

JULY, 2021
EBS 132
GENERAL CHEMISTRY
1 HOUR, 30 MINUTES

Candidate's Index Number:
Signature:

UNIVERSITY OF CAPE COAST
COLLEGE OF EDUCATION STUDIES
SCHOOL OF EDUCATIONAL DEVELOPMENT AND OUTREACH
INSTITUTE OF EDUCATION

COLLEGES OF EDUCATION
FOUR-YEAR BACHELOR OF EDUCATION (B.ED)
FIRST YEAR, END-OF-SECOND SEMESTER EXAMINATION, JULY/AUGUST, 2021

JULY 30, 2021

GENERAL CHEMISTRY

2:30 PM – 4:00 PM

SECTION B (40 Marks)

Answer any TWO questions in this section

1. a. An atom has six protons and a mass number of thirteen. Find the following for the atom;
- Neutron number (6 marks)
 - Number of electrons (4 marks)

- b. Complete the table below

Shell	K	L	M	N
Shell Number (n)	1		3	
Maximum number of electrons	2			32

- c. Write two factors influencing the formation of ionic bond. (2 marks)

- d. The element Q is represented as ${}_{17}^{35}\text{Q}$. (5 marks)

- What do the subscripts and superscript stand for?
- Calculate the number of neutrons
- How many protons and electrons has Q?
- What is the actual name and chemical symbol of Q?

- e. Using the data below, find the relative atomic mass of boron using percentage abundance and fractional abundance. (3 marks)

Isotope	Atomic/isotopic mass	% abundance	Fractional abundance
${}_{5}^{10}\text{B}$	10	20	0.2
${}_{5}^{11}\text{B}$	11	80	0.8

2. a. Define acid and base according to Lewis concept. (4 marks)
- b. Give the chemical formulae of the following compounds (4 marks)
- Tetraoxosulphate(VI) acid
 - Calcium(II) tetraoxonitrate(V)
 - Trioxocarbonate(IV) ion
 - Copper(I) oxide
- c. Give any two properties of pure substance. (2 marks)
- d. Copy and complete the table below (6 marks)

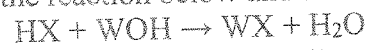
Name of Hydrocarbon	General molecular formula	Formula for C = 2	IUPAC name
Alkane			Ethane
Alkene		C ₂ H ₄	
Alkyne	C _n H _{2n-2}		

- e. Give any four properties of covalent compounds. (4 marks)
3. a. Draw the Lewis structures of each of the following covalent compounds (2 marks)
- O₂
 - CH₄
- b. Classify the following into good and poor conductors of electricity; Ca(OH)₂, H₂SO₄, NaOH, CH₃COOH. (4 marks)
- c. Calculate the molar mass of the following molecules: (8 marks)
- NaOH
 - Ca(OH)₂
 - (COOH)₂·2H₂O
 - Na₂CO₃·10H₂O : (Ar: Na=23, O=16, H=1, Ca=40, C=12)
- d. Balance the following chemical equations (2 marks)
- CH₄ + O₃ → CO₂ + H₂O
 - P + O₂ → P₂O₅
- e. Calculate the number of molecules in 6.4g of Sulphur (iv) oxide gas (S=34, O=16, L = 6.02 × 10²³) (4 marks)
4. a. The table below shows the pH of solutions E, F, G, H, I, J and K (8 marks)

Solution	E	F	G	H	I	J	K
pH	3	4	8	13	5	10	7

- Give the letter of solution(s) which will turn red litmus paper blue.
- Give the letters of the most acidic, the most alkaline and neutral solutions.
- Which of the solutions will change the colour of a universal indicator to violet?

b. Study the reaction below and use it to answer the questions that follow; (8 marks)



- i. Name the type of reaction illustrated.
- ii. Which species is
 - (α) an acid
 - (β) a salt
 - (λ) a base

c. Explain why the solution of WX is a good conductor (4 marks)

