SECTION B - GENERAL PAPER

In question 1 to 50 choose the correct answer from option (a) to (d) that follow each question

1. A sample of orange juice has pH of 3.80. What is the molar concentration of hydrogen ion in the juice?
(a) 1.588×10^4 (b) 1.58×10^{-2} (c) 1.58×10^3 (d) 1.58×10^4

2. Which of the following solutions is NOT acidic?
(a) Aluminium chloride (b) Zinc chloride (c) Copper (II) tetraoxosulphate (VI) (d) Silver chloride

3. Calculate the current in ampere required to produce 18.0g of aluminium in 1.50hours (Al = 27, F = 96500C)
(a) 33.65 amperes (b) 35.74 amperes (c) 37.85amperes (d) 39.25 amperes

4. Calculate the oxidation number of chlorine in Cl_2O_2
(a) +7 (b) +2 (c) +5 (d) +1

5. The two nuclei in the hydrogen molecule are held together by
(a) mutual attraction (b) mutual sharing of the electron charge (c) dative covalent bond (d) the two electrons having the same spin

6. Which of the following statements about catalysis is correct?
(1) A small amount of catalyst often affects the rate of a reaction for a long time
(2) A catalyst is always chemically unchanged at the end of a reaction
(3) The effect of a catalyst is often enhanced by adding promoters
(4) A catalyst always physically unchanged at the end of a reaction
(5) A catalyst always speeds up the rate of a chemical reaction
(a) 1,2,3,4,5 (b) 1,2,3 only (c) 2,3,4 only (d) 2,4 only

7. When $K_2Cr_2O_7$ dissolves in water, the following equilibrium is established
$Cr_2O_7^{2-}{}_{(aq)} + H_2O_{(l)} \rightleftarrows 2CrO_4^{2-}{}_{(aq)} + 2H^+{}_{(aq)}$
Orange yellow
State the colour observed on adding a few drops of dilute H_2SO_4 in the system
(a) orange (b) yellow (c) pink (d) colourless

8. Which of the following statements is NOT true of hydrogen sulphide?
(a) it is a liquid at temperature (b) it is a covalent compound (c) it is weak dibasic acid in aqueous solution (d) it is a much stronger reducing agent than water

9. Which of the following are products of acid hydrolysis of sucrose?
(a) fructose and maltose (b) glucose and cellulose (c) maltose and cellulose (d) glucose and fructose

10. What is the concentration (in $mol.dm^3$) of a solution containing 0.38g of potassium hydroxide $100cm^3$ of solution? (K = 39, H = 1, O = 16)
(a) 0.028 (b) 0.04 (c) 0.05 (d) 0.07

11. Determine the distance between point P (8, 5, 3) and Q (2, 1, -2)
(a) 3.87 (b) 3.32 (c) 15.00 (d) 8.77

12. One person walks south-east at 4m/s and another heads north at 3m/s. How far apart are they in 10 seconds if they started from the same point simultaneously?
(a) 80.3m (b) 28.3m (c) 64.7m (d) 419.7m

13. The centre of gravity of a rectangular object is at
(a) the intersection of the median (b) the middle of the rectangle (c) the intersection of the diagonals (d) any of the vertices

14. A uniform meter rule of weight 1.0N is pivoted at the 40cm mark. A weight of 2.0N is hung at the 15cm mark. Where must a weight of 2N be placed to balance the rule?
(a) 60cm (b) 45cm (c) 55m (d) 35cm

15. Two plane mirrors inclined at an angle of 60° to each other. Determine the number of images in the two mirrors
(a) 6 (b) 2 (c) 5 (d) 11

16. When an oil drop is placed gently on a clean water surface of area $100cm^3$
(a) the drop spreads until the film is 50 molecules thick (b) the drop spreads to fill exactly an area of $100cm^2$ (c) volume of the drop decreases as it spreads (d) the oil film formed is not less than one molecule thick

17. When illuminated by a light beam, a smoke particle in oxygen gas can be seen moving in different directions all the time when viewed in a microscope. This is because
(a) the light beam is not constant (b) the smoke particle is affected by gravity (c) oxygen molecules hit the smoke particles in different directions (d) the smoke particle has a high speed in oxygen.

18. A siren having a ring of 200 holes makes 132 revolutions per minute. A jet of air is directed on the set of holes. Calculate the frequency of the note produced. (Take the speed of sound in air as 350m/s)
(a) 26.40Hz (b) 1.52Hz (c) 440Hz (d) 0.66Hz

19. A concave mirror of focal length 20cm form image ½ the size of the object. Determine the object distance
(a) 20cm (b) 60cm (c) 100cm (d) 80cm

20. A pool of water is 12m deep, what is its apparent dept? (Reactive index of water is 4/3)
(a) 6.0m (b) 48.0m (c) 9.0m (d) 36.0m

21. In the optical system of the eye and lens camera, which statements is NOT true?
(a) the ciliary muscle controls the focal length of the eye lens (b) the focal length of the camera lens is fixed (c) the retina and camera film have similar purpose (d) the focal length of the eye lens is fixed

22. A cell needed 0.30m of the wire of a potentiometer to balance its e.m.f. but only 2.0m of its p.d. when a resistance of 4Ω was connected across its terminals. Calculate the internal resistance of the cell.
(a) 1.0 Ω (b) 0.5 Ω (c) 1.5 Ω (d) 2.0 Ω

23. When a steady current move in a long solenoid P, it said that P
(a) P settles in a north-south direction if freely suspended (b) both end of P are south poles
(c) both ends of P are north poles (d) there is only a magnetic field at the end of P.

24. A transformer has a primary coil of 400 turns and a secondary coil of two hundred turns. If the primary coil is connected to 240 a.c. mains, calculate the efficiency given that the current in the primary coil is 3A and in the secondary 5A.
(a) 60% (b) 50% (c) 83% (d) 62.5%

25. When a P-n junction of a semi conductor is forward biased
(a) a large current is obtained (b) a small is obtained (c) no current is obtained (d) the current value remains the same

26. Which of the following is the largest single cell in the body?
(a) the neuron (b) the ovum (c) liver cell (d) muscle cell

27. Blue-green algae belong to the phylum
(a) cyanophyta (b) schizophyta (c) chlorophyta (d) chrysophyta

28. The concept of antibiotic started with the work of
(a) Gregor Mendel (b) Mary Slessor (c) Louis Pasteur (d) Alexander Fleming

29. The botanical name for yellow yam is
(a) *Dioscorea cayenensis* (b) *Dioscorea rotundata* (c) *Dioscorea alata* (d) *Dioscorea dumentorum*

30. Which of the following tissues are made of dead cells?
(a) xylem vessels (b) cambium (c) mesophyll (d) palisade

31. Which of the following is not a function of the liver
(a) storage of iron (b) formation of bile (c) breakdown of excess amino acid (d) excretion of urine from the blood

32. Alkaline pyrogallol was used in an experiment. That experiment must have been connected with
(a) respiration (b) photosynthesis (c) transpiration (d) excretion

33. The enzyme that breaks down cane sugar is
(a) lipase (b) ptyalin (c) invertase (d) peptidase

34. The large single bone in the body is the
(a) scapula (d) humerus (c) femur (d) skull

35. Axins are produced in the
(a) root and stem apices (b) young leaves and nodes (c) flower bud and leaf apices.

36. The hormone which tones up the muscles of a person in time of danger is from the
(a) thyroid gland (b) pancreas (c) adrenal gland (d) sebaceous gland

37. A diet with a high concentration of iodine will probably be needed by a patient suffering from a malfunction of the
(a) thyroid gland (b) adrenal gland (c) nervous system (d) circulatory system

38. The sampling method is most often used in ecological study of a habitat because
(a) the area to be studied is usually large (b) some areas are more important than others (c) it enable the use of quadrants (d) plants and animals live in small communities

39. Which of the following groups of factors is completely abiotic
(a) soil water, bacteria salinity (b) salinity, tide, plankton, turbidity (c) wind, altitude, humidity, light (d) confers, wind, pH, rainfall

40. Nitrogen-fixing bacteria and cowpea demonstrate an ecological association known as
(a) predation (b) parasitism (c) mutualism (d) commensalism

41. Plants that live in salty water are called
(a) hydrophytes (b) xerophytes (c) halophytes (d) salinophytes

42. A sample of soil was put into a measuring cylinder and water was added to it. After the mixture was shaken the cylinder was left undisturbed for one hour. This experiment was probably performed to:
(a) compare the capillarity of different samples (b) find out the relative densities of different soil particles
(c) find out the water retaining capacity of soil (d) demonstrate the presence of air in the soil sample

43. A farmer X working in a swamp did not eat any food nor drank any water. Which of these diseases can he not contact?
(a) bilharziasis (b) malaria (c) cholera (d) sleeping sickness

44. Which of the following elements may be added to drinking water to lessen dental decay
(a) chlorine (b) phosphorus (c) fluorine (d) hydrogen

45. A man with normal haemoglobin gets married to a woman who has sickle cell haemoglobin. They have a child who has a sickle cell train, which of the following genotype could be associated with the child's haemoglobin?
(a) SS (b) AS (c) AO (d) AA

46. Trichloromethane is a solvent used to remove grease from clothing. How after use is the solvent separated from the grease?
(a) by chromatography (b) by crystallization (c) by distillation (d) by filtration

47. Arrange the following elements of the second period in the order of increasing atomic radius lithium, beryllium, boron, carbon
(a) carbon, boron, beryllium, lithium (b) lithium, beryllium, boron, carbon (c) lithium, carbon, boron, beryllium (d) carbon, lithium, beryllium, boron

48. Argon is used in gas filled electric lamps because
(a) it is radioactive (b) it has low pressure (c) is combustible (d) it helps to prevent oxidation

49. If $250cm^3$ of a saturated solution of potassium trioxonitrate (V) at 30°C produced 3.4g of the dry salt, calculate the solubility of the salt at 30°C (K = 39, N = 14, O = 16)
(a) 0.112 $mol.dm^3$ (b) 0.118 $mol.dm^3$ (c) 0.124 $mol.dm^3$ (d) 0.134 $mol.dm^3$

50. Calculate the mass of $ZnSO_4$ produced where excess of $ZnCO_3$ is added to 50.0cm cm^3 of $4mol.dm^3$ H_2SO_4. The equation for the reaction is:
$ZnCO_3 + H_2SO_4 \rightarrow ZnSO_4 + CO_2 + H_2O$ (Zn = 65, S = 32, O = 16)
(a) 32.2 (b) 37.5 (c) 38.6 (d) 34.3