MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY DABWALI ROAD, BATHINDA [Established by State Government of Punjab vide Act No. 5 of 2015 u/s UGC Act 2(f)]

PET-2017 (Chemistry- Faculty of Sciences)

Roll No:	Date 2 5 JUN ? 017
Signature of the Candidate:	

- Q1 Which one of the following statements concerning radioactive decay is true?
 - a) The half-life of a radioactive isotope depends on the amount of radioactive material present.
 - b) The activity of a radioactive isotope is inversely proportional to its decay constant.
 - c) The half-life increases as more of the isotope decays.

The half-life is inversely proportional to the decay constant.

- Q2 The pK_{a1} , pK_{a2} values of oxalic acid are 1.25 and 4.26 respectively. Choose the correct statement.
 - a) The predominant ionic form at $p^{H} = 7$ is $HC_2O_4^{-1}$
 - b) The predominant ionic form at $p^H = 2$ is $C_2 O_4^{2-}$
 - c) The predominant ionic form at $p^H = 4$ is $C_2 O_4^{2}$

The predominant ionic form at $p^H = 3$ is HC_2O_4

Q3 According to the Arrhenius equation, the correct relation between specific rate (k), temperature (T) and activation energy (E_a) is:

a)
$$k = A.e^{-E_a/RT}$$

b)
$$logk = log A - \frac{Ea/2.303RT}{}$$

$$\int \ln k = \ln A - E_a/RT$$

- Q4 Which of the following statements best describes the working of a catalyst?
 - a) A catalyst decreases the enthalpy of the reaction and thus by increasing the rate.

A catalyst decreases the activation energy barrier of a reaction by providing an alternative reaction mechanism.

- c) A catalyst increases the effective concentration of the reactants.
- d) A catalyst increases the collision frequency and helps in orienting the molecules in proper configuration.
- Q5 The crystal field splitting energy (Δ) for CoCl⁴⁻ is 18000 cm⁻¹. The Δ for CoCl²⁻ would be
 - a) 18000 cm⁻¹
- b) 16000 cm⁻¹ 8000 cm⁻¹
- d) 2000 cm⁻¹
- Q6 Which one of the following free ions has the lowest magnetic moment?
 - a) Ce^{3+}
- b) Nd³⁺
- Sm³⁺



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Q7 ,The compound which obeys 18-ele		JUN 2017				
a) $Mn(CO)_3$ b) $Fe(CO)_4$	c) V(CO) ₆	Cr(CO) ₆				
Q8 Solid ammonium nitrate, NH ₄ NO ₃	140.000					
$NH_4Cl(s) \rightarrow NH_4^+(aq) + Cl^-(aq);$ likely true?	If this process is endothermi	ic, which of the following is most				
a) $\triangle G > 0$ b) $\triangle G =$	$0 c) \Delta S < 0$	$\Delta > 0$				
Q9 The expected spin-only magnetic m	oments for [Fe(CN)]4- and	[FeF] ³⁻ respectively are				
a) 1.73 and 7.73 B.M.	c) 0.0 and 1.73 B.M.					
b) 1.73 and 5.92 B.M.	(a) 0.0 and 5.92 B.M.					
Q10 Which one of the following comp visible region?						
a) $[Cr(H_2O)_6]^{2+}$ b) $[V(H_2O)_6]^{2+}$	$[Mn(H_2O)_6]^{2+}$	d) $[Co(H_2O)_6]^{2+}$				
Q11 For which one of the following ior	as, the colouris NOT due to a	a d-d transition?				
	$_{3})_{4}^{4+}$ c)Ti(H ₂ O) ₆ ³⁺					
Q12 Wilkinson's catalyst is						
a) [Rh(CO) ₂ I ₂] ¹⁻	b) (Ph ₃ P) ₃ RhCl					
c) Co ₂ (CO) ₈	$d)^{(Ph_3P)}2^{Rh(Ch_3P)}$	O)Cl				
Q13 Beer's Law states that Absorbance is proportional to be	th the path length and conc.	of the absorbing species				
b) Absorbance is proportional to the log of the concentration of the absorbing species						
c) Absorbance is equal to P ₀ / P						
d) None of the above						
Q14 Apolarogram is obtained when	is plotted against					
a) current, time	current, appli	ed potential				

Q15 Which of the following represents the ilkovic equation?

a)
$$i_d = 708nCD^{1/2}m^{1/3}t^{1/6}$$

c) time, applied potential

b)
$$i_d = 708nCD^{1/3}m^{2/3}t^{1/6}$$

d) current, concentration

$$i_d = 708 \text{nCD}^{1/2} \text{m}^{2/3} \text{t}^{1/6}$$

d)
$$i_d$$
=708 $nCD^{1/2}m^{2/3}t^{1/3}$

Q16 Which of the following detectors is commonly used in gas chromatography?

- a) Fluorescence by Flame ionization c) Atomic absorbance
- d) All



Q17 Which of the foll	owing methods is	based on minimal curre	ent flow?	JUN (1)11
a) coulometry	b) voltammetry	potentiometry	d) amperometry	
Q18 In aqueous mediu	ım a mixture of K	I and I ₂ converts thiosu	lfate to:	
S ₄ O ₆ ²⁻	b) SO ₄ ²⁻	c) $S_2 O_6^{2-}$	d) $S_2O_4^{2-}$	
Q19 Boranes with form	nula BnHn ⁴⁻ have			
a) nbonding orbi	itals and n antibon	ding orbital		
b) total2n+4 elec	ctrons in bonding of	orbitals		
c) n+1 framewor	rk bonding orbitals	3		
d) framework wi	ith n corners of (n-	+2) cornered polyhedro	n	
Q20 Uranium exhibit	s several oxidation	n states because		
/	a) It is an inner transition element			
5f orbitals par	ticipate in bonding	d) It forms strong	bond with oxygen	
Q21 CO bond order is	lowest in			
a) Uncoordinated			ging two metals	
c) CO bonded to o		V	ging three metals	
		es can be determined by		
c) Microwave spe		b) IR specti d) NMR sp		
		os expected in the prote		NH.+ion
(for 14 N, I = 1) as		os expected in the prote	on with spectrum of	14114 1011
a) singlet		b) doublet, 1:1		
(a) triplet, 1:1:1		d) triplet, 1:2:1		
Q24 In which one of t	he following pairs	the species have similar	ar geometry?	
a) CO_2 and SO_2	b)	NH ₃ and BH ₃		
c) CO_3^{2-} and SO_3^{2-}	- . d	SO ₄ and ClO		
Q25 The species which	V			
a) BF ₄ ⁻	b) FeCl ₄	c) SF ₄	d) XeF ₄	
Q26 Which one of the	e following statem	ents concerning radioac	tive decay is true?	
a) The half-life o	of a radioactive isc	otope depends on the an	nount of radioactive m	naterial

- b) The activity of a radioactive isotope is inversely proportional to its decay constant
- c) The activity of a radioactive isotope decays hyperbolically with time
- d The half-life is inversely proportional to the decay constant

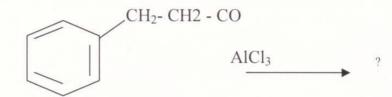


Q27 At very low pressures, the van der Waals equation can be reduced to: a) P(V - b) = RT b) PV = RT + Pb d) PV+a/V=RT Q28 Aqueous titanium (IV) solution develops intense grange colour on additional develops intense grange granten grange granten grant

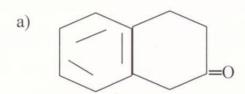
- Q28 Aqueous titanium (IV) solution develops intense orange colour on addition of ${\rm H_2O_2}$. The colour is due to
 - a) d d transition b) $n-\Pi^*$ transition of peroxo group c) reduction of the Ti(IV) to Ti (III) d charge transfer transition.
- Q29 For which one of the following ions, the colour is NOT due to a d-d transition? CrO_4^{2-} b) $\text{Cu(NH}_3)_4^{4+}$ c) $\text{Ti(H}_2\text{O})_6^{3+}$ d) CoF_6^{3-}
- Q30 Which one of the following is most easily reduced? $V(CO)_6$ b) $Cr(CO)_6$ c) $Fe(CO)_5$ d) $Ni(CO)_4$
- Q31 Which one of the following complex ions shows the minimum intensity of absorption in the uv-visible region?
 - a) $[Cr(H_2O)_6]^{2+}$ b) $[V(H_2O)_6]^{2+}$ c) $[Mn(H_2O)_6]^{2+}$ d) $[Co(H_2O)_6]^{2+}$
- Q32 The expected spin-only magnetic moments for $[Fe(CN)_6]^{4-}$ and $[FeF_6]^{3-}$ respectively are
 - a) 1.73 and 7.73 B.M. b) 1.73 and 5.92 B.M. c) 0.0 and 1.73 B.M
- Q33 Borax is used in preparing
 - a) soda glass b) pyrex glass c) opal glass d) portland cement
- Q34 The complex with spin-only magnetic moment of 4.9BM is:
 - a) $[Fe(H_2O)_6]^{2+}$ b) $[Fe(CN)_6]^{3-}$ c) $[Fe(CN)_6]^{4-}$ d) $[Fe(H_2O)_6]^{3+}$
- Q35 The Reformatsky reaction is often used for preparing of
 - a) α- hydroxy ester
 b) β- hydroxy ester
 c) α-halo ester
 d) β-halo ester
- Q36 The stability of the free radical is enhanced by the presence of
 - a) electron donating substituent
 - b) electron withdrawing substituent both electron donating and electron withdrawing substituents
 - d) None of them

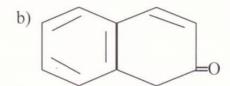


Q37

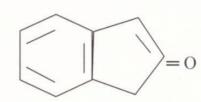


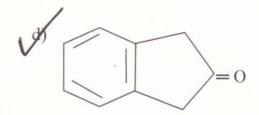
Identify the product.





c)





Q38 Which technique is used to produce nanotubes in sizeable quantities?

a) Arc discharge

- b) Laser ablation
- c) Chemical vapour deposition
- All are correct

Q39 - I effect is largest for



b) Cl

c) Br

d) I

Q40 Addition of oxygen to anthracene in presence of light is known as



b) Photochemical addition

c) Photochemical reduction

d) None of these

