Register			
Number			

Part III — CHEMISTRY					
	(English Version)				
Tim	Time Allowed: 3 Hours] [Maximum Marks: 150				
	Note	e: Draw diagrams	and write equ	ations	s wherever necessary.
			PAR	T – I	they are clean -
		Note: i)	Answer all th	e que	stions.
		ii)			the correct answer. $30 \times 1 = 30$
		ш	Choose and	WIIIC (
1.	Wh	ich compound is form	ned when exce	ess of	KCN is added to an aqueous solution
**		opper sulphate?			
	a)	Cu (CN) ₂		b)	K ₂ [Cu(CN) ₆]
	c)	K [Cu (CN) 2]		d)	Cu ₂ (CN) ₂ + (CN) ₂ .
2.	Allo	ys of Lanthanides ar	e called as		nouve et thicke restignationals and
	a)	Mish metals		b)	Metalloids
	.c)	Plate metal		d)	actinides.
3.	Lar	thanide contraction	is due to		of a st force multipayer to
	a)	perfect shielding of	4f electrons		The second secon
	b) imperfect shielding of 4f electrons				
	c) perfect shielding of 3d electrons				
	d) imperfect shielding of 3d electrons.				
4.					
4.			15 115 114 15	b)	chloro
	a)	nitro	own F . W		
	c)	bromo		d)	en.

5.	92 U	²³⁵ nucleus absorbs a neutron	and	disintegrates into $_{54}\mathrm{Xe}$ $^{139},_{38}\mathrm{Sr}$ 94
	and	X. What is X ?		
	a)	3 neutrons	b)	2 neutrons
	c)	α-particle	d)	β-particle.
6.	The	$t_{1/2}$ of a first order reaction i	s 100	minutes. The rate constant of the
	reac	tion is		
	a)	$6.93 \times 10^{3} \text{ min}^{-1}$	b)	$0.693 \times 10^{-3} \text{ min}^{-1}$
	c) .	$6.93 \times 10^{-3} \text{ min}^{-1}$	d)	$69.3 \times 10^{-2} \text{ min}^{-1}$.
7.	Colle	oidal medicines are more effective	becau	ise
	a)	they are clean		
	b)	they are easy to prepare		
	c)	the germs move towards them		
	d)	they are easily assimilated and ac	dsorbe	ed.
8.	The	decomposition of hydrogen perox	ide in	the presence of colloidal platinum is
	a / a	an .		
	a)	positive catalysis	b)	negative catalysis
	c)	auto-catalysis	d)	induced catalysis.
9.	For	chemisorption which is wrong?		
	a)	It is irreversible		
	b)	It requires activation energy		
	c)	It forms multilayers on adsorbate		ut note at absolute series (big subject) - 13
	d)	Surface compounds are formed.		
10.	For	the titration between oxalic acid a	nd soc	lium hydroxide, the indicator used is
	a)	potassium permanganate	b)	phenolphthalein
	c)	litmus	d)	methyl orange.
11.	Nitre	omethane condenses with acetalde	hyde	to give
	a)	nitropropane	b)	1-nitro-2-propanol
	c)	2-nitro-1-propanol	d)	3-nitropropanol.

12.	VV 1110	cit offe of the following is a second	ary ar	
	a)	Aniline	b)	Diphenyl amine
	c)	Secondary butyl amine	d)	tertiary butyl amine.
13.		en aqueous solution of benzene	diazor	nium chloride is boiled, the product
	a)	Benzyl alcohol	b)	Benzene + N ₂
	c)	Phenol	d)	Phenyl hydroxyl amine.
14.	The	amino acid without chiral carbon	is	Solone particular
	a)	Glycine	b)	Alanine
	c)	Proline	d)	Tyrosine.
15.	Inve	ert sugar is a mixture of equal amo	ount o	f
	a)	D (+) glucose and sucrose		
*	b)	D (-) fructose and sucrose		
	c)	D (+) glucose and D (-) fructo	se	
	d)	sucrose and maltose.		
16.	The	e intramolecular hyd <mark>r</mark> ogen bonding	is pro	esent in
	a)	o-nitrophenol	b)	m-nitrophenol
	c)	p-nitrophenol	d)	none of these.
17.	The	e momentum of a particle which h	as de-	Broglie wavelength of 1 Å
	(h	= $6.626 \times 10^{-34} \text{ kgm}^2 \text{ s}^{-1}$) is		graph you have expendent which is
	a)	$6.63 \times 10^{-23} \text{ kg ms}^{-1}$	b)	6.63×10^{-24} kg ms ⁻¹
	c)	$6.63 \times 10^{-34} \text{ kg ms}^{-1}$	d)	6.63×10^{34} kg ms ⁻¹ .
18.	Effe	ective nuclear charge can be calcu	lated	using the formula
	a)	$Z^* = Z - S$	b)	$Z^* = Z + S$
	0)	7* - 5 - 7	d) ·	$Z = Z^* - S.$

19	. Ine	ert gas used in beacon lights for sa	fety of	f air navigation is
	a)	Helium	b)	Argon
	c)	Neon	d)	Xenon.
20.	Wh	nich one of the following will have n	naxim	um magnetic moment ?
	a)	$3d^2$	b)	3d ⁶
	c)	3d7	d)	3d ⁹ .
21.	The	e Bragg's equation is		The state of the s
	a)	$\lambda = 2d \sin \theta$	b)	$nd = 2\lambda \sin \theta$
	c)	$2\lambda = nd \sin \theta$	d)	$n\lambda = 2d \sin \theta$.
22.	Acc	cording to Trouton's rule, the value	of cha	ange in entropy of vaporisation is
	a)	21 cal. deg ⁻¹ mole ⁻¹	b)	12 cal. deg ⁻¹ mol ⁻¹
	c)	21 k.cal. deg. mole - 1	d)	12 kcal. deg. mol ⁻¹ .
23.	In v	which of the following processes, the	he pro	cess is always non-feasible?
	a)	$\Delta H > 0$, $\Delta S > 0$	b)	$\Delta H < 0, \ \Delta S > 0$
	c)	$\Delta H > 0$, $\Delta S < 0$	d)	$\Delta H < 0$, $\Delta S < 0$.
24.		the manufacture of ammonia by monia will be obtained with the pro		er's process, the maximum yield of naving
	a)	low pressure and high temperatu	ire	
	b)	low pressure and low temperatur	·e	isometotting (16
	c)	high pressure and high temperat	ure	
	d)	high pressure and low temperatu	re.	The most serious and a serious serious
25.	The	relationship between \boldsymbol{K}_p and \boldsymbol{K}_c	for the	equilibrium
		$2 H_2 O(g) + 2 Cl_2(g) \rightleftharpoons 4 H$	C1 (g) + O ₂ (g)
	is			

a) $K_p = K_c$ b) $K_p = K_c (RT)^2$

d) $K_p = K_c (RT)^{-2}$.

c) $K_p = K_c (RT)^{1}$

26.	Con	apound which is used as medicine	for As	thma and Whooping cough is
	a)	Benzyl acetate	b)	Ethyl acetate
	c)	Benzyl benzoate	d)	Benzyl formate.
27.	Number of ether isomers possible for the molecular formula C $_4$ H $_{10}$ O is			
	a)	one	b)	two
	c)	three	d)	four.
28.	Whe	en ether is exposed to air for some	time,	an explosive substance produced is
	a)	Peroxide	b)	Oxide
	c)	TNT	d)	Superoxide.
29.	A C	yanohydrin of a compound X on h	ydroly	sis gives lactic acid. X is
	a)	нсно	b)	CH 3CHO
	c)	(CH ₃) ₂ CO	d)	C ₆ H ₅ CH ₂ CHO.
30.	The	compound found in some stony d	eposit	in kidneys is
	a)	potassium oxalate	b)	oxalic acid
	c)	potassium succinate	d)	calcium oxalate.
		PAR	r – II	
		Note: i) Answer any fifteen	questi	ons.
		ii) Each answer should	d be in	n one or two sentences. $15 \times 3 = 45$
31.	State Heisenberg's uncertainty principle.			
32.	Calculate the electronegativity value of fluorine on Mullikan's scale from the following data:			
	Ioni	sation potential of $F = 17.4 \text{ eV/ato}$	om, El	ectron affinity of $F = 3.62 \text{ eV/atom}$.
33.	Why HF cannot be stored in glass bottles?			
34.	What is the action of heat on orthophosphoric acid?			
35.	Why do d-block elements exhibit variable oxidation states?			
36.	Write the reaction of gold with aqua regia.			

7035 6

- 37. Write the uses of Radio carbon dating.
- 38. What is molecular crystal? Give an example.
- 39. Calculate the maximum % efficiency possible from a thermal engine operating between 110°C and 25°C.
- 40. Define reaction quotient.
- 41. What is pseudo first order reaction? Give example.
- 42. Write the Arrhenius equation and explain the terms.
- 43. Write any three general characteristics of catalytic reaction.
- 44. What is common ion effect? Give example.
- 45. Distinguish racemic mixture from mesoform.
- 46. How can Terylene be prepared?
- 47. How is tertiary butyl alcohol converted to isobutylene?
- 48. How can acetophenone be prepared by Friedel-Crafts reaction?
- 49. What is aspirin? How is it prepared?
- 50. An organic compound A of molecular formula C₂H₅ON treated with bromine and KOH gives B of molecular formula CH₅N. Identify A and B. Write the equation involved.
- 51. Write any three characteristics of dyes.

PART - III

Note: Answer any seven questions choosing at least two questions from each Section. $7 \times 5 = 35$

SECTION - A

- 52. Derive de-Broglie's equation.
- 53. Explain the extraction of zinc from its ore.
- 54. Write any five differences between lanthanides and actinides.

- 55. For the complex K $_4$ $\left[$ Fe $\left($ CN $\right)_6$ $\right]$ mention the following :
 - a) IUPAC name
 - b) Central metal ion
 - c) Ligand
 - d) Co-ordination number
 - e) Charge on the complex ion.

SECTION - B

- 56. Write the characteristics of free energy G.
- 57. Derive the expressions for K_c and K_p for decomposition of PCl $_5$.
- 58. Write the characteristics of order of reaction.
- 59. Calculate the e.m.f. of the cell:

Zn | Zn²⁺ (0·001 M) | | Ag⁺ (0·1 M) | Ag

$$E_{Ag}^{o}$$
 | Ag⁺ = +0·80 V, E_{zn}^{o} | Zn²⁺ = -0·76 V.

SECTION - C

- 60. Distinguish aliphatic and aromatic ethers.
- 61. How is acetone converted to
 - i) mesityl oxide
 - ii) mesitylene?
- 62. Write the mechanism of esterification reaction.
- 63. Explain briefly on characteristics of rocket propellants.

PART - IV

- Note: i) Question No. **70** is compulsory and answer any *three* from the remaining questions.
 - ii) Answer four questions in all.

 $4 \times 10 = 40$

- 64. a) How do electronegativity values help to find out the nature of bonding between atoms?
 - b) How are noble gases separated by Dewar's method?

7035

8

- 65. a) Write the application of VB theory on the following complexes:
 - i) [Fe II (F) 6] 4-
 - ii) $\left[\text{Fe}^{\text{II}} \left(\text{CN} \right)_{6} \right]^{4-}$.
 - b) Differentiate between chemical reaction and nuclear reaction.
- 66. a) Write the properties of ionic crystals.
 - b) How can colloidal solutions be purified by dialysis?
- 67. a) Derive Henderson equation.
 - b) Write IUPAC representation of a cell.
- 68. a) Explain geometrical isomerism with example.
 - b) How to do the following conversions?
 - i) Lactic acid to lactide
 - ii) Salicylic acid to methyl salicylate.
- 69. a) Write the following reactions:
 - i) Carbylamine reaction
 - ii) Gabriel's phthalimide synthesis.
 - b) How are carbohydrates classified? Give example for each.
- 70. a) An organic compond $A (C_2H_6O)$ liberates hydrogen with sodium metal. A when heated with alumina at 620 K gives an alkene B which when passed through Bayer's reagent gives $C (C_2H_6O_2)$. C reacts with PI $_3$ and gives back B. Identify A, B and C. Write the reactions.
 - b) The chief ore of chromium A on roasting with molten sodium carbonate gives compound B. Compound B on acidification with conc. H $_2$ SO $_4$ gives compound C. Compound C on treatment with KCl gives compound D. Identify A, B, C and D. Explain the reactions.

OR

- c) An organic compound A (C_7H_8) on oxidation by air in the presence of V_2O_5 at 773 K gives B (C_7H_6O), which reduces Tollen's reagent. B when heated with acetic anhydride and sodium acetate gives C ($C_9H_8O_2$). Identify A, B and C. Write the reactions.
- d) Calculate the pH of 0.1 M acetic acid solution. Dissociation constant of acetic acid is 1.8×10^{-5} M.