UNIVERSITY OF SWAZILAND

SUPPLEMENTARY EXAMINATION – 2013, MAY

TITLE OF PAPER : Introductory Chemistry II

COURSE NUMBER : C112

TIME : Three Hours

INSTRUCTIONS :

1. **Answer all questions in Section A** (Total 40 marks)
2. **Answer any three questions in Section B** (each question is 20 marks)

NB: Non-programmable electronic calculators may be used
A data sheet, a periodic table and answer sheet (for **Section A**) are attached

Useful data and equations:

1 atm = 760 Torr = 760 mmHg

1 atm = 101325 Pa

Arrhenius equation: $k = Ae^{-E_a/RT}$ or $lnk = lnA - \frac{E_a}{RT}$

Van der Walls equation: $P = \frac{nRT}{V-nb} - \frac{n^2a}{V^2}$

This Examination Paper Contains Thirteen Printed Pages Including This Page

You are not supposed to open the paper until permission to do so has been grated by the Chief Invigilator.

1. Which statement about hydrocarbons is false?
   A) The smallest alkane to have structural (constitutional) isomers has 4 carbon atoms.
   B) Cyclic alkanes are structural isomers of alkenes.
   C) Alkanes are more reactive than alkenes.
   D) Alkanes can be produced by hydrogenating alkenes.
   E) Alkenes can be polymerized.
2. At equilibrium, __________.
   A) All chemical reactions have ceased
   B) The rates of the forward and reverse reactions are equal
   C) The rate constants of the forward and reverse reactions are equal
   D) The value of the equilibrium constant is 1
   E) The limiting reagent has been consumed
3. Which one of the following is an endothermic process?
   A) Ice melting
   B) Water freezing
   C) Boiling soup
   D) Hydrochloric acid and barium hydroxide are mixed at 25 °C: the temperature increases.
   E) Both A and C
4. Gaseous mixtures __________.
   A) Can only contain molecules
   B) Are all heterogeneous
   C) Can only contain isolated atoms
   D) Are all homogeneous
   E) Must contain both isolated atoms and molecules
5. Which of the following expressions is the correct equilibrium-constant expression for the following reaction?

   $CO_2\ (g) + 2H_2\ (g) \longrightarrow CH_3OH\ (g)$

   A) $\dfrac{[CH_3OH]}{[CO_2]}$

   B) $\dfrac{[CH_3OH]}{[CO_2][H_2]}$

   C) $\dfrac{[CO_2][H_2]^2}{[CH_3OH]}$

   D) $\dfrac{[CO_2][H_2]}{[CH_3OH]}$

   E) $\dfrac{[CH_3OH]}{[CO_2][H_2]^2}$
6. Of the units below, __________ are appropriate for a first-order reaction rate constant.
   A) $M\ s^{-1}$
   B) s^{-1}
   C) mol/L
   D) $M^{-1}\ s^{-1}$
   E) $L\ mol^{-1}\ s^{-1}$
7. Which of the following compounds do not contain an sp^3 hybridized oxygen atom?
   A) Ketones

B) Alcohols
C) Ethers
D) Esters
E) Water

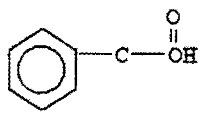
8. Which of the following is a statement of the first law of thermodynamics?
A) $E_k = (1/2)\ mv^2$
B) A negative ΔH corresponds to an exothermic process.
C) $\Delta E = E_{final} - E_{initial}$
D) Energy lost by the system must be gained by the surroundings.
E) 1 cal = 4.184 J (exactly)

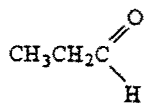
9. The rate law of a reaction is rate = k[D][X]. The units of the rate constant are __________.
A) mol $L^{-1}s^{-1}$
B) L $mol^{-1}s^{-1}$
C) $mol^2\ L^{-2}s^{-1}$
D) mol $L^{-1}s^{-2}$
E) $L^2\ mol^{-2}s^{-1}$

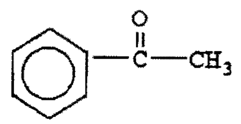
10. "Isothermal" means __________.
A) At constant pressure
B) At constant temperature
C) At variable temperature and pressure conditions
D) At ideal temperature and pressure conditions
E) That $\Delta H_{rxn} = 0$

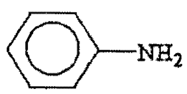
11. Which structure below represents an amine?

A) $CH_3CH_2 — O — CH_2CH_3$

B) 

C) 

D) 

E) 

12. The K_{eq} for the equilibrium below is 7.52×10^{-2} at 480.0°C.

$$2Cl_2\ (g) + 2H_2O\ (g) \longrightarrow 4HCl\ (g) + O_2\ (g)$$

What is the value of K_{eq} at this temperature for the following reaction?

$$4HCl\ (g) + O_2\ (g) \longrightarrow 2Cl_2\ (g) + 2H_2O\ (g)$$

A) 0.0752
B) -0.0752
C) 13.3
D) 5.66×10^{-3}
E) 0.150

13. Under what condition(s) is the enthalpy change of a process equal to the amount of heat transferred into or out of the system?
(a) Temperature is constant
(b) Pressure is constant
(c) Volume is constant

A) a only
B) b only
C) c only
D) a and b

E) b and c

14. The rate law for a reaction is

rate = k [A][B]^2

Which one of the following statements is <u>false</u>?

A) The reaction is first order in A.
B) The reaction is second order in B.
C) The reaction is second order overall.
D) k is the reaction rate constant
E) If [B] is doubled, the reaction rate will increase by a factor of 4.

15. Which of the following expressions is the correct equilibrium-constant expression for the reaction below?

CO_2 (s) + H_2O (l) $\longrightarrow$ H^+ (aq) + HCO_3^- (aq)

A) $[H^+][HCO_3^-] / [CO_2]$
B) $[CO_2] / [H^+][HCO_3^-]$
C) $[H^+][HCO_3^-] / [CO_2][H_2O]$
D) $[CO_2][H_2O] / [H^+][HCO_3^-]$
E) $[H^+][HCO_3^-]$

16. Hydrocarbons containing carbon-carbon triple bonds are called __________.

A) Alkanes
B) Aromatic hydrocarbons
C) Alkynes
D) Alkenes
E) Olefins

17. Of the following, only __________ is impossible for an ideal gas.

A) $\frac{V_1}{T_1} = \frac{V_2}{T_2}$
B) $V_1T_1 = V_2T_2$
C) $\frac{V_1}{V_2} = \frac{T_1}{T_2}$
D) $V_2 = \frac{T_2}{T_1} V_1$
E) $\frac{V_1}{V_2} = \frac{T_1}{T_2} = 0$

18. Of the following equilibria, only __________ will shift to the left in response to a decrease in volume.

A) H_2 (g) + Cl_2 (g) $\longrightarrow$ 2 HCl (g)
B) 2 SO_3 (g) $\longrightarrow$ 2 SO_2 (g) + O_2 (g)
C) N_2 (g) + 3 H_2 (g) $\longrightarrow$ 2 NH_3 (g)
D) 4 Fe (s) + 3 O_2 (g) $\longrightarrow$ 2 Fe_2O_3 (s)
E) 2HI (g) $\longrightarrow$ H_2 (g) + I_2 (g)

19. The reaction

$$CH_3\text{-}N{\equiv}C \rightarrow CH_3\text{-}C{\equiv}N$$

is a first-order reaction. At 230.3 °C, $k = 6.29 \times 10^{-4} s^{-1}$. If $[CH_3\text{-}N{\equiv}C]$ is 1.00×10^{-3} initially, $[CH_3\text{-}N{\equiv}C]$ is __________ after 1.000×10^3 s.

A) 5.33×10^{-4}
B) 2.34×10^{-4}
C) 1.88×10^{-3}
D) 4.27×10^{-3}
E) 1.00×10^{-6}

20. In which of the following reactions would increasing pressure at constant temperature <u>not</u> change the concentrations of reactants and products, based on Le Châtelier's principle?

A) $N_2(g) + 3H_2(g) \longrightarrow 2NH_3(g)$
B) $N_2O_4(g) \longrightarrow 2NO_2(g)$
C) $N_2(g) + 2O_2(g) \longrightarrow 2NO_2(g)$
D) $2N_2(g) + O_2(g) \longrightarrow 2N_2O(g)$
E) $N_2(g) + O_2(g) \longrightarrow 2NO(g)$

21. The general formula of an alkane is __________.

A) $C_{2n}H_{2n+2}$
B) C_nH_{2n}
C) C_nH_{2n+2}
D) C_nH_{2n-2}
E) C_nH_n

22. Which of the following is a statement of Hess's law?

A) If a reaction is carried out in a series of steps, the ΔH for the reaction will equal the sum of the enthalpy changes for the individual steps.
B) If a reaction is carried out in a series of steps, the ΔH for the reaction will equal the product of the enthalpy changes for the individual steps.
C) The ΔH for a process in the forward direction is equal in magnitude and opposite in sign to the ΔH for the process in the reverse direction.
D) The ΔH for a process in the forward direction is equal to the ΔH for the process in the reverse direction.
E) The ΔH of a reaction depends on the physical states of the reactants and products.

The reaction A → B *is first order in* [A]. *Consider the following data.*

time (s)	[A] (M)
0.0	1.60
10.0	0.40
20.0	0.10

23. The rate constant for this reaction is __________ s^{-1}.

A) 0.013
B) 0.030
C) 0.14
D) 3.0
E) 3.1×10^{-3}

24. Sodium bicarbonate is reacted with concentrated hydrochloric acid at 37.0°C and 1.00 atm. The reaction of 6.00 kg of bicarbonate with excess hydrochloric acid under these conditions will produce __________ L of CO_2.

A) 1.09×10^2
B) 2.85×10^4
C) 1.82×10^4
D) 8.70×10^2
E) 1.82×10^3

25. Consider the following two reactions:

$A \rightarrow 2B \qquad \Delta H^\circ_{rxn} = 456.7$ kJ/mol

$A \rightarrow C \qquad \Delta H^\circ_{rxn} = -22.1$ kJ/mol

Determine the enthalpy change for the process:

$2B \rightarrow C$

A) -478.8 kJ/mol
B) -434.6 kJ/mol
C) 434.6 kJ/mol
D) 478.8 kJ/mol
E) More information is needed to solve the problem.

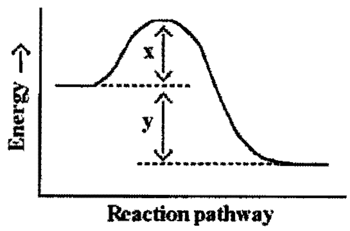
26. As the temperature of a reaction is increased, the rate of the reaction increases because the __________.

A) Reactant molecules collide less frequently
B) Reactant molecules collide more frequently and with greater energy per collision
C) Activation energy is lowered
D) Reactant molecules collide less frequently <u>and</u> with greater energy per collision
E) Reactant molecules collide more frequently with less energy per collision

27. The kinetic-molecular theory predicts that pressure rises as the temperature of a gas increases because __________.

A) The average kinetic energy of the gas molecules decreases
B) The gas molecules collide more frequently with the wall
C) The gas molecules collide less frequently with the wall
D) The gas molecules collide more energetically with the wall
E) Both the gas molecules collide more frequently with the wall <u>and</u> the gas molecules collide more energetically with the wall

28. Which energy difference in the energy profile below corresponds to the activation energy for the forward reaction?



A) x
B) y
C) x + y
D) x - y
E) y - x

29. Which one of the following gases would have the <u>highest</u> average molecular speed at 25°C?

A) O_2
B) N_2
C) CO_2
D) CH_4
E) SF_6

30. A real gas will behave most like an ideal gas under conditions of __________.

A) High temperature and high pressure
B) High temperature and low pressure
C) Low temperature and high pressure
D) Low temperature and low pressure
E) STP

31. The mechanism for formation of the product X is:

$A + B \rightarrow C + D$ (slow)

$B + D \rightarrow X$ (fast)

The intermediate reactant in the reaction is __________.

A) A
B) B
C) C
D) D
E) X

32. The rate law of the overall reaction

$A + B \rightarrow C$

is rate = $k[A]^2$. Which of the following will not increase the rate of the reaction?

A) Increasing the concentration of reactant A
B) Increasing the concentration of reactant B
C) Increasing the temperature of the reaction
D) Adding a catalyst for the reaction
E) All of these will increase the rate.

33. The reaction

$4Al\,(s) + 3O_2\,(g) \rightarrow 2\,Al_2O_3\,(s)$ $\Delta H° = -3351$ kJ

is __________, and therefore heat is __________ by the reaction.

A) Endothermic, released
B) Endothermic, absorbed
C) Exothermic, released
D) Exothermic, absorbed
E) thermoneutral, neither released nor absorbed

34. In the reaction below, $\Delta H_f°$ is zero for __________.

$Ni\,(s) + 2CO\,(g) + 2PF_3\,(g) \rightarrow Ni(CO)_2\,(PF_3)_2\,(l)$

A) Ni (s)
B) CO (g)
C) PF_3 (g)
D) $Ni(CO)_2(PF_3)_2$ (l)
E) Both CO (g) and PF_3 (g)

35. Which one of the following is not an alcohol?

A) Acetone
B) Glycerol
C) Ethanol
D) Cholesterol
E) Ethylene glycol

36. Gaseous mixtures __________.

A) Can only contain molecules
B) Are all heterogeneous
C) Can only contain isolated atoms
D) Are all homogeneous
E) Must contain both isolated atoms and molecules

37. Which one of the following is a valid statement of Avogadro's law?

A) $V \alpha 1/P$

B) $V \alpha T$

C) $V \alpha R$

D) <u>$V \alpha n$</u>

E) None of the above

38. Which statement about addition reactions between alkenes and HBr is <u>false</u>?

A) The addition occurs at the double bond.

B) Bromine attacks the alkene carbon atom possessing a partial positive charge.

C) A hydrogen atom attaches to the alkene carbon atom possessing a partial negative charge.

D) The π bond breaks in the course of the reaction.

E) The proposed mechanism involves radicals.

39. The molecular geometry of each carbon atom in an alkane is __________.

A) Octahedral

B) Square planar

C) Trigonal planar

D) Tetrahedral

E) Trigonal pyramidal

40. 5. A 0.007500 m^3 volume of carbon dioxide was collected at 45.15°C and 121.59 kPa. The volume was then decreased by 75.00% while the temperature was halved. The new pressure in the container was:

A. 0.1150 bar

B. 243.2 kPa

C. 1130 mmHg

D. 4.560 atm

E. <u>None of the above</u>

Section B

Question 1

a) A solution is made by mixing 17.3 mL of 0.25 M HCl and 15.0 mL of 0.33 M NaOH. Calculate the pH of this solution. (4)

b) The data obtained during the reaction between aqueous hydrochloric acid and aqueous sodium thiosulphate to precipitate sulphur are tabulated below:

T(°C)	25	35	45	55	65
t(s)	25.3	17.9	12.5	9.0	6.0
K(s^{-1})	0.040	0.056	0.080	0.111	0.152

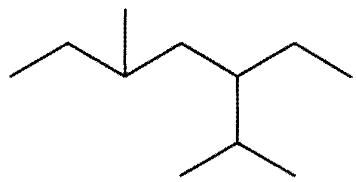
i. Using the Arrhenius plot, evaluate the activation energy, Ea, for this reaction. (10)
ii. Calculate the 'A' factor for this reaction at 25°C. (3)
iii. If the precipitation of sulphur follows a first order rate law, estimate its half life at temperature of 45°C. (3)

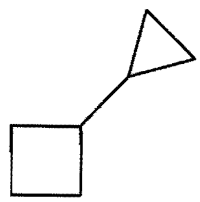
Question 2

a) (i) Name any six classes of organic compounds. (3)
(ii) Give the functional group and a named example for each of the classes of compounds named in part (i) above. (6)

b) Write the structural formulas for all the constitutional isomers that have the following molecular formula. (7)
i. C_2H_7N
ii. C_3H_7Cl
iii. C_3H_8O

c) Expand the following bond line representations to show all the atoms including all the carbons and hydrogens. (4)

i. 

ii. 

Question 3

a) Nitrous oxide can be formed by thermal decomposition of ammonium nitrate.

$$NH_4NO_{3(s)} \longrightarrow N_2O_{(g)} + 2H_2O_{(g)}$$

What mass of ammonium nitrate would be required to produce 115 L of N_2O at 2800 Torr and 42°C (3)

b) (i) State Dalton's law of partial pressures. (1)
(ii) At 25°C, 0.300 moles of $CH_{4(g)}$, 0.200 mole of $H_{2(g)}$ and 0.400 mole of $N_{2(g)}$ are contained in a 10.0 L flask. Evaluate the partial pressure (in atm), of each of the components of the gaseous mixture in the flask, and the overall pressure in the flask. (5)
(iii) Suppose the temperature of the flask above is raised from 25°C to 75°C, evaluate the ratio of the total pressures in the flask at the two temperatures. (3)
(iv) Calculate the volume of 0.65 mole of an ideal gas at 499 Torr and 102°C (3)
(NB: use R = 0.0821 $L.atm.mol^{-1}K^{-1}$)

c) Tennis balls are usually filled with either air or N_2 gas to a pressure above atmospheric pressure to increase their bounce. If a tennis ball has a volume of 144 cm^3 and contains 0.33 g of N_2 gas, what is the pressure inside the ball at 24 °C? (5)

Question 4

a) For the reaction:

$$H_2(g) + I_2(g) \rightleftharpoons 2\,HI(g)$$

K_p = 794 at 298 K and K_p = 55 at 700 K. Is the formation of HI favored more at the higher or lower temperature? (3)

b) Write the following equilibrium-constant expressions: (4)

i. K_c for $Cr(s) + 3\,Ag^+(aq) \rightleftharpoons Cr^{3+}(aq) + 3\,Ag(s)$

ii. K_p for $3\,Fe(s) + 4\,H_2O(g) \rightleftharpoons Fe_3O_4(s) + 4\,H_2(g)$

c) Sulfur trioxide decomposes at high temperature in a sealed container:

$$2\,SO_3(g) \rightleftharpoons 2\,SO_2(g) + O_2(g)$$

Initially, the vessel is charged at 1000 K with $SO_3(g)$ at a partial pressure of 0.500 atm. At equilibrium the SO_3 partial pressure is 0.200 atm. Calculate the value of K_p at 1000 K. (8)

d) For the reaction

$$PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g) \qquad \Delta H° = 87.9\ kJ$$

in which direction will the equilibrium shift when

i. $Cl_2(g)$ is removed,

ii. the temperature is decreased,

iii. the volume of the reaction system is increased,

iv. $PCl_3(g)$ is added? (5)

General data and fundamental constants

Quantity	Symbol	Value
Speed of light	c	$2.997\,924\,58 \times 10^{8}$ m s^{-1}
Elementary charge	e	$1.602\,177 \times 10^{-19}$ C
Faraday constant	$F = N_A e$	9.6485×10^{4} C mol^{-1}
Boltzmann constant	k	$1.380\,66 \times 10^{-23}$ J K^{-1}
Gas constant	$R = N_A k$	$8.314\,51$ J K^{-1} mol^{-1}
		$8.205\,78 \times 10^{-2}$ dm^{3} atm K^{-1} mol^{-1}
		6.2364×10 L Torr K^{-1} mol^{-1}
Planck constant	h	$6.626\,08 \times 10^{-34}$ J s
	$\hbar = h/2\pi$	$1.054\,57 \times 10^{-34}$ J s
Avogadro constant	N_A	$6.022\,14 \times 10^{23}$ mol^{-1}
Atomic mass unit	u	$1.660\,54 \times 10^{-27}$ Kg
Mass		
electron	m_e	$9.109\,39 \times 10^{-31}$ Kg
proton	m_p	$1.672\,62 \times 10^{-27}$ Kg
neutron	m_n	$1.674\,93 \times 10^{-27}$ Kg
Vacuum permittivity	$\varepsilon_o = 1/c^2\mu_o$	$8.854\,19 \times 10^{-12}$ J^{-1} C^{2} m^{-1}
	$4\pi\varepsilon_o$	$1.112\,65 \times 10^{-10}$ J^{-1} C^{2} m^{-1}
Vacuum permeability	μ_o	$4\pi \times 10^{-7}$ J s^{2} C^{-2} m^{-1}
		$4\pi \times 10^{-7}$ T^{2} J^{-1} m^{3}
Magneton		
Bohr	$\mu_B = e\hbar/2m_e$	$9.274\,02 \times 10^{-24}$ J T^{-1}
nuclear	$\mu_N = e\hbar/2m_p$	$5.050\,79 \times 10^{-27}$ J T^{-1}
g value	g_e	$2.002\,32$
Bohr radius	$a_o = 4\pi\varepsilon_o\hbar/m_e e^2$	$5.291\,77 \times 10^{-11}$ m
Fine-structure constant	$\alpha = \mu_o e^2 c/2h$	$7.297\,35 \times 10^{-3}$
Rydberg constant	$R_\infty = m_e e^4/8h^3 c\varepsilon_o^2$	$1.097\,37 \times 10^{7}$ m^{-1}
Standard acceleration of free fall	g	$9.806\,65$ m s^{-2}
Gravitational constant	G	$6.672\,59 \times 10^{-11}$ N m^{2} Kg^{-2}

Conversion factors

1 cal	=	4.184 joules (J)	1 erg	=	1×10^{-7} J
1 eV	=	$1.602\,2 \times 10^{-19}$ J	1 eV/molecule	=	96 485 kJ mol^{-1}

Prefixes

f	p	n	μ	m	c	d	k	M	G
femto	pico	nano	micro	milli	centi	deci	kilo	mega	giga
10^{-15}	10^{-12}	10^{-9}	10^{-6}	10^{-3}	10^{-2}	10^{-1}	10^{3}	10^{6}	10^{9}

PERIODIC TABLE OF ELEMENTS

GROUPS

PERIODS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	IA	IIA	IIIB	IVB	VB	VIB	VIIB	VIIIB			IB	IIB	IIIA	IVA	VA	VIA	VIIA	VIIIA
1	1.008 H 1																	4.003 He 2
2	6.941 Li 3	9.012 Be 4										Atomic mass Symbol Atomic No.	10.811 B 5	12.011 C 6	14.007 N 7	15.999 O 8	18.998 F 9	20.180 Ne 10
3	22.990 Na 11	24.305 Mg 12					TRANSITION ELEMENTS						26.982 Al 13	28.086 Si 14	30.974 P 15	32.06 S 16	35.453 Cl 17	39.948 Ar 18
4	39.098 K 19	40.078 Ca 20	44.956 Sc 21	47.88 Ti 22	50.942 V 23	51.996 Cr 24	54.938 Mn 25	55.847 Fe 26	58.933 Co 27	58.69 Ni 28	63.546 Cu 29	65.39 Zn 30	69.723 Ga 31	72.61 Ge 32	74.922 As 33	78.96 Se 34	79.904 Br 35	83.80 Kr 36
5	85.468 Rb 37	87.62 Sr 38	88.906 Y 39	91.224 Zr 40	92.906 Nb 41	95.94 Mo 42	98.907 Tc 43	101.07 Ru 44	102.91 Rh 45	106.42 Pd 46	107.87 Ag 47	112.41 Cd 48	114.82 In 49	118.71 Sn 50	121.75 Sb 51	127.60 Te 52	126.90 I 53	131.29 Xe 54
6	132.91 Cs 55	137.33 Ba 56	138.91 *La 57	178.49 Hf 72	180.95 Ta 73	183.85 W 74	186.21 Re 75	190.2 Os 76	192.22 Ir 77	195.08 Pt 78	196.97 Au 79	200.59 Hg 80	204.38 Tl 81	207.2 Pb 82	208.98 Bi 83	(209) Po 84	(210) At 85	(222) Rn 86
7	223 Fr 87	226.03 Ra 88	(227) **Ac 89	(261) Rf 104	(262) Ha 105	(263) Unh 106	(262) Uns 107	(265) Uno 108	(266) Une 109	(267) Uun 110								

*Lanthanide Series	140.12 Ce 58	140.91 Pr 59	144.24 Nd 60	(145) Pm 61	150.36 Sm 62	151.96 Eu 63	157.25 Gd 64	158.93 Tb 65	162.50 Dy 66	164.93 Ho 67	167.26 Er 68	168.93 Tm 69	173.04 Yb 70	174.97 Lu 71
**Actinide Series	232.04 Th 90	231.04 Pa 91	238.03 U 92	237.05 Np 93	(244) Pu 94	(243) Am 95	(247) Cm 96	(247) Bk 97	(251) Cf 98	(252) Es 99	(257) Fm 100	(258) Md 101	(259) No 102	(260) Lr 103

( ) indicates the mass number of the isotope with the longest half-life.

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C111 SECTION A ANSWER SHEET

STUDENT ID NUMBER:____________________

Correct answer must be indicated by putting a circle around the letter for that answer on the answer sheet provided. If you change your answer, please cancel the wrong answer with a cross and then put a circle around the correct one. If more than one option has a circle around it a zero will be given for that question.

1.	(A)	(B)	(C)	(D)	(E)	21.	(A)	(B)	(C)	(D)	(E)
2	(A)	(B)	(C)	(D)	(E)	22	(A)	(B)	(C)	(D)	(E)
3	(A)	(B)	(C)	(D)	(E)	23	(A)	(B)	(C)	(D)	(E)
4	(A)	(B)	(C)	(D)	(E)	24	(A)	(B)	(C)	(D)	(E)
5	(A)	(B)	(C)	(D)	(E)	25	(A)	(B)	(C)	(D)	(E)
6	(A)	(B)	(C)	(D)	(E)	26	(A)	(B)	(C)	(D)	(E)
7	(A)	(B)	(C)	(D)	(E)	27	(A)	(B)	(C)	(D)	(E)
8	(A)	(B)	(C)	(D)	(E)	28	(A)	(B)	(C)	(D)	(E)
9	(A)	(B)	(C)	(D)	(E)	29	(A)	(B)	(C)	(D)	(E)
10	(A)	(B)	(C)	(D)	(E)	30	(A)	(B)	(C)	(D)	(E)
11	(A)	(B)	(C)	(D)	(E)	31	(A)	(B)	(C)	(D)	(E)
12	(A)	(B)	(C)	(D)	(E)	32	(A)	(B)	(C)	(D)	(E)
13	(A)	(B)	(C)	(D)	(E)	33	(A)	(B)	(C)	(D)	(E)
14	(A)	(B)	(C)	(D)	(E)	34	(A)	(B)	(C)	(D)	(E)
15	(A)	(B)	(C)	(D)	(E)	35	(A)	(B)	(C)	(D)	(E)
16	(A)	(B)	(C)	(D)	(E)	36	(A)	(B)	(C)	(D)	(E)
17	(A)	(B)	(C)	(D)	(E)	37	(A)	(B)	(C)	(D)	(E)
18	(A)	(B)	(C)	(D)	(E)	38	(A)	(B)	(C)	(D)	(E)
19	(A)	(B)	(C)	(D)	(E)	39	(A)	(B)	(C)	(D)	(E)
20	(A)	(B)	(C)	(D)	(E)	40	(A)	(B)	(C)	(D)	(E)