BOWEN UNIVERSITY, IWO, OSUN STATE
COLLEGE OF AGRICULTURE, ENGINEERING AND SCIENCE
INDUSTRIAL CHEMISTRY PROGRAMME
B.SC DEGREE 2019/2020 FIRST SEMESTER EXAMINATION

Course Code: CHM 103 Courses Title: General Chemistry Practical I Credit: 1
Date: 29/01/2020 Time Allowed: 1 hour

Instructions: (a) Answer all questions. Each question carries 1 mark.
(b) Answer questions on the table provided at the back of this question paper.
(c) Submit the answer page along with the question paper.

SURNAME: _____ Other names: _____

Matric No: _____ Programme: _____

College: _____

Provide the correct options in capital letters in the spaces below

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

1. All the following except one is a precaution while titrating in the laboratory:
(a) any of the titre values be used
(b) remove the funnel after pouring the acid into the burette
(c) never pour water into acid while diluting
(d) always wear your laboratory coat once you enter the laboratory
2. The objective of drawing the line of best fit while drawing a graph after an experiment includes:
(a) to graphically express the results of one's experiment (b) to be able to effectively determine the slope of the graph (c) to include a maximum number of points (d) all of the above
3. Janet drew a straight line graph and picked points A (6, 6) and B (10, 8) to determine the slope. The value of the slope will be (a) 1 (b) 2 (c) ½ (d) $^2/_3$
4. The equation of a graph was given as $y = 1.8x - 0.5$. The slope and the intercept of the graph respectively are (a) 1.8 & 0.5 (b) 0.5 & 1.8 (c) -0.5 & 1.8 (d) 1.8 & -0.5
5. A volumetric flask is used to measure which of the following? (a) Gases (b) Liquids
(c) Solids (d) same as a weighing balance
6. The calibration of a pipette is carried out by which of the following methods?
(a) Gravimetric method (b) Titrimetric method (c) Centroid method
(d) Volumetric method
7. Bolanle was trying to calibrate a burette in the laboratory. Which of the following errors is she likely to encounter? (a) Error due parallax (b) Gas leakage (c) Improperly cleaned standard flask (d) None of the above
8. How close a measurement is to the true value is called (a) Estimate (b) Precision
(c) Significant (d) Accuracy
9. Which of the following formula is correct for calculating standard deviation for cases when $n \geq 10$?

a) $\sqrt{\frac{\sum(X - Xi)^2}{n}}$

b) $\sqrt{\frac{\sum(Xi - X)^2}{n-1}}$

c) $\sqrt{\frac{\sum(Xi - X)^2}{n}}$

d) $\sqrt{\frac{\sum(Xi - X)}{n}}$

10. One of the following best describes random errors
(a) Random errors are due to steadiness of temperature or other natural conditions.
(b) Random errors arise from the inability of an individual to make observations.
(c) Random errors are erratic.
(d) Random errors are irregular and variable both in magnitude and sign
11. The reaction between CH_3COOH and KOH will produce a salt of CH_3COOK and is expected to have a pH range of _____ (a) 5-6 (b) 8-9 (c) 6-7 (d) 1-3
12. pH is the mathematical expression of (a) $-\log_{10}[H^+]$ (b) $-\log[H^+]$
(c) $-\log_5[H^+]$ (d) $-\log_{10}[OH^-]$

13. The acid/base pair that will produce sodium nitrate is (a) HNO_3/NaOH
(b) HCl/$NaNO_3$ (c) H_2CO_3/NaOH (d) no answer
14. The suitable indicator for a strong acid and a strong base titration is (a) methyl orange
(b) Phenolphthalein (c) None of the above (d) Options (a) or (b)
15. Ammonium chloride can be produced from the reaction of (a) HNO_3 & NH_3
(b) HCl & NH_4Cl (c) HCl & NH_3 (d) NaCl & H_2O
16. The acid & base pair that give rise to the salt Na_2CO_3 are (a) CH_3COOH & NaOH
(b) H_2CO_3 & NaOH (c) CO_2 & Na_2O (d) NaOH & H_2CO_3
17. Equivalence point in titrimetric analysis is (a) the end point of a titration
(b) the point at which the amount of titrant added completely neutralyzes the analyte
(c) the point at which the indicator changes colour (d) all of the above
18. Neutralization can be defined as (a) the reaction of an acid and a base to form salt and water only (b) the point at which a solution becomes neutral
(c) the reaction of water with another molecule to hydrolyze its atoms (d) none of the above

Use the following salts to answer questions 19 to 21: K_2SO_4, Na_2CO_3, NH_4Cl and CH_3COONa.
19. A dilute solution tested with a universal paper revealed it had a pH of 7-8. The dissolved salt is likely to be (a) Na_2CO_3 (b) K_2SO_4 (c) NH_4Cl (d) CH_3COONa
20. Which of the dilute solution of the salt will have a pH of 1-2
(a) K_2SO_4 (b) $NaCO_3$ (c) NH_4Cl (d) None of the above
21. A dilute solution of pH 5-6 is likely to be a solution of which salt?
(a) K_2SO_4 (b) $NaCO_3$ (c) NH_4Cl (d) CH_3COONa
22. All the followings are glass wares except
(a) conical flask (b) pipette (c) spatula (d) burette
23. The carbonate ion is readily hydrolyzed by water to give an aqueous solution of
(a) CO_2 (b) CO & H^+ (c) HCO_3^- & OH^- (d) no answer
24. Ammonium ion is readily hydrolyzed by water to give an aqueous solution of
(a) NH_3 & H_3O^+ (b) NH_4^+, H_2O & NH_4OH (c) either option (a) or (b) (d) no answer
25. Ferric ion is readily hydrolyzed by water to give an aqueous solution of
(a) $[Fe(H_2O)_5(OH)]^{2+}$ (b) $Fe(OH)_3$ & H^+ (c) either options (a) or (b) (d) no answer
26. The average titre value obtained from the titration of 0.1 M HCl against 20 cm^3 of NaOH solution was 18.5 cm^3. What is the molarity of the NaOH solution?
(b) 0.0103 M NaOH (b) 0.103 M NaOH (c) 0.0925 M NaOH (d) 0.975 M NaOH
27. Calculate the concentration (mol/dm^3) of 3.2 g of NaOH dissolved in a 100 ml standard flask.
(a) 0.08 M (b) 0.008 M (c) 0.8 M (d) 8.0 M
28. Hydrolysis of a salt leads to:
(a) Decrease/ Increase in Hydrogen ion concentration (b) Decrease/Increase in Hydroxyl ion concentration (c) Options (a) and (b) (d) Neither (a) nor (b)

State the pH of the following reactions at the equivalence point (questions 29-31)

29. NaOH and CH_3COOH

(a) pH < 7 (b) pH > 7 (c) pH = 7 (d) pH = 0

30. HNO_3 and NaOH

(a) pH > 7 (b) pH = 7 (b) pH = 0 (d) pH < 7

31. H_2SO_4 and aqueous NH_3

(a) pH = 7 (b) pH < 7 (c) pH > 7 (d) pH = 0

32. The first aid treatment for a spillage of dilute acid on a finger in the laboratory is

(a) quickly dry the finger with a clean napkin and call the attention of the anyone around

(b) quickly run the tap water on the finger and call the attention of the technologist/lecturer

(c) there is no need to not call the attention of any of the technologists on duty

(d) quickly remove your laboratory coat and go to the hospital

33. All the following are safety wears in the laboratory except

(a) safety goggles (b) laboratory coat (c) hand gloves (d) all of the above

34. An indicator is

(a) a substance that undergoes a detectable colour change during titration thereby indicating the equivalence point

(b) a weak organic acid or base which possesses different colours according to the hydrogen ion concentration

(c) a substance that ascertains during titration that the "neutral point" corresponds to a pH of 7

(d) Options (a) and (b)

Suggest suitable choices of indicators for the titrations involving the following acids/bases in questions 35 – 38.

35. H_2SO_4/ aqueous NH_3

(a) methyl orange (b) phenolphthalein (c) litmus red (d) no indicator

36. HCl/NaOH

(a) phenolphthalein (b) congo red (c) methyl orange (d) all of the above

37. $HCOOH/CH_3NH_2$

(a) phenolphthalein (b) congo red (c) methyl orange (d) no suitable indicator

38. CH_3COOH/KOH

(a) phenolphthalein (b) congo red (c) methyl orange (d) litmus

39. The pH of the titration of $HCOOH/CH_3NH_2$ at the end point is

(a) variable (b) 7 (c) >7 (d) <7

40. Chemistry in the laboratory is

(a) a practical test of theories (b) could be toxic thus safety rules must be obeyed

(c) applicable to life (d) all of the above