = CHCH_3$, <u>'</u>		action i	n this re	duet A i	Prix	.8
	(4) $(CH_3)_2C = CHCH_3$	HO	PH					
3.	Arrange the following compounds in inci	1 rm	att	of polar	ity:			
			> 2	2	CH ₃	H ₃ C Ph	(1)	
	(4) Pn 2 Ph (1)		(.) ¹	IF J	613	19 PH	(3)	
	(1) I < II < III	(2)		I di ni b	nintdo 1	produc	The	7.
	(3) II < I < III	(4)	 	I				
4.	No. 1 14 Cal - Illustrations and managed	froi	n/by:			Я		į.
	(1) Condensation	ine	HO-04	(2) R	HOSK	- F	(1)	
	(2) Acetylene	no i	iish ethano	listingo	ent can o	gner doi	idW	.8
	(3) Dehydrohalogenation (2)					,500Z	(1)	
	(4) Hydrogenation	ed			0,(0)* ff. (, (,),)	(2)	a A
EE	-2022/(Chemistry)-(SET-Y)/(B)		(B)	MV-TA	स)-(ज्यास	ment')	IIO.P.	T. O.

PG-EE-2022/(Chemistry)-(SET-Y)/(B)

5. In S_N^2 reaction of cis-3-methylcyclopentyl bromide with aqueous alkali, the product formed is:

Li Lychtpropane

(1) a cis-alcohol

- (2) a trans-alcohol And the OH the off the saving singlement of another dealer
- (3) an equimolecular mixture of cis and trans-alcohols (19) (19) (19) (19) (19)
- (4) there is no reaction

(2) $CH_*CH_*CH_* = UHCH_*CH_*$

6. Product A in this reaction is:

(3)
$$CH_3CH_3CH = CHCH_3$$

- Conc. H_2SO_4 (H) (h)3. Arrange the following compounds in in

- The product obtained in the following reaction is:

- (2) $RH_2C \xrightarrow{R'} OH$ (3) $R'CH_2 \xrightarrow{R'} OH$ (4) $R''CH_2 \xrightarrow{R'} OH$
- 8. Which reagent can distinguish ethanol and phenol?
 - (1) SOCI,

(2) CH₃COCl nonemark for the charle (8)

 $(3) (CH_3CO), O$

(4) CH₃COOH

9. CH3CHO+HCN > 1130 persons resultation from the state of the state o

The product is a:

- (2) Mixture of 1: 1 diastercomers of acid
- (3) Mixture of 1: 2 enantiomers of acid
- the observed value of the dipole moment and the bond length of III are (1711) and II and the bond length of III are (1711) and III are (1711) and III are (1711) are (1711) and III are (1711) are (17

144 Cilhamol electrode

10. The structure of the product X is:

(M) | Selamont : Felamon of this

sharpsty issue 1/1

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box is 12 units of cuerth the (4) erence in energy tels of the (6) 2 in

- 11. Which of the following is false regarding galvanic cells?
 - (1) It converts chemical energy into electrical energy
 - (2) The electrolytes taken in the two beakers are different
 - (3) The reactions taking place are non-spontaneous
 - (4) To set up this cell, a salt bridge is used

the above system in the same tails

P.G.-E.S.-20224 (Chemistry)-(SET-Y)/(R)

PG-EE-2022/(Chemistry)-(SET-Y)/(B)

4

- 18. The fundamental vibration frequency of N_2 is 2334 cm⁻¹. The force constant for the molecule will be:
 - (1) 2250 Nm^{-171 Salid}
 - (2) 2334 Nm⁻¹
 - (3) 0.0004 Nm⁻¹
 - (4) 83.36 Nm⁻¹
- 19. For a particular vibrational mode to appear in Raman spectrum, what must change?
 - (1) Frequency of radiation
 - (2) Molecule's polarizability
 - (3) Intensity of radiation
 - (4) None of the above

HO SHY

20. Absorption of radiation in the UV range attributable to $n \to \pi^*$ electronic transitions is characteristic of which of the following types of compounds?

HO THIS

- 22. A nitrepen containing aromatic compound A reacts with SalMC followed by MVO₂ notreact hydrocarbons and an aromatic compound B. B on treatment with photocommon account a summan
 - (2) Unsaturated carbonyl compounds
 - (3) Non-conjugated polyenes
 - (4) Conjugated polyenes

ArN₂+X-
$$X = \frac{ArN_2+X^-}{pH=5-7}$$

$$ArN_2 + X = \frac{ArN_2+X^-}{pH=8-10}$$

$$PH=8-10 = \frac{ArN_2+X^-}{pH=8-10}$$

B

(1)
$$NH_2$$
 OH NH_2 OH

A nitrogen containing aromatic compound A reacts with Sn/HCl followed by HNO₂ to give an unstable compound B. B on treatment with phenol forms a coloured compound C with molecular formula $C_{12}H_{10}N_2O$. The structure of compound A is:

EE-1911/Chamieury-(MT-VV(H)

PG-EE-2022/(Chemistry)-(SET-Y)/(B)

- 23. Wolf-Kishner reduction is the reduction of:
 - (1) Carbonyl compounds into hydrocarbons
 - (2) Carbonyl compounds into alcohols
 - (3) Nitrobenzene into aniline
 - (4) Carbohydrates into alcohols
- 24. The product A formed in the following reaction is:

(1) C_6H_5 NH(CH₃)₂+Cr(\mathcal{L})

(4) (4) Sometrical isomers (4) Epimers

(2) C₆H₅ NH(CH₃)₂+ Cr ⁽¹⁾ Isotropic si incompany grive left and to mainly in the latter of Other standard and grive and grive

(2) The Rull procedure shortens an atoose class and gives (vertically the Chiland Fisher procedure lengthens an aldose class and edge (3). The Kiliand Fisher procedure lengthens an aldose class and edge (3).

t. about office. It is the fill that the change of the fill that the change of the fill that the change of the cha

23. Which of the following reasons, when treated who party magnesian tenidal tellowed by acid worker, will yield? phenylaband

(4) Orden teiner (2) Francis (4) Orden to the Change (4) Crimmin (4) Orden to the Change (4) Orden to

PG-EE-2022/(Chemistry)-(SET-Y)/(B)

(E) IT-THE terminal PART.O.

(1)

FIG-F1-1012/(Checulatry)-(SET-V)/(B)

25. The major products A and B respectively for the following reaction are:

(1)
$$A = CH_2OH$$

$$B = CH_2OH$$

$$University (1)$$

(3)
$$A = CH_2OH$$
 at containing and CH_2OH and A toubong add CH_2OH and A toubong add CH_2OH CH_2OH CH_2OH CH_2OH

26. α -D-(+)-glucose and β -D-(+)-glucose are :

(1) Anomers

- (2) Enantiomers
- (3) Geometrical isomers

(4) Epimers

27. Which of the following statement is correct?

- (1) The Ruff procedure lengthens an aldose chain and gives a single product.
- (2) The Ruff procedure shortens an aldose chain and gives two epimers.
- (3) The Kiliani-Fisher procedure lengthens an aldose chain and gives two epimers.
- (4) The Kiliani-Fisher procedure shortens an aldose chain and gives a single product.
- 28. Which of the following reagents, when treated with phenyl magnesium bromide followed by acid workup, will yield 2-phenylethanol?
 - (1) Diethyl ether

(2) Ethanol

(3) Ethanal

(4) Oxiranc

	(1) Thiophene > furan > pyrrole	
	(2) Furan > pyrrole > thiophene	
	(3) Thiophene > pyrrole > furan	
•	(4) Pyrrole > thiophene > furan	
30.	Thiophene reacts with HCHO in the pro-	esence of aq. HCl to give:
	(1) S CHO (2) S CH₂CI	(3) \bigcirc CH ₃ (4) \bigcirc CI
31.	Identify the strongest Bronsted acid: (1) H_2SO_4 (3) HNO_3	(2) CH ₃ COOH (4) H ₃ PO ₄
32.	Which of the following does <i>not</i> give for Ca^{2+} (2) Na^{+}	ame colourations? (3) Cu^{2+} (4) Cd^{2+}
33.	The structure of XeF_2 and XeO_2F_2 respectively.	ctively are:
	(1) bent, tetrahedral	(2) linear, square planar
	(3) linear, see-saw	(4) bent, see-saw
34.	Among the following electronic config with the highest ionization energy is:	urations, the one corresponding to the element
	(1) [Ne] $3s^23p^1$	(2) [Ar] $3d^{10}4s^24p^2$
	(3) [Nc] $3s^23p^2$	(4) [Ne] $3s^23p^3$
35.	The reaction in which the molecules of called:	the solvent get attached to the solute species are
	(1) Solvation reaction	(2) Solvolytic reaction
	(3) Metathetical reaction	(4) Redox reaction
PG-EE-	-2022/(Chemistry)-(SET-Y)/(B)	P.T. C

29. The order of aromaticity of furan, thiophene and pyrrole is:

36.	36. Oxymyoglobin $Mb(O)_2$ and oxyhemoglobin $Hb(O)_2$, respectively are:						
	(1) paramagnetic and paramagnetic						
	(2) diamagnetic and diamagnetic						
	(3) paramagnetic and diamagnetic						
	(4) diamagnetic and paramagnetic						
37.	The ring size and the number of linked tetrahedral present in $[Si_6O_{18}]^{12}$ are, respectively:						
	(1) 6 and 6 (2) 12 and 6 (3) 12 and 12 (4) 6 and 12						
38.	The IUPAC nomenclature of $Na[PCl_6]$ is:						
	(1) Sodium hexachlorophosphine (V)						
	(2) Sodium hexachlorophosphate (V)						
	(3) Sodium hexachlorophosphine						
	(4) Sodium hexachlorophosphite (V)						
39.	Coordination number and geometry of $[Ce(NO_3)_6]^{2-}$ is:						
	(1) 6, Octahedral (2) 12, Octahedral						
	(3) 8, Dodecahedral (4) 12, Icosahedral						
40.	Which of the following has highest lattice energy?						
	(1) KF (2) NaF (3) CsF (4) RbF						
41.	Sulphaguanidine, a sulpha drug is used for the treatment of:						
	(1) Eye diseases (2) Bacillary dysentery						
	(3) Pneumonia (4) Skin infections						
PG-EE	-2022/(Chemistry)-(SET-Y)/(B)						

42.	Which of the following is a	product	formed in	Claisen	Condensation	7
42.	which of the following is a	product	formed in	1 Claisen	Condensatio	n

(1) β-ester

(2) \(\beta\)-ketone

(3) β- keto ester

(4) γ-diketone

43. Bakelite is a condensation polymer of phenol and formaldehyde. The initial step between two compounds is an example of:

- (1) Free radical reaction
- (2) Aldol condensation
- (3) Aromatic nucleophilic substitution
- (4) Aromatic electrophilic substitution
- 44. The isoelectric point of the amino acid is:

$$(pKb = 9.6) H_2N$$
 COOH $(pKa = 2.34)$

- (1) 3.35
- (2) 10.64
- (3) 5.97
- (4) 8.02

45. Which of the following absorbs at more wavelength?







46. Calculate the maximum wavelength of the following compound according to Woodward Fieser rules:

- (1) 278 nm
- (2) 273 nm
- (3) 283 nm
- (4) 290 nm

47.	What is the relation between restoring	force,	f to the	displacement,	q in the	Hooke's
	law?					

- (1) f = -kq
- (2) f = kq
- (3) $f = kq^2$ (4) $f = -kq^2$

48. What is the order of decreasing vibrational frequency for C-Cl, C-Br, C-C, C-O and C-H?

- (1) C-Cl, C-Br, C-C, C-H, C-O
- (2) C-O, C-H, C-Br, C-Cl, C-C
- (3) C-Br, C-Cl, C-O, C-C, C-H
- (4) C-H, C-C, C-O, C-Cl, C-Br

49. How many methyl peaks would you expect to observe in the ¹H NMR spectrum of cis-1,4- dimethylcyclohexane?

- (1).2.
- (2) 3

50. Compounds A and B exhibit two singlets, each in their ¹H NMR spectra. The expected chemical shifts are at δ :

- (1) 6.9 and 3.9 for A; 7.7 and 2.1 for B
- (2) 7.7 and 2.1 for A; 6.9 and 3.9 for B
- (3) 7.7 and 3.9 for A; 6.9 and 2.1 for B
- (4) 6.9 and 2.1 for A; 7.7 and 3.9 for B

51. A Spin inversion of electrons takes place in which of the following?

- (1) Internal conversion
- (2) Fluorescence

(3) Phosphorescence

(4) None of the above

PG-EE-2022/(Chemistry)-(SET-Y)/(B)

52 .	If 1.5 grams of a
	If 1.5 grams of a non-volatile solute ($M_w = 100$) is added to 200 ml of pure CS_2 ($\rho = 1.3$ g/cc) whose vapor pressure is 400.
	1.5 g/cc) whose vapor pressure is 100
	1.3 g/cc) whose vapor pressure is 400 mm of Hg at 27.0°C, what is the resulting vapor pressure of the dilute solution?
	and Colution?

(1) 382.15 mm Hg

(2) 396.60 mm Hg

- (3) 401.75 mm Hg
- (4) 398.25 mm Hg (11) box (A (11)

53.	At 27°C the osmotic pressure of a 0.01 Van't Hoff factor will be equal to:	M solution	of a	compound	is 0.492	atm.	The
	ractor will be equal to:	Torragal of al					

- (1) 1
- (2) 2

Boiling point of chloroform is 61°C. After addition of 5.0 g of a non-volatile solute to 20 g chloroform the solution boils at 64.63°C. If $K_b = 3.63$ K kg mol⁻¹, what is the molecular weight of the solute?

- (1) 320

- (2) 100 (3) 250 (4) 400

55. In which of the following equilibrium either P or T can be changed independently?

- (1) Invariant
- (2) Univariant
- (3) Divariant
 - (4) All of the above

56. Which is a metastable equilibrium in sulphur system?

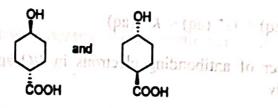
- $(1) S_r \rightleftarrows S_m \rightleftarrows S_v$
- consider (4) (2) $S_m \rightleftarrows S_l \rightleftarrows S_v$ reinsder (3)
- (3) $S_m \rightleftharpoons S_r \rightleftarrows S_l$ subsequences in a solution of the state of the

57. Number of hyperconjugation structures in isopropyl radical is:

- (1) 3
- (2) 6
- (3) $9^{(pa)}$ (2) (pa) (2) (pa) (2)

(3) If (aq) < K' (aq) < Na' (aq)

The given compounds are:



(1) Diastereomers

(2) Enantiomers

(3) Identical

(4) Regioisomers

59. The statement that is true about the reaction given below is:

- (1) (A) and (B) both are R-isomers
- (2) (A) and (B) both are S-isomers
- (3) (A) is R-isomer and (B) is S-isomer
- (4) (A) is S-isomer and (B) is R-isomer
- 60. Which intermediate is involved in the following reaction?

(1) Free radical

(2) Carbocation

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(M) (Y-Fish (crisement 1) Cont. (A)

(3) Carbanion

- (4) Carbene
- 61. Which of the following are arranged in order of increasing radius?
 - (1) $K^+(aq) \le Na^+(aq) \le Li^+(aq)$
 - (2) $K^+(aq) \le Li^+(aq) \le Na^+(aq)$
 - (3) Li^+ (aq) $< K^+$ (aq) $< Na^+$ (aq)
 - (4) Na^+ (aq) $< Li^+$ (aq) $< K^+$ (aq)
- **62.** The number of antibonding electrons in *NO* and *CO* according to *MO* theory are respectively:
 - (1) 1, 0

(2) 2, 2

(3) 3, 2

(4) 2, 3

63.	Ozone present in upper atmosphere protects people on earth:				
	(1) due to its diamagnetic nature	te approx	rgot it contains in t		
	(2) due to its blue colour	ahich all the codu	avade metriculting		
	(3) due to absorption of radiation of wa	ivelength at 255 nm	antsi gene vili (5)		
	(4) by destroying chlorofluoro carbons				
64.	The temperature at which RMS velocity at 300 K is: (1) 150 K (2) 600 K	of SO ₂ molecules	is half that of He molec	cules	
	(1) 150 K (2) 600 K	(3) 900 K	(4) 1200 K	GV.	
65.	The mean free path of oxygen molecule equal to (molecular diameter of oxygen	es at 0°C and one molecule is 2.0 × 1	atmospheric pressure wi 0^{-8} cm):	ll be	
	(1) 2.1×10^{-5} cm	(2) 4.2×10^{-5} cm			
	(3) 2.9×10^{-5} cm	(4) 1.0×10^{-8} cm	Pyval adiguid blazaco	79	
66.	What will be the Vander Waal's consta $T_C = 304 \text{ K}$ and $P_C = 73 \text{ atm}$?	nt b for carbon dio	xide in lit mol ⁻¹ (given	that	
	(1) 0.043 (2) 2.732	(3) 0.341	(4) 4.164	to to	
67.	What happens to the viscosity of liquid	with the increase in	temperature ?	21	
	(1) It increases	(2) It decreases	Dear original		
	(3) It may increase or decrease	(4) No change	or as not upon to the William	£.T	
68.	Which of the following statements is not	true about smeetic	liquid crystals?		
	(1) They have limited mobility	box 5 cm	anadomi sailmost 45°	1.0	
	(2) They do not flow as normal liquids	respond as smaller	generalia, and a	7.4	
	(3) The concept of viscosity is applicabl	e to them	- ntr		
N. Co.	(4) They show X-ray diffraction patterns	3	सिंहित है।		
PG-EE-	2022/(Chemistry)-(SET-Y)/(B)	(II)/(Y-T	[1 q2 022/((hembier)-(SE	Г. О.	

69	Rate constant of a reaction can be expectation, E_a , represents:	pressed by Arrhenius equation as: $k = Ae^{-RT}$. If
	(1) The energy above which all the co	olliding molecules will react
	(2) The energy below which the collic	ling molecules will not react
	(3) The total energy of the reacting me	olecules at a temperature T
- 2	(4) The fraction of molecules with end	ergy greater than the activation energy
70.	Which of the following statements is tr (1) TST fails for some reactions at hig	rue in the Transition State Theory (TST)? th temperature
	1992 101 102 11 110 120	squal to (molecular monutes of accept in Lendal)
	(3) TST is not applicable when the interest (4) All of the above	
71.	Ostwald dilution law is applicable to:	(2) 2.9×10^{-5} cm
4	(1) Strong electrolytes only (3) non electrolytes	(2) Weak electrolytes only (4) Strong as well as weak electrolytes
72.	Which of the following is not a type of	PARTY INC.
	$(1) Na_2HPO_4 + Na_3PO_4$	(2) $CH_3COOH + CH_3COONa$
	(3) $H_2CO_3 + Na_2CO_3$	(4) $H_3PO_4 + NaH_2PO_4^{\text{Excession}}$ (1)
73.	When a large ion is replaced by a small	ion, the conductivity of the solution:
	(1) Decreases	(2) Increases to graviolist add to maid W .88
	(5) Remains unchanged	(4) None of the above
74.	All of the following are intensive proper	rties except : non an aroll march rad!
	(1) Mass	(2) Viscosity
	(5) Delisity	141 Temperatura
PG-EE	-2022/(Chemistry)-(SET-Y)/(B)	(4) They show X-ray diffrant 11 allowers
		PG-5E-19224(Chembury)-(SFT-Y)/(B)

75.	In an isothermal process change in interest	ial energy	en voiceitte (numn **
	(1) Decreases	(2) Increases	61
	(3) Remains constant	(4) Becomes 2	ero (1)
76.	The ratio of the rise in temperature of when compressed isothermally to the sar	a gas when come extent is:	ompressed adiabatically to that
	(1) Less than 1 (S)	(2) More than	1. 310, 211 (1.
			n the gas
77.	Three Carnot engines A, B and C have and sink temperatures 400 K, 350 K & efficient?		vely. Which engine is the least
	(1) Engine A	(2) Engine B	and laighte san its qf () (80) the choice radial mode and (1)
	(3) Engine C		e same efficiencies
78.	For the reaction; $SBr_4(g) \rightarrow S(g) + 2B$ 25°C. ΔG° for the reaction at 25°C will be	$r_2(l)$; $\Delta H^\circ = +1$	115 kJ and $\Delta S^{\circ} = +125$ J/K at
	(1) +152.00kJ (2) -56.75 kJ	(3) +77.75 kJ	edi L (4) +37.10 kJ
79.	When pressure is applied to ice		
	(1) More ice is formed (2) Water will evaporate		11 aquae prome
	(3) The system will not be in equilibrium	poque in a me	86. White of the following in
	(4) More water is formed		· W (1)
80.	The partition coefficient of iodine betw	een carbon tetra	achloride and water is 90. The
	volume of carbon tetrachloride required 100 ml of aqueous solution will be equal	l for 95% of th to:	e iodine to be extracted from
	(1) 21.1 ml (2) 60.5 ml	(3) 95.0 ml	(4) 90.0 ml

O.T. q. 021 (Leminica) (SI I V) (B)

81.	81. Among the following, metal carbonyl species having highest vco stretching free				luchcy	
	is:				וון או בדבטני	
	(1) $[Mn(CO)_6]^+$	(2)	$[Cr(CO)_6]$	1112:121	yerur nesi (+)	
	(3) IV(CO)-1-	(4)	11.4CO) 12-			
82.	Glauber's salt is:		The state of the	ozn or lo- lise	te office แล้ง องกุศตร แล้ง	ar
	(1) MgSO ₄ .7H ₂ O - 1 nch epot (1)			0 1	outraso ()	
	(3) CuSO ₄ .5H ₂ O _{cd} and he ship of (4)	(4)	$FeSO_4.7H_2O$		followp 1 (2)	
83.	The colour of CuS is:	7 - 61	La fan U.F	engines	Prec Campt	27.
i tad	(1) Black (3) Blue destrict year and the	(2) (4)	Yellow White	erinat.	and sink tamp : (fictent ?	
84.	A 3p atomic orbital has:				(U. Fngine A.	
	(1) one radial node and one angular nod	e			A Smgn	
	(2) two angular nodes and a rad We (1)				(3) Lagine (1
ik di	(3) one angular node	· 13	(9) 1 (9)	ID. SBr.	For the reaction	78.
					25°C AG for	
85.	The geometry around the central atom in	the	ClF ₄ is:	2)	(1) = 15 2 00kJ	
1 13	(1) square planar orbito dollar mateva	(2)	square pyram	idal	When pressure	79.
	(3) octahedral	(4)	trigonal bipyr	amidal	(i) More ice i	
86.	Which of the following ions is not expec	ted 1			(2) Water will	
	(1) Mn^{2+}		Fe3+			
	(3) Ti^{3+}		Cu ⁺	mol a t	(4) Viore water	40
d.	tel al music from abquidamental modes in re-		ande to in	nor Hiere	The parmion of	.08
87.	The S and L values for 15 N atom respec	tivel	y, are :	Tai nod	volume of car	
	(1) 1/2 and 1	(2)	1/2 and 0	the such	tion of anni-	
	(3) 1 and 0 (4) kn 0 et (8)	(4)	3/2 and 0	C)	In 115 als	43

88.	Chelate effect is				
	Chelate effect is : finder dealer	controllers her subletul	(interese	arnol	many

- (1) Predominantly due to enthalpy change contain with a size of the reached to appropriate the
- (2) Predominantly due to entropy change
- (3) Independent of ring size
- (4) Due to equal contribution of entropy and enthalpy change

The red colour of oxyhaemoglobin is mainly due to the: 89.

- (1) d-d transition
- The spin only (p.) magnetic moment of tent (F) (2) Metal to ligand charge transfer transition MC 182 (2) MR 183 (1)
- (3) Intraligand π π* transition (2) (12) (13) To reason it to reduce the entire self-
- (4) Ligand to metal charge transfer transition

97. The tripositive landianides ion which does not show sharp neak in its 90. Which of the following does not obey 18 e^- rule?

- (1) $[Cr(CO)_6]$ (2) $[Fe(CO)_5]$ (3) $[V(CO)_6]$ (4) $[Mn_2(CO)_{10}]$

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(1) WO JANUARY WELL

91. The strength of $p\pi$ -d π bonding in A-O (A = Si, P, S, C) follows the order:

(1)
$$Si - O > P - O > S - O > Cl - O$$

(2)
$$P - O > Si - O > Si - O > Cl - O$$

(3)
$$S-O>Cl-O>P-O>Si-O$$
 and also of NH2, NF2 and of $O-iS=O-iS=O$

(4)
$$Cl - O > S - O > P - O > Si - O$$

The order of acidity in boron trihalides is:

- 92. $(1) BF_3 > BCl_3 > BBr_3$
 - (2) $BBr_3 > BCl_3 > BF_3$
 - (3) $BF_3 > BBr_3 > BCl_3$ (4) $BBr_3 > BF_3 > BCl_3$ (4) $BBr_3 > BF_3 > BCl_3$ (5)
- The stable oxidation state of Λu is:
 - (3) V (1) I (2) III

(4) -I

VI = 11 = 1 (1)

viere ii s iii (8)

(3) ME < MH, = NE

94.	Xenon forms several fluorides and correct sequence of descending Lewiby:	exofluorides which exhibit acidic behavior. The sacidity among the given species is represented
	(1) $XeF_6 > XeOF_4 > XeF_4 > XeO_2F_2$	Committee of the control of the control of the

(1) $XeF_6 > XeOF_4 > XeF_4 > XeO_2F_2$

(2) $XeOF_4 > XeO_2F_2 > XeF_4 > XeF_6$

(3) $XeF_4 > XeO_2F_2 > XeOF_4 > XeF_6$

(4) $XeF_4 > XeF_6 > XeOF_4 > \frac{500}{XeO_2F_2}$

95. The spin only (μ_s) magnetic moment of $[CrCl_6]^{3-}$:

(1) 3.87 BM

(2) 2.84 BM (3) 6.87 BM (4) 5.20 BM

The total number of isomers of $Co(en)_2Cl_2$ (cn = ethylenediamine) is:

(1) 4

(2) 3

(3) 6

-) Ligand to metal thorse transfer at lation 97. The tripositive lanthanides ion which does not show sharp peak in its absorption Which of the following does not obey 48 a rule? spectrum:

(1) Ce^{3+} (2) Pr_{a}^{3+} (2) Pr_{a}^{3+} (3) Gd^{3+} (4) Pm^{3+} (1)

93. The stable on duron take of fairs

(HIMY-THE Considered PATTOL STAFF

Among the following anions (i) CH_3^- (ii) NH_2^- (iii) OH_3^- (iv) F_3^- , the order of basicity 98. is:

(3) V

(1) i > ii > iii > iv

(2) ii > i > iii > iv

(3) iii > ii > i > iv

(4) iii > i > ii > iv < 0 - i2 < 0 - 9 (6)

The order of polarity of NH_3 , NF_3 and BF_3 is:

(1) $NH_3 < NF_3 < BF_3$ (2) $BF_3 < NF_3 < NH_3$

(3) $BF_3 < NH_3 < NF_3$

(4) $NF_3 < BF_3 < NH_3$

The arrier of acidity in leave trabalides is Silicates with continuous 3D framework are:

1 (4)

(1) Neso-Silicates

CM < (An (a) (2) Soro-Silicates

(3) Phyllo-Silicates

(4) Tecto-Silicates

Total No. of Printed Pages: 21

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ARE ASKED TO DO SO)

PG-EE-2022

SET-Y

SUBJECT: Chemistry

11471

			Sr. No
Time: 11/4 Hours	Max	k. Marks : 100	Total Questions: 100
Roll No. (in figures)	(in w	vords)	· · · · · · · · · · · · · · · · · · ·
Name			
Mother's Name			
		- - 	
(Signature of the Candidate)			(Signature of the Invigilator)

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

- 1. All questions are compulsory.
- 2. The candidates *must return* the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfairmeans / mis-behaviour 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.** Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
- 4. Question Booklet along with answer key of all the A, B, C & D code will be got uploaded on the University website after the conduct of Entrance Examination. In case there is any discrepancy in the Question Booklet/Answer Key, the same may be brought to the notice of the Controller of Examinations in writing/through E.Mail within 24 hours of uploading the same on the University Website. Thereafter, no complaint in any case, will be considered.
- 5. 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 booklet itself. Answers *must not* be ticked in the question booklet.
- 6. 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.
- 7. Use only Black or Blue Ball Point Pen of good quality in the OMR Answer-Sheet.
- 8. Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after starting of the examination.

1.	Ostwald dilution law is applicable to	:
	(1) Strong electrolytes only	(2) Weak electrolytes only
	(3) non electrolytes	(4) Strong as well as weak electrolytes
2.	Which of the following is not a type of	of acidic buffer solution?
	$(1) Na_2HPO_4 + Na_3PO_4$	(2) $CH_3COOH + CH_3COONa$
	$(3) H_2CO_3 + Na_2CO_3$	$(4) H_3PO_4 + NaH_2PO_4$
3.	When a large ion is replaced by a sma	all ion, the conductivity of the solution:
	(1) Decreases	(2) Increases
	(3) Remains unchanged	(4) None of the above
4.	All of the following are intensive prop	perties except :
	(1) Mass (2) Viscosity	(3) Density (4) Temperature
5.	In an isothermal process change in int	ernal energy:
	(1) Decreases	(2) Increases
	(3) Remains constant	(4) Becomes zero
6.	The ratio of the rise in temperature when compressed isothermally to the	of a gas when compressed adiabatically to that same extent is:
	(1) Less than 1	(2) More than 1
	(3) Equal to 1	(4) Depends on the gas
7.		we source temperatures 750 K, 700 K & 650 K & 300 K respectively. Which engine is the least
	(1) Engine A	(2) Engine B
	(3) Engine C	(4) All have the same efficiencies

8.	For the reaction; $SBr_4(g) \rightarrow S(g) + 2Br_2(l)$; $\Delta H^\circ = +115$ kJ and $\Delta S^\circ = +125$ J/K at 25°C. ΔG° for the reaction at 25°C will be:		
	(1) +152.00kJ	(2) -56.75 kJ	
	(3) +77.75 kJ	(4) +37.10 kJ	
9.	When pressure is applied to ice ⇒ water	r system, which of the following will happen?	
	(1) More ice is formed		
	(2) Water will evaporate		
	(3) The system will not be in equilibriu	m	
	(4) More water is formed		
10.		ween carbon tetrachloride and water is 90. The ed for 95% of the iodine to be extracted from al to:	
	(1) 21.1 ml	(2) 60.5 ml	
	(3) 95.0 ml	(4) 90.0 ml	
11.	Among the following, metal carbonyl s is:	pecies having highest v_{CO} stretching frequency	
	(1) $[Mn(CO)_6]^+$	(2) $[Cr(CO)_6]$	
	$(3) [V(CO)_6]^-$	(4) $[Fe(CO)_4]^{2-}$	
12.	Glauber's salt is:		
	$(1) MgSO_4.7H_2O$	(2) $Na_2SO_4.10H_2O$	
	$(3) CuSO_4.5H_2O$	(4) FeSO ₄ .7H ₂ O	
13.	The colour of CuS is:		
	(1) Black	(2) Yellow	
	(3) Blue	(4) White	
C FF	2022//Chomistm/) (SET V)//C)		

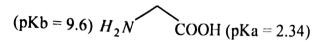
1	14. A 3p atomic orbital has:		
	(1) one radial node and one angula	r node	
	(2) two angular nodes		
	(3) one angular node		
	(4) one radial node		
1	5. The geometry around the central ato	om in the ClF_4^+ is:	
	(1) square planar	(2) square pyra	midal
	(3) octahedral	(4) trigonal bip	yramidal
16	5. Which of the following ions is not e	xpected to be coloure	d ?
	(1) Mn^{2+} (2) Fe^{3+}	(3) Ti^{3+}	(4) Cu+
17	. The S and L values for 15 N atom res	spectively, are:	
	(1) 1/2 and 1 (2) 1/2 and 0	(3) 1 and 0	(4) 3/2 and 0
18.	. Chelate effect is:		
	(1) Predominantly due to enthalpy c	hange	
	(2) Predominantly due to entropy ch	ange	
	(3) Independent of ring size		
	(4) Due to equal contribution of entre	opy and enthalpy cha	nge
19.	The red colour of oxyhaemoglobin is	mainly due to the :	
	(1) d-d transition		
	(2) Metal to ligand charge transfer tra	insition	
	(3) Intraligand π - π * transition		
	(4) Ligand to metal charge transfer tra	ansition	

20	Which of the following	lowing does not obey	y 18 e ⁻ rule ?	
	(1) $[Cr(CO)_6]$		(3) [V(CO) ₆]	(4) $[Mn_2(CO)_{10}]$
21	1. The strength of p	π -d π bonding in A-6	O (A = Si, P, S, C) fo	ollows the order:
		O > S - O > CI - O		
	(2) $P - O > Si -$	O > S - O > Cl - O		
	(3) $S - O > CI -$	O > P - O > Si - O		
	(4) $Cl - O > S -$	O > P - O > Si - O		
22.	. The order of acid		s is :	
	(1) $BF_3 > BCl_3 >$ (3) $BF_3 > BBr_3 >$	· ·	$(2) BBr_3 > BCl_3 >$	
			$(4) BBr_3 > BF_3 >$	BCl ₃
23.	The stable oxidati	on state of Au is:	indungkon tila in et	
	(1) I	(2) III (DA)	(3) V () [see	(4) –I
24.	Xenon forms sever correct sequence of by:	eral fluorides and o of descending Lewis	exofluorides which es acidity among the	xhibit acidic behavior. The given species is represented
	$(1) XeF_6 > XeOF_4$	$> XeF_4 > XeO_2F_2$		
	$(2) XeOF_4 > XeO_2F_4$	$_2 > XeF_4 > XeF_6$		
	$(3) XeF_4 > XeO_2F_2$	$> XeOF_4 > XeF_6$		
	(4) $XeF_4 > XeF_6 > X$	$XeO_{4} > XeO_{2}F_{2}$		
25.	The spin only (μ_s)	magnetic moment o	of [CrCl _c] ³⁻ ·	
	(1) 3.87 BM		(3) 6.87 BM	(4) 5.20 BM
26.	The total number of	f isomers of Co(en).	$_{2}Cl_{2}$ (en = ethylened	iamine) is :
	(1) 4	(2) 3	(3) 6	(4) 5

P. T. O.

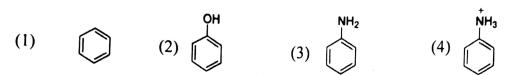
27.	The tripositive lanthanides is spectrum:	on which does	not show	sharp peak in	its absorp	tion
	(1) Ce^{3+} (2) Pr^{3+}	(3)	Gd^{3+}	(4) Pm^{3+}		
28.	Among the following anions is:	(i) CH ₃ (ii) N	H ₂ (iii) OH	F^- (iv) F^- , the ord	ler of bas	icity
	(1) i > ii > iii > iv	(2)	ii > i > iii >	· iv		
	(3) iii > ii > i > iv	(4)	iii > i > ii >	· iv		
29.	The order of polarity of NH_3 ,	NF_3 and BF_3 is	:			
	(1) $NH_3 < NF_3 < BF_3$		$BF_3 \le NF_3 \le$	< NH ₃		
	(3) $BF_3 < NH_3 < NF_3$	(4)	$NF_3 < BF_3$	<nh<sub>3</nh<sub>		
30.	Silicates with continuous 3D f	framework are:				
	(1) Neso-Silicates	(2)	Soro-Silica	tes		
	(3) Phyllo-Silicates	(4)	Tecto-Silic	ates		
31.		ug is used for the	e treatment	of:		
	(1) Eye diseases	(2)	Bacillary d	ysentery		
	(3) Pneumonia	(4)	Skin infecti	ions		
32.	Which of the following is a pr	roduct formed in	n Claisen Co	ondensation?		
	(1) β-ester	(2)	β-ketone			
	(3) β - keto ester	(4)	γ-diketone			
33.	Bakelite is a condensation between two compounds is an		enol and f	ormaldehyde. Th	ne initial	step
	(1) Free radical reaction					
	(2) Aldol condensation					
	(3) Aromatic nucleophilic su	bstitution				
	(4) Aromatic electrophilic su	bstitution				
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The isoelectric point of the amino acid is:



- (1) 3.35
- (2) 10.64
- (3) 5.97
- (4) 8.02

35. Which of the following absorbs at more wavelength?



Calculate the maximum wavelength of the following compound according to **36**. Woodward Fieser rules:



- (1) 278 nm
- (2) 273 nm
- (3) 283 nm
- (4) 290 nm

What is the relation between restoring force, f to the displacement, q in the Hooke's **37**. law?

- (1) f = -kq
- (2) $f = kq^2$ (3) $f = kq^2$ (4) $f = -kq^2$

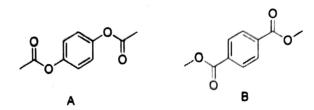
What is the order of decreasing vibrational frequency for C-Cl, C-Br, C-C, C-O and 38. C-H?

- (1) C-Cl, C-Br, C-C, C-H, C-O
- (2) C-O, C-H, C-Br, C-Cl, C-C
- (3) C-Br, C-Cl, C-O, C-C, C-H
- (4) C-H, C-C, C-O, C-Cl, C-Br

How many methyl peaks would you expect to observe in the ¹H NMR spectrum of **39**. cis-1,4- dimethylcyclohexane?

- (1) 2
- (2) 3
- (3) 1
- (4) 4

40. Compounds A and B exhibit two singlets, each in their ${}^{1}H$ NMR spectra. The expected chemical shifts are at δ :



- (1) 6.9 and 3.9 for A; 7.7 and 2.1 for B
- (2) 7.7 and 2.1 for A; 6.9 and 3.9 for B
- (3) 7.7 and 3.9 for A; 6.9 and 2.1 for B
- (4) 6.9 and 2.1 for A; 7.7 and 3.9 for B
- 41. A Spin inversion of electrons takes place in which of the following?
 - (1) Internal conversion

(2) Fluorescence

(3) Phosphorescence

- (4) None of the above
- 42. If 1.5 grams of a non-volatile solute ($M_w = 100$) is added to 200 ml of pure CS_2 ($\rho = 1.3$ g/cc) whose vapor pressure is 400 mm of Hg at 27.0°C, what is the resulting vapor pressure of the dilute solution?
 - (1) 382.15 mm Hg

(2) 396.60 mm Hg

(3) 401.75 mm Hg

- (4) 398.25 mm Hg
- **43.** At 27°C the osmotic pressure of a 0.01 M solution of a compound is 0.492 atm. The Van't Hoff factor will be equal to:
 - (1) 1
- (2) 2
- (3) 3
- (4) 4
- 44. Boiling point of chloroform is 61°C. After addition of 5.0 g of a non-volatile solute to 20 g chloroform the solution boils at 64.63°C. If $K_b = 3.63$ K kg mol⁻¹, what is the molecular weight of the solute?
 - (1) 320
- (2) 100
- (3) 250
- (4) 400

45. In which of the following equilibrium either P or T can be changed independently?

(1) Invariant

(2) Univariant

(3) Divariant

(4) All of the above

46. Which is a metastable equilibrium in sulphur system?

(1) $S_r \rightleftarrows S_m \rightleftarrows S_v$

 $(2) S_m \rightleftarrows S_l \rightleftarrows S_v$

(3) $S_m \rightleftharpoons S_r \rightleftarrows S_t$

 $(4) S_r \rightleftarrows S_t \rightleftarrows S_v$

47. Number of hyperconjugation structures in isopropyl radical is:

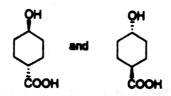
(1) 3

(2) 6

(3) 9

(4) 12

48. The given compounds are :



(1) Diastereomers

(2) Enantiomers

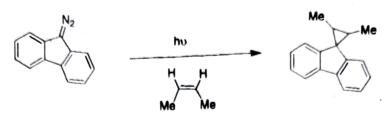
(3) Identical

(4) Regioisomers

49. The statement that is true about the reaction given below is:

- (1) (A) and (B) both are R-isomers
- (2) (A) and (B) both are S-isomers
- (3) (A) is R-isomer and (B) is S-isomer
- (4) (A) is S-isomer and (B) is R-isomer

50. Which intermediate is involved in the following reaction?



(1) Free radical

(2) Carbocation

(3) Carbanion

(4) Carbene

51. Which of the following are arranged in order of increasing radius?

(1)
$$K^+(aq) \le Na^+(aq) \le Li^+(aq)$$

(2)
$$K^+(aq) \le Li^+(aq) \le Na^+(aq)$$

(3)
$$Li^+$$
 (aq) $\leq K^+$ (aq) $\leq Na^+$ (aq)

(4)
$$Na^+$$
 (aq) $\leq Li^+$ (aq) $\leq K^+$ (aq)

52. The number of antibonding electrons in *NO* and *CO* according to *MO* theory are respectively:

(1) 1, 0

(2) 2, 2

(3) 3, 2

(4) 2, 3

53. Ozone present in upper atmosphere protects people on earth :

- (1) due to its diamagnetic nature
- (2) due to its blue colour
- (3) due to absorption of radiation of wavelength at 255 nm
- (4) by destroying chlorofluoro carbons

54. The temperature at which RMS velocity of SO_2 molecules is half that of He molecules at 300 K is:

(1) 150 K

(2) 600 K

(3) 900 K

(4) 1200 K

- **55.** The mean free path of oxygen molecules at 0° C and one atmospheric pressure will be equal to (molecular diameter of oxygen molecule is 2.0×10^{-8} cm):
 - (1) 2.1×10^{-5} cm

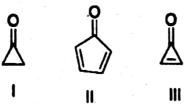
(2) 4.2×10^{-5} cm

(3) 2.9×10^{-5} cm

- (4) 1.0×10^{-8} cm
- **56.** What will be the Vander Waal's constant b for carbon dioxide in lit mol⁻¹ (given that $T_C = 304 \text{ K}$ and $P_C = 73 \text{ atm}$)?
 - (1) 0.043
- (2) 2.732
- (3) 0.341
- (4) 4.164
- 57. What happens to the viscosity of liquid with the increase in temperature?
 - (1) It increases

- (2) It decreases
- (3) It may increase or decrease
- (4) No change
- **58.** Which of the following statements is **not** true about smectic liquid crystals?
 - (1) They have limited mobility
 - (2) They do not flow as normal liquids
 - (3) The concept of viscosity is applicable to them
 - (4) They show X-ray diffraction patterns
- **59.** Rate constant of a reaction can be expressed by Arrhenius equation as : $k = Ae^{\frac{-Ea}{RT}}$. In this equation, E_a , represents :
 - (1) The energy above which all the colliding molecules will react
 - (2) The energy below which the colliding molecules will not react
 - (3) The total energy of the reacting molecules at a temperature T
 - (4) The fraction of molecules with energy greater than the activation energy

- 60. Which of the following statements is true in the Transition State Theory (TST)?
 - (1) TST fails for some reactions at high temperature
 - (2) Activated complex is in quasi-equilibrium with the reactants
 - (3) TST is not applicable when the intermediates are very short-lived
 - (4) All of the above
- 61. Identify the compound with highest ring strain?
 - (1) Cyclohexane
 - (2) Cyclopropane
 - (3) Cyclobutane
 - (4) Cyclopentane
- **62.** Which alkene on ozonolysis gives CH_3CH_2CHO and CH_3COCH_3 ?
 - (1) $CH_3CH_2CH = C(CH_3)_2$
 - (2) $CH_3CH_2CH = CHCH_2CH_3$
 - (3) $CH_3CH_2CH = CHCH_3$
 - (4) $(CH_3)_2C = CHCH_3$
- **63.** Arrange the following compounds in increasing order of polarity:



- (1) I < II < III
- (2) III < II < I
- (3) II < I < III
- (4) III < I < II

64. Majority of the alkynes are *not* prepared from/ by:

- (1) Condensation
- (2) Acetylene
- (3) Dehydrohalogenation
- (4) Hydrogenation

65. In S_N^2 reaction of cis-3-methylcyclopentyl bromide with aqueous alkali, the product formed is:

- (1) a cis-alcohol
- (2) a trans-alcohol
- (3) an equimolecular mixture of cis and trans-alcohols
- (4) there is no reaction

66. Product A in this reaction is:

$$(1) \qquad \begin{array}{c} H_3C & CH_3 \\ Ph & Ph \end{array}$$

$$\begin{array}{cccc} (3) & \begin{array}{c} H_3C & O \\ Ph & \end{array} \end{array}$$

$$(4) \quad \begin{array}{c} \text{H}_3\text{C} \quad \text{O} \\ \text{Ph} \quad \text{H}_3\text{C} \quad \text{Ph} \end{array}$$

The product obtained in the following reaction is: 67.

(1)
$$R' \stackrel{R}{\stackrel{}{\longleftarrow}} CH_2OH$$
 (2) $RH_2C \stackrel{R'}{\stackrel{}{\longleftarrow}} OH$ (3) $R'CH_2 \stackrel{R}{\stackrel{}{\longleftarrow}} OH$ (4) $R''CH_2 \stackrel{R}{\stackrel{}{\longleftarrow}} OH$

(3)
$$R'CH_2 \xrightarrow{R} OH$$

(4)
$$R"CH_2 \xrightarrow{R} OH$$

68. Which reagent can distinguish ethanol and phenol?

- (1) *SOCl*₂
- (2) CH₃COCl
- (3) $(CH_3CO)_2O$
- (4) CH₃COOH

69.
$$CH_3CHO + HCN \rightarrow \xrightarrow{H_3O^+}$$

The product is a:

- (1) Mixture of 1:1 enantiomers of acid
- (2) Mixture of 1:1 diastereomers of acid
- (3) Mixture of 1: 2 enantiomers of acid
- (4) Mixture of 1:1 enantiomers of aldehyde

70. The structure of the product X is:

71. X and Y respectively are:

$$X = ArN_2^+X^ pH=5-7$$
 $NH_2 OH$
 $ArN_2^+X^ pH=8-10$

(1)
$$NH_2$$
 OH NH_2 OH NH_2 OH NH_2 OH NH_2 OH NH_2 OH

(2)
$$NH_2$$
 OH NH_2 OH

72. A nitrogen containing aromatic compound A reacts with Sn/HCl followed by HNO_2 to give an unstable compound B. B on treatment with phenol forms a coloured compound C with molecular formula $C_{12}H_{10}N_2O$. The structure of compound A is:

(1)
$$NH_2$$
 (2) NO_2 (3) $CONH_2$

- **73.** Wolf-Kishner reduction is the reduction of:
 - (1) Carbonyl compounds into hydrocarbons
 - (2) Carbonyl compounds into alcohols
 - (3) Nitrobenzene into aniline
 - (4) Carbohydrates into alcohols
- **74.** The product A formed in the following reaction is:

75. The major products A and B respectively for the following reaction are:

A i) NaBH₄
ii) H₃O⁺

$$A = CH2OH$$

$$B = CH2OH$$

$$CH2OH$$

$$B = CH2OH$$

$$A = CH2OH$$

$$A = CH2OH$$

$$B = CH2OH$$

$$A = CH2OH$$

$$B = CH2OH$$

76. α -D-(+)-glucose and β -D-(+)-glucose are :

(1) Anomers

(2) Enantiomers

(3) Geometrical isomers

(4) Epimers

77. Which of the following statement is correct?

- (1) The Ruff procedure lengthens an aldose chain and gives a single product.
- (2) The Ruff procedure shortens an aldose chain and gives two epimers.
- (3) The Kiliani-Fisher procedure lengthens an aldose chain and gives two epimers.
- (4) The Kiliani-Fisher procedure shortens an aldose chain and gives a single product.

78. Which of the following reagents, when treated with phenyl magnesium bromide followed by acid workup, will yield 2-phenylethanol?

(1) Diethyl ether

(2) Ethanol

(3) Ethanal

(4) Oxirane

		•	
79.	The order of aromaticity of furan, thiop	ohene and pyrrole is:	
	(1) Thiophene > furan > pyrrole		
	(2) Furan > pyrrole > thiophene		
	(3) Thiophene > pyrrole > furan		
	(4) Pyrrole > thiophene > furan		
80.	Thiophene reacts with HCHO in the pro-	esence of aq. HCl to give:	
	(1) S—cho (2) S—ch₂ci		
81.	bronsted deld .		
	(1) H_2SO_4 (2) CH_3COOH	(3) HNO_3 (4) H_3PO_4	
82 .	Which of the following does not give f	lame colourations?	
	(1) Ca^{2+}	(2) Na^+	
	(3) Cu^{2+}	(4) Cd^{2+}	
83.	The structure of XeF_2 and XeO_2F_2 respectively are:		
	(1) bent, tetrahedral	(2) linear, square planar	
	(3) linear, see-saw	(4) bent, see-saw	
84.	34. Among the following electronic configurations, the one corresponding to the elewith the highest ionization energy is:		
	(1) [Ne] $3s^23p^1$	(2) [Ar] $3d^{10}4s^24p^2$	
	(3) [Ne] $3s^23p^2$	(4) [Ne] $3s^23p^3$	
85.	The reaction in which the molecules of called:	the solvent get attached to the solute species are	
	(1) Solvation reaction	(2) Solvolytic reaction	
	(3) Metathetical reaction	(4) Redox reaction	

86	Oxymyoglobin $Mb(O)_2$ and oxyhemoglobin $Hb(O)_2$, respectively are:			
	(1) paramagnetic and paramagnetic			
	(2) diamagnetic and diamagnetic			
	(3) paramagnetic and diamagnetic			
	(4) diamagnetic and paramagnetic			
87.	The ring size and the number of respectively:	linked tetrahedral	present in	$[Si_6O_{18}]^{12}$ are
	(1) 6 and 6 (2) 12 and 6	(3) 12 and 12	(4) 6 and	12
88.	The IUPAC nomenclature of Na[PCl ₆]	is:		
	(1) Sodium hexachlorophosphine (V)			
	(2) Sodium hexachlorophosphate (V)			
	(3) Sodium hexachlorophosphine			
	(4) Sodium hexachlorophosphite (V)			
89.	Coordination number and geometry of	$[Ce(NO_3)_6]^{2-}$ is:		
	(1) 6, Octahedral	(2) 12, Octahedral	l ,	
	(3) 8, Dodecahedral	(4) 12, Icosahedra	1	
90. Which of the following has highest lattice energy?				
	(1) KF (2) NaF	(3) <i>CsF</i>	(4) <i>RbF</i>	
91.	Which of the following is false regarding galvanic cells?			
	(1) It converts chemical energy into electrical energy			
	(2) The electrolytes taken in the two beakers are different			
	(3) The reactions taking place are non-spontaneous			
	(4) To set up this cell, a salt bridge is us	<i>E</i>		
PG-EE-	2022/(Chemistry)-(SET-Y)/(C)			

92.	The standard oxidation potential of Ni/Ni^{2+} electrode is 0.3 V . If this is combined with a hydrogen electrode in acid solution, at what pH of the solution will the measured e.m.f. be zero at 25°C? (Assume $[Ni^{2+}] = 1M$)		
	(1) 5.08	(2) 4.05	
	(3) 4.55	(4) 5.25	
93. Which electrode is used for pH measurement?			
	(1) Silver electrode	(2) Glass electrode	
	(3) Redox electrode	(4) Calomel electrode	
94.	If the observed value of the dipole moment and the bond length of <i>HCl</i> are 1.02 D and 0.125 nm respectively, the percentage of ionic character in the molecule will be equal to:		
	(1) 100	(2) 13	
	(3) 81	(4) 17	
95.	The zero point energy of a particle configuration (1) 0 (3) 8h ² /mL ²		
96.	box is 12 units of energy, what is the difference in energy levels of $n = 3$ & $n = 2$ for the above system in the same units? (1) 8 (2) 5		
97.	(3) 20 (4) 10 The rotational constant B for the <i>HCl</i> molecule is 10.6 cm ⁻¹ . The frequency for the pure rotation transition $J = 0 \rightarrow J = 1$ is equal to:		
	(1) 10.6 cm ⁻¹	(2) 21.2 cm ⁻¹	
	(3) 42.4 cm ⁻¹	(4) No absorption	
C_թթ	2022/(Chemistry)-(SET-Y)/(C)	P. T. O.	

molecule will be: (1) 2250 Nm ⁻¹ (2) 2334 Nm ⁻¹ (3) 0.0004 Nm ⁻¹ (4) 83.36 Nm ⁻¹ 90. For a particular vibrational mode to appear in Raman spectrum, what must change? (1) Frequency of radiation (2) Molecule's polarizability (3) Intensity of radiation (4) None of the above		
 (2) 2334 Nm⁻¹ (3) 0.0004 Nm⁻¹ (4) 83.36 Nm⁻¹ 99. For a particular vibrational mode to appear in Raman spectrum, what must change? (1) Frequency of radiation (2) Molecule's polarizability (3) Intensity of radiation (4) None of the above 100. Absorption of radiation in the UV range attributable to n → π* electronic transitions 	96	The fundamental vibration frequency of N_2 is 2334 cm ⁻¹ . The force constant for the molecule will be:
 (3) 0.0004 Nm⁻¹ (4) 83.36 Nm⁻¹ 99. For a particular vibrational mode to appear in Raman spectrum, what must change? (1) Frequency of radiation (2) Molecule's polarizability (3) Intensity of radiation (4) None of the above 100. Absorption of radiation in the UV range attributable to n → π* electronic transitions 		(1) 2250 Nm^{-1}
 (4) 83.36 Nm⁻¹ 99. For a particular vibrational mode to appear in Raman spectrum, what must change? (1) Frequency of radiation (2) Molecule's polarizability (3) Intensity of radiation (4) None of the above 100. Absorption of radiation in the UV range attributable to n → π* electronic transitions 		(2) 2334 Nm^{-1}
 99. For a particular vibrational mode to appear in Raman spectrum, what must change? (1) Frequency of radiation (2) Molecule's polarizability (3) Intensity of radiation (4) None of the above 100. Absorption of radiation in the UV range attributable to n → π* electronic transitions 		(3) 0.0004 Nm ⁻¹
 (1) Frequency of radiation (2) Molecule's polarizability (3) Intensity of radiation (4) None of the above 100. Absorption of radiation in the UV range attributable to n → π* electronic transitions 		(4) 83.36 Nm^{-1}
 (2) Molecule's polarizability (3) Intensity of radiation (4) None of the above 100. Absorption of radiation in the UV range attributable to n → π* electronic transitions 	99.	For a particular vibrational mode to appear in Raman spectrum, what must change?
 (3) Intensity of radiation (4) None of the above 100. Absorption of radiation in the UV range attributable to n → π* electronic transitions 		(1) Frequency of radiation
(4) None of the above 100. Absorption of radiation in the UV range attributable to $n \to \pi^*$ electronic transitions		(2) Molecule's polarizability
100. Absorption of radiation in the UV range attributable to $n \to \pi^*$ electronic transitions		(3) Intensity of radiation
		(4) None of the above
	100.	Absorption of radiation in the UV range attributable to $n \to \pi^*$ electronic transitions is characteristic of which of the following types of compounds?

- (2) Unsaturated carbonyl compounds
- (3) Non-conjugated polyenes
- (4) Conjugated polyenes

Total No. of Printed Pages: 21

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

D

PG-EE-2022

SET-Y

SUBJECT: Chemistry

11472

	Sr. No		
Time: 11/4 Hours	Max	c. Marks : 100	Total Questions: 100
Roll No. (in figures)	(in w	ords)	
Name		Father's Name	
Mother's Name		Date of Examination_	·
(Signature of the Candidate)			(Signature of the Invigilator)

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

- 1. All questions are compulsory.
- 2. The candidates *must return* the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfairmeans / mis-behaviour 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.** Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
- 4. Question Booklet along with answer key of all the A, B, C & D code will be got uploaded on the University website after the conduct of Entrance Examination. In case there is any discrepancy in the Question Booklet/Answer Key, the same may be brought to the notice of the Controller of Examinations in writing/through E.Mail within 24 hours of uploading the same on the University Website. Thereafter, no complaint in any case, will be considered.
- 5. 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 booklet itself. Answers *must not* be ticked in the question booklet.
- 6. 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.
- 7. Use only Black or Blue Ball Point Pen of good quality in the OMR Answer-Sheet.
- 8. Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after starting of the examination.

(2) 12 and 6

(3) 12 and 12

(4) 6 and 12

(1) 6 and 6

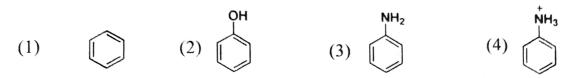
8	3. The IUPAC nomenclature of $Na[PCl_6]$	is:		
	(1) Sodium hexachlorophosphine (V)			
	(2) Sodium hexachlorophosphate (V)			
	(3) Sodium hexachlorophosphine			
	 (4) Sodium hexachlorophosphite (V) 9. Coordination number and geometry of [Ce(NO₃)₆]²⁻ is: 			
9.				
	(1) 6, Octahedral	(2) 12, Octahedral		
	(3) 8, Dodecahedral	(4) 12, Icosahedral		
10.	Which of the following has highest latti			
	(1) KF (2) NaF	(2) G F		
11,		(1) RDI		
	Sulphaguanidine, a sulpha drug is used (1) Eye diseases			
	(3) Pneumonia	(2) Bacillary dysentery		
10		(4) Skin infections		
12,	Which of the following is a product form	ned in Claisen Condensation?		
	(1) β-ester	(2) β -ketone		
	(3) β- keto ester	(4) γ-diketone		
13.				
	(1) Free radical reaction			
	(2) Aldol condensation			
	(3) Aromatic nucleophilic substitution			
(4) Aromatic electrophilic substitution				
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The isoelectric point of the amino acid is:

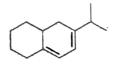
$$(pKb = 9.6) H_2N$$
 COOH $(pKa = 2.34)$

- (1) 3.35
- (2) 10.64
- (3) 5.97
- (4) 8.02

Which of the following absorbs at more wavelength? 15.



Calculate the maximum wavelength of the following compound according to Woodward Fieser rules:



- (1) 278 nm
- (2) 273 nm
- (3) 283 nm
- (4) 290 nm

What is the relation between restoring force, f to the displacement, q in the Hooke's 17. law?

- (1) f = -kq (2) f = kq (3) $f = kq^2$ (4) $f = -kq^2$

What is the order of decreasing vibrational frequency for C-Cl, C-Br, C-C, C-O and 18. C-H?

- (1) C-Cl, C-Br, C-C, C-H, C-O
- (2) C-O, C-H, C-Br, C-Cl, C-C
- (3) C-Br, C-Cl, C-O, C-C, C-H
- (4) C-H, C-C, C-O, C-Cl, C-Br

How many methyl peaks would you expect to observe in the ¹H NMR spectrum of 19. cis-1,4- dimethylcyclohexane?

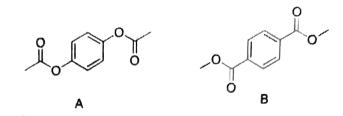
(1) 2

(2) 3

(3) 1

(4) 4

20. Compounds A and B exhibit two singlets, each in their ¹H NMR spectra. The expected chemical shifts are at δ:



- (1) 6.9 and 3.9 for A; 7.7 and 2.1 for B
- (2) 7.7 and 2.1 for A; 6.9 and 3.9 for B
- (3) 7.7 and 3.9 for A; 6.9 and 2.1 for B
- (4) 6.9 and 2.1 for A; 7.7 and 3.9 for B
- 21. Identify the compound with highest ring strain?
 - (1) Cyclohexane
 - (2) Cyclopropane
 - (3) Cyclobutane
 - (4) Cyclopentane
- **22.** Which alkene on ozonolysis gives CH_3CH_2CHO and CH_3COCH_3 ?

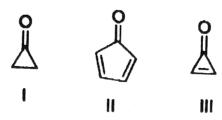
(1)
$$CH_3CH_2CH = C(CH_3)_2$$

(2)
$$CH_3CH_2CH = CHCH_2CH_3$$

(3)
$$CH_3CH_2CH = CHCH_3$$

(4)
$$(CH_3)_2 C = CHCH_3$$

23. Arrange the following compounds in increasing order of polarity:



(1) I < II < III

(2) III < II < I

(3) II < I < III

- (4) III < I < II
- **24.** Majority of the alkynes are *not* prepared from/ by:
 - (1) Condensation

(2) Acetylene

(3) Dehydrohalogenation

- (4) Hydrogenation
- **25.** In S_N^2 reaction of *cis*-3-methylcyclopentyl bromide with aqueous alkali, the product formed is:
 - (1) a cis-alcohol
 - (2) a trans-alcohol
 - (3) an equimolecular mixture of cis and trans-alcohols
 - (4) there is no reaction
- **26.** Product A in this reaction is:

$$(1) \qquad \begin{array}{c} \text{H}_3\text{C} \\ \text{Ph} \end{array} \qquad \begin{array}{c} \text{CH}_3 \\ \text{Ph} \end{array}$$

$$(2) \quad \begin{array}{c} H_3C \\ Ph \end{array} \quad \begin{array}{c} CH_3 \\ Ph \end{array}$$

$$(3) \quad \begin{array}{ccc} H_3C & O \\ Ph & CH \end{array}$$

- (1) $R' \xrightarrow{R} CH_2OH$ (2) $RH_2C \xrightarrow{R'} OH$ (3) $R'CH_2 \xrightarrow{R} OH$ (4) $R''CH_2 \xrightarrow{R} OH$

28. Which reagent can distinguish ethanol and phenol?

(1) $SOCl_2$

(2) CH_3COCl

(3) $(CH_3CO)_2O$

(4) CH_3COOH

29.
$$CH_3CHO + HCN \rightarrow \xrightarrow{H_3O^+}$$

The product is a:

- (1) Mixture of 1:1 enantiomers of acid
- (2) Mixture of 1:1 diastereomers of acid
- (3) Mixture of 1: 2 enantiomers of acid
- (4) Mixture of 1:1 enantiomers of aldehyde

The structure of the product X is : 30.

$$(4) \qquad {}_{\mathsf{H_3C}} - \underbrace{ }_{\mathsf{NH}}^{\mathsf{Q}} - \underbrace{ }_{\mathsf{NH}}^{\mathsf{Q}}$$

31.	Which of the following is false regarding	galvanic cells ?	
	(1) It converts chemical energy into electrical energy		
	(2) The electrolytes taken in the two beakers are different		
	(3) The reactions taking place are non-sp	oontancous	
(4) To set up this cell, a salt bridge is used			
32.	2. The standard oxidation potential of Ni/Ni^{2+} electrode is 0.3 V . If this is combined with a hydrogen electrode in acid solution, at what pH of the solution will the measured e.m.f. be zero at 25°C? (Assume [Ni^{2+}] = 1M)		
	(1) 5.08	(2) 4.05	
	(3) 4.55	(4) 5.25	
33.	Which electrode is used for pH measure	ment ?	
	(1) Silver electrode	(2) Glass electrode	
	(3) Redox electrode	(4) Calomel electrode	
34.	If the observed value of the dipole moment and the bond length of <i>HCl</i> are 1.02 D and 0.125 nm respectively, the percentage of ionic character in the molecule will be equal to:		
	(1) 100	(2) 13	
	(3) 81	(4) 17	
35.	The zero point energy of a particle con-	fined to one dimensional box of length L is:	
	(1) 0	(2) $h^2/8mL^2$	
	(3) $8h^2/mL^2$	(4) $h^2/8m$	
36.	6. The difference in energy levels of $n = 2 \& n = 1$ of a particle in a one dimensional box is 12 units of energy, what is the difference in energy levels of $n = 3 \& n = 2$ for the above system in the same units?		
	(1) 8	(2) 5	
	(3) 20	(4) 10	
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37 .	The rotational constant B for the HCl molecule is 10.6 cm ⁻¹ . The frequency for	th
	pure rotation transition $J = 0 \rightarrow J = 1$ is equal to :	1171 111

(1) 10.6 cm⁻¹

(2) 21.2 cm⁻¹

 $(3) 42.4 \text{ cm}^{-1}$

(4) No absorption

38. The fundamental vibration frequency of N_2 is 2334 cm⁻¹. The force constant for the molecule will be:

(1) 2250 Nm^{-1}

(2) 2334 Nm⁻¹

(3) 0.0004 Nm^{-1}

(4) 83.36 Nm⁻¹

39. For a particular vibrational mode to appear in Raman spectrum, what must change ?

- (1) Frequency of radiation
- (2) Molecule's polarizability
- (3) Intensity of radiation
- (4) None of the above

40. Absorption of radiation in the UV range attributable to $n \to \pi^*$ electronic transitions is characteristic of which of the following types of compounds?

- (1) Aromatic hydrocarbons
- (2) Unsaturated carbonyl compounds
- (3) Non-conjugated polyenes
- (4) Conjugated polyenes

41. Which of the following are arranged in order of increasing radius?

(1)
$$K^+(aq) \le Na^+(aq) \le Li^+(aq)$$

(2)
$$K^+(aq) < Li^+(aq) < Na^+(aq)$$

(3)
$$Li^+$$
 (aq) $\leq K^+$ (aq) $\leq Na^+$ (aq)

(4)
$$Na^+$$
 (aq) $\leq Li^+$ (aq) $\leq K^+$ (aq)

37. The rotational constant B for the *HCl* molecule is 10.6 cm⁻¹. The frequency for the pure rotation transition $J = 0 \rightarrow J = 1$ is equal to :

(1) 10.6 cm^{-1}

 $(2) 21.2 \text{ cm}^{-1}$

 $(3) 42.4 \text{ cm}^{-1}$

(4) No absorption

38. The fundamental vibration frequency of N_2 is 2334 cm⁻¹. The force constant for the molecule will be:

(1) 2250 Nm^{-1}

 $(2) 2334 \text{ Nm}^{-1}$

(3) 0.0004 Nm^{-1}

(4) 83.36 Nm⁻¹

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(2)
$$K^+(aq) < Li^+(aq) < Na^+(aq)$$

(3)
$$Li^+$$
 (aq) $\leq K^+$ (aq) $\leq Na^+$ (aq)

(4)
$$Na^+$$
 (aq) $\leq Li^+$ (aq) $\leq K^+$ (aq)

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D		,
42.	The number of antibonding electrons respectively:	in NO and CO according to MO theory are
	(1) 1, 0	(2) 2.2
	(3) 3, 2	(4) 2, 3
43.	Ozone present in upper atmosphere prote	ects people on earth:
	(1) due to its diamagnetic nature	
	(2) due to its blue colour	
	(3) due to absorption of radiation of war	velength at 255 nm
	(4) by destroying chlorofluoro carbons	
44.	The temperature at which <i>RMS</i> velocity at 300 K is:	of SO_2 molecules is half that of He molecules
	(1) 150 K	(2) 600 K
	(3) 900 K	(4) 1200 K
45.	The mean free path of oxygen molecule equal to (molecular diameter of oxygen	es at 0° C and one atmospheric pressure will be molecule is 2.0×10^{-8} cm):
	(1) 2.1×10^{-5} cm	(2) 4.2×10^{-5} cm
	(3) 2.9×10^{-5} cm	(4) 1.0×10^{-8} cm
46.	What will be the Vander Waal's consta	nt b for carbon dioxide in lit mol-1 (given that
,	$T_C = 304 \text{ K} \text{ and } P_C = 73 \text{ atm})?$	
	(1) 0.043	(2) 2.732(4) 4.164
	(3) 0.341	
47.	What happens to the viscosity of liquid	with the increase in temperature
	(1) It increases	(2) It decreases
	(3) It may increase or decrease	(4) No change P. T. O.

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4	8. Which of the following statements is not true about smectic liquid crystals?
	(1) They have limited mobility
	(2) They do not flow as normal liquids
	(3) The concept of viscosity is applicable to them
	(4) They show X-ray diffraction patterns
49	Rate constant of a reaction can be expressed by Arrhenius equation as : $k = Ae^{\frac{-Ea}{RT}}$. In this equation, E_a , represents :
	(1) The energy above which all the colliding molecules will react
	(2) The energy below which the colliding molecules will not react
	(3) The total energy of the reacting molecules at a temperature T
	(4) The fraction of molecules with energy greater than the activation energy
50.	Which of the following statements is true in the Transition State Theory (TST)?
	(1) TST fails for some reactions at high temperature
	(2) Activated complex is in quasi-equilibrium with the reactants
	(3) TST is not applicable when the intermediates are very short-lived
	(4) All of the above
51.	Among the following, metal carbonyl species having highest υ_{CO} stretching frequency is :
	(1) $[Mn(CO)_6]^+$ (2) $[Cr(CO)_6]$ (3) $[V(CO)_6]^-$ (4) $[Fe(CO)_4]^{2-}$
52.	Glauber's salt is:
	(1) $MgSO_4.7H_2O$ (2) $Na_2SO_4.10H_2O$
	(3) CuSO ₄ .5H ₂ O (4) FeSO ₄ .7H ₂ O

53.	The colour of CuS	is:		
	(1) Black	(2) Yellow	(3) Blue	(4) White
54.	A 3p atomic orbital	has:		
	(1) one radial node	and one angular r	node	
	(2) two angular no	des		
	(3) one angular no	de		
	(4) one radial node			
55.	The geometry arou	nd the central ator	n in the ClF_4^+ is:	
	(1) square planar		(2) square pyr	ramidal
	(3) octahedral		(4) trigonal bi	ipyramidal
56 .	Which of the follow	wing ions is not ex	spected to be colou	red?
	$(1) Mn^{2+}$		(2) Fe^{3+}	
	(3) Ti^{3+}		(4) Cu ⁺	,
57 .	The S and L values	s for ¹⁵ N atom res	epectively, are:	
	(1) 1/2 and 1		(2) 1/2 and 0	
	(3) 1 and 0		(4) 3/2 and 0	
58 .	Chelate effect is:			
	(1) Predominantly	due to enthalpy c	hange	
	(2) Predominantly	due to entropy ch	nange	
	(3) Independent o	f ring size		
	(4) Due to equal of	ontribution of ent	ropy and enthalpy	change

5	9. The red colodi of oxyllachloglobin is if	iality due to the :
	(1) d-d transition	
	(2) Metal to ligand charge transfer tran	sition
	(3) Intraligand $\pi - \pi^*$ transition	
	(4) Ligand to metal charge transfer transfer	nsition
60	Which of the following does not obey 1	8 <i>e</i> ⁻ rule ?
	$(1) [Cr(CO)_6]$	(2) $[Fe(CO)_5]$
	(3) $[V(CO)_6]$	(4) $[Mn_2(CO)_{10}]$
61	. Ostwald dilution law is applicable to:	
	(1) Strong electrolytes only	(2) Weak electrolytes only
	(3) non electrolytes	(4) Strong as well as weak electrolytes
62.	Which of the following is <i>not</i> a type of	acidic buffer solution?
•	$(1) Na_2HPO_4 + Na_3PO_4$	(2) $CH_3COOH + CH_3COONa$
	$(3) H_2CO_3 + Na_2CO_3$	(4) $H_3PO_4 + NaH_2PO_4$
63.	When a large ion is replaced by a small	ion, the conductivity of the solution:
	(1) Decreases	(2) Increases
	(3) Remains unchanged	(4) None of the above
64.	All of the following are intensive proper	ties excent:
•	(1) Mass	(2) Viscosity
	(3) Density	(4) Temperature
65.	In an isothermal process change in inter-	
	(1) Decreases	
		(2) Increases
	(3) Remains constant	(4) Becomes zero
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66.	The ratio of the rise in temperature of when compressed isothermally to the sai	a gas when compressed adiabatically to that me extent is:		
	(1) Less than 1	(2) More than 1		
	(3) Equal to 1	(4) Depends on the gas		
67.	Three Carnot engines A, B and C have source temperatures 750 K, 700 K & 650 K and sink temperatures 400 K, 350 K & 300 K respectively. Which engine is the least efficient?			
	(1) Engine A	(2) Engine B		
	(3) Engine C	(4) All have the same efficiencies		
68.	For the reaction; $SBr_4(g) \rightarrow S(g) + 2E$ 25°C. ΔG° for the reaction at 25°C will	$Br_2(l)$; $\Delta H^\circ = +115$ kJ and $\Delta S^\circ = +125$ J/K at be:		
	(1) $+152.00$ kJ (2) -56.75 kJ	(3) $+77.75 \text{ kJ}$ (4) $+37.10 \text{ kJ}$		
69.	When pressure is applied to ice ⇔ water	system, which of the following will happen?		
	(1) More ice is formed			
	(2) Water will evaporate			
	(3) The system will not be in equilibrium	m		
	(4) More water is formed			
70.	The partition coefficient of iodine between volume of carbon tetrachloride required 100 ml of aqueous solution will be equal	veen carbon tetrachloride and water is 90. The ed for 95% of the iodine to be extracted from 1 to:		
	(1) 21.1 ml (2) 60.5 ml	(3) 95.0 ml (4) 90.0 ml		
71.	A Spin inversion of electrons takes place	e in which of the following?		
	(1) Internal conversion	(2) Fluorescence		
	(3) Phosphorescence	(4) None of the above		
PG-EE	-2022/(Chemistry)-(SET-Y)/(D)	P. T. O.		

72. If 1.5 grams of a non-volatile solute ($M_w = 100$) is added to 200 ml of pure $CS_2(\rho = 1.3 \text{ g/cc})$ whose vapor pressure is 400 mm of Hg at 27.0°C, what is the resulting vapor pressure of the dilute solution?

(1) 382.15 mm Hg

(2) 396.60 mm Hg

(3) 401.75 mm Hg

(4) 398.25 mm Hg

73. At 27°C the osmotic pressure of a 0.01 M solution of a compound is 0.492 atm. The Van't Hoff factor will be equal to :

(1) 1

(2) 2

(3) 3

(4) 4

74. Boiling point of chloroform is 61°C. After addition of 5.0 g of a non-volatile solute to 20 g chloroform the solution boils at 64.63°C. If $K_b = 3.63$ K kg mol⁻¹, what is the molecular weight of the solute?

(1) 320

(2) 100

(3) 250

(4) 400

75. In which of the following equilibrium either P or T can be changed independently?

(1) Invariant

(2) Univariant

(3) Divariant

(4) All of the above

76. Which is a metastable equilibrium in sulphur system?

 $(1) S_r \rightleftarrows S_m \rightleftarrows S_v$

 $(2) S_m \rightleftarrows S_l \rightleftarrows S_v$

 $(3) S_m \rightleftarrows S_r \rightleftarrows S_l$

 $(4) S_r \rightleftarrows S_l \rightleftarrows S_v$

77. Number of hyperconjugation structures in isopropyl radical is:

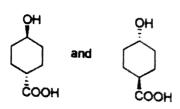
(1) 3

(2) 6

(3) 9

(4) 12

78. The given compounds are:



(1) Diastereomers

(2) Enantiomers

(3) Identical

(4) Regioisomers

79. The statement that is true about the reaction given below is:

- (1) (A) and (B) both are R-isomers
- (2) (A) and (B) both are S-isomers
- (3) (A) is R-isomer and (B) is S-isomer
- (4) (A) is S-isomer and (B) is R-isomer
- **80.** Which intermediate is involved in the following reaction?

(1) Free radical

(2) Carbocation

(3) Carbanion

- (4) Carbene
- **81.** The strength of $p\pi$ - $d\pi$ bonding in A–O (A = Si, P, S, C) follows the order :

(1)
$$Si - O > P - O > S - O > Cl - O$$

(2)
$$P - O > Si - O > S - O > Cl - O$$

(3)
$$S - O > Cl - O > P - O > Si - O$$

(4)
$$Cl - O > S - O > P - O > Si - O$$

- 82. The order of acidity in boron trihalides is:
 - $(1) BF_3 > BCl_3 > BBr_3$
 - $(2) BBr_3 > BCl_3 > BF_3$
 - (3) $BF_3 > BBr_3 > BCl_3$
 - (4) $BBr_3 > BF_3 > BCl_3$

83	3. The stable oxid	dation state of Au is:		
	(1) I	(2) III	(3) V	(4) –I
84	correct sequentity:	several fluorides an ce of descending Le	d oxofluorides which wis acidity among th	e exhibit acidic behavior. The given species is represented
	(1) $XeF_6 > XeC$	$OF_4 > XeF_4 > XeO_2F_2$		
	$(2) XeOF_4 > Xee$	$O_2F_2 > XeF_4 > XeF_6$		
	$(3) XeF_4 > XeC$	$O_2F_2 > XeOF_4 > XeF_6$		
	$(4) XeF_4 > XeF_6$	$> XeOF_4 > XeO_2F_2$		
85.	(4)	(μ_s) magnetic mome (2) 2.84 BM	nt of $[CrCl_6]^{3-}$: (3) 6.87 BM	(4) 5.20 BM
86.			$(en)_2 Cl_2$ (en = ethylen)	
	(1) 4	(2) 3	(3) 6	(4) 5
87.	The tripositive spectrum:	lanthanides ion wh	nich does not show	sharp peak in its absorption
	(1) Ce^{3+}	(2) Pr^{3+}	(3) Gd^{3+}	(4) Pm^{3+}
88.	Among the foll is:	lowing anions (i) CF	H_3^- (ii) NH_2^- (iii) OH_3^-	(iv) F^- , the order of basicity
	(1) $i > ii > iii >$	iv	(2) $ii > i > iii >$	iv
	(3) $iii > ii > i >$	iv	(4) $iii > i > ii >$	iv
89.	The order of po	larity of NH3, NF3 a	and BF_3 is:	
	$(1) NH_3 < NF_3$	$< BF_3$	(2) $BF_3 < NF_3 <$	≤ NH ₃
	(3) $BF_3 < NH_3$	$< NF_3$	(4) $NF_3 < BF_3 <$	$\leq NH_3$
90.	Silicates with co	ontinuous 3D framev	vork are :	
	(1) Neso-Silicat	tes	(2) Soro-Silicat	tes
	(3) Phyllo-Silic	ates	(4) Tecto-Silica	ates
PG-EE	-2022/(Chemistry	')-(SET-Y)/(D)		

91. X and Y respectively are:

X

ArN₂+X·

pH=5-7

$$NH_2$$
 OH

 NH_2 OH

92. A nitrogen containing aromatic compound A reacts with Sn/HCl followed by HNO_2 to give an unstable compound B. B on treatment with phenol forms a coloured compound C with molecular formula $C_{12}H_{10}N_2O$. The structure of compound A is:

(1)
$$\stackrel{\mathsf{NH}_2}{\bigcirc}$$
 (2) $\stackrel{\mathsf{NO}_2}{\bigcirc}$ (3) $\stackrel{\mathsf{CONH}_2}{\bigcirc}$

P. T. O.

- **93.** Wolf-Kishner reduction is the reduction of :
 - (1) Carbonyl compounds into hydrocarbons
 - (2) Carbonyl compounds into alcohols
 - (3) Nitrobenzene into aniline
 - (4) Carbohydrates into alcohols
- **94.** The product A formed in the following reaction is:

(1)
$$C_6H_5$$
 NH(CH₃)₂+ CF

95. The major products A and B respectively for the following reaction are :

A
$$\frac{i) \text{ NaBH}_4}{ii) \text{ H}_3\text{O}^+}$$
 $\frac{i) \text{ LiAlH}_4, \text{ dry ether}}{ii) \text{ H}_3\text{O}^+}$ B

A $=$ $CH_2\text{OH}$

B $=$ $CH_2\text{OH}$

(3)
$$A = \bigcirc CH_2OH$$

$$B = \bigcirc CH_2OH$$

(4)
$$A = CH_2OH$$

$$B = CH_2OH$$

- **96.** α -D-(+)-glucose and β -D-(+)-glucose are :
 - (1) Anomers

(2)

(2) Enantiomers

(3) Geometrical isomers

- (4) Epimers
- **97.** Which of the following statement is *correct*?
 - (1) The Ruff procedure lengthens an aldose chain and gives a single product.
 - (2) The Ruff procedure shortens an aldose chain and gives two epimers.
 - (3) The Kiliani-Fisher procedure lengthens an aldose chain and gives two epimers.
 - (4) The Kiliani-Fisher procedure shortens an aldose chain and gives a single product.
- **98.** Which of the following reagents, when treated with phenyl magnesium bromide followed by acid workup, will yield 2-phenylethanol?
 - (1) Diethyl ether

(2) Ethanol

(3) Ethanal

(4) Oxirane

The order of aromaticity of furan, thiophene and pyrrole is:

- (1) Thiophene > furan > pyrrole
- (2) Furan > pyrrole > thiophene
- (3) Thiophene > pyrrole > furan
- (4) Pyrrole > thiophene > furan

100. Thiophene reacts with HCHO in the presence of aq. HCl to give :

- (1) $\stackrel{S}{\triangleright}$ CHO (2) $\stackrel{S}{\triangleright}$ CH₂CI (3) $\stackrel{S}{\triangleright}$ CH₃ (4) $\stackrel{S}{\triangleright}$ CI

	ANSWER KEYS	OF CHEMISTRY FOR	SESSION 2022-23	
Q. NO.	A	В	С	D
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2	2	1	1	4
3	2	3	2	3
4	1	4	1	4
5	1	2	3	1
6	3	3	2	2
7	1	2	1	2
8	1	1	3	2
9	2	1	4	4
10	4	4	1	2
11	1	3	1	2
12	4	1	2	3
13	3	2	1	4
14	4	4	1	3
15	1	2	4	3
16	2	3	4	1
17	2	2	4	1
18	2	1	2	4
19	4	2	3	3
20	2	2	3	4
21	1	3	4	2
22	2	2		
23	1		2	1
24		1	2	3
	1	2	1	4
25	4	4	1	2
26	4	1	3	3
27	4	3	1	2
28	2	4	1	1
29	3	3	2	1
30	3	2	4	4
31	1	1	2	3 ·
32	1	4	3	1
33	3	3	4	2,
34	4	4	3	4
35	1	1	3	2
36	1	2	1	3.
37	2	2	1	2.
38	3	2	4	1.
39	2	4	3	2
40	4	2	4	2
41	2	2	3	1
42	1	3	4	1
43	2	4	2	3
44	1	3	3	4
45	3	3	2	1
46	2	1	4	1
47	1	1	2	2
48	3	4	3	3
	9	Contract to the second		•
49	4	3	1	2

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		OF CHEMISTRY FOR		
Q. NO.	A	В	С	D
51	3	3	1	1
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53	2	2	3	1
54	4	3	4	1
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57	2	2	2	4
58	1	3	3	2
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60	2	4	4	3
61	3	1	2	2
62	4	1	1	1
63	2	3	3	2 .
64	3	4	4	1.
65	2	1	2	3.
66	4	1	3	2
67	2	2	2	1
68	3	3	1	3.
69	1	2	1	4.
70	4	4	4	1
71	2	2	3	3
72	1	1	2	4
73	3	2	1	
74				2
75	4	1	2	3
	2	3	4	2.
76	3	2	1	4.
77	2	1	3	2.
78	1	3	4	3
79	1	4	3	1
80	4	1	2	4
81	3	1	1	4
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83	1	1	3	2
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85	4	4	2	1
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93	4	2	2	1
94	3	1	4	2
95	3	1	2	4
96	1	3	3	1
97	1	1	2	3 .
98	4	1	1	4 ·
99	3	2	2	3 ·
100	4	4	2	2.

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