Engineering Daily 20 [Home Practice] EV

Industrial Chemistry + Economic Chemistry

Total Marks: 50 **Negative Marks:** 0.25 **Time:** 1 Hour

MCQ 50 marks

1. Reaction for producing triple super phosphate: $Ca_3(PO_4)_2 + xH_3PO_4 \rightarrow 3Ca(H_2PO_4)_2$; what is the value of x?

(A) 4 (B) 2 (C) 3 (D) 6

2. Supplies energy to the body—
i. Carbohydrates
ii. Fats
iii. Mineral salts
Which one is correct?

(A) i, ii and iii (B) i and ii
(C) i and iii (D) ii and iii

3. A pickle of pH = 3.8 and a piece of raw meat of pH = 6.2 are kept in the same environment. In which one will bacterial spoilage occur faster?

(A) In the meat (B) Equally in both
(C) In neither (D) In the pickle

4. De-aeration is effective in food preservation, because —

(A) lack of O_2 prevents aerobic microorganisms from growing
(B) the enzyme action increases
(C) the pH of the food increases
(D) the water activity of the food becomes 1

5. As water activity gradually increases, in which order does the growth of microorganisms become possible?

(A) Bacteria → Yeast → Mould
(B) Mould → Bacteria → Yeast
(C) Yeast → Mould → Bacteria
(D) Mould → Yeast → Bacteria

6. Food remains good for a long time in the frozen state, because—
i. enzymes remain inactive
ii. water turns into ice and a_w decreases
iii. all bacteria are completely destroyed
Which one is correct?

(A) ii and iii (B) i and ii
(C) i and iii (D) i, ii and iii

7. Which one is not a natural food preservative?

(A) Ethyl formate (B) Vitamin E
(C) Honey (D) Onion

8. Which one is especially used to prevent mould growth in bread and cake?

(A) Sodium nitrite (B) Potassium metabisulphite
(C) EDTA (D) Calcium propanoate

9. Which are the oldest food preservatives?

(A) Sodium benzoate and SO_2
(B) Salt and sugar
(C) Wax and honey
(D) Vinegar and mustard oil

10. How does mustard oil work in preserving pickles?

(A) By raising the pH of the food above 7
(B) By forming chelates with metal ions
(C) By adding H^+ to the proteins of microorganisms
(D) By keeping the food moisture-free and lowering a_w

11. Sodium benzoate is used more than benzoic acid in food preservation, because—

(A) it is an antioxidant
(B) it is more acidic
(C) it is a chelating agent
(D) it is more soluble in water

12. In a meat processing plant, 0.36 g $NaNO_2$ is mixed with 2.5 kg of meat. How many more kg of meat must be added to bring the nitrite level to the maximum permitted limit? [permitted level of nitrite 120 ppm]

(A) 0.6 (B) 0.3 (C) 3.0 (D) 0.5

13. What percentage of citric acid is generally added as a preservative to the canning liquid of canned food?

(A) 0.25% (B) 25% (C) 2.5% (D) 0.1%

14. 800 g of a jelly contains 0.24 g citric acid. Which one is correct about the jelly? [permitted level of citric acid 200 to 350 ppm]

(A) 3000 ppm; above the permitted limit
(B) 30 ppm; below the permitted limit
(C) 300 ppm; above the permitted limit
(D) 300 ppm; within the permitted limit

15. Which is the molecular formula of the acid produced by hydrolysis of sorbate salts?

(A) $C_6H_8O_7$ (B) $C_6H_8O_2$
(C) $C_6H_{10}O_2$ (D) $C_7H_6O_2$

16. What is the molecular mass of the antimicrobial agent ethyl formate?

(A) 74 (B) 88 (C) 60 (D) 46

17. White vinegar is prepared from which one?

(A) Date palm juice (B) Pure ethanoic acid
(C) Malt (D) Sugarcane juice

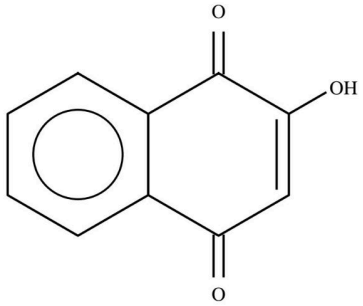
18. Which of the following pairs is correct?

(A) Beta-carotene — free-radical absorbing antioxidant

(B) Sulphite salt — oxygen-absorbing antioxidant

(C) TBHQ — oxygen-absorbing antioxidant

(D) Propyl gallate — chelating agent



19. The compound in the figure—
i. is the main dye of henna leaf extract
ii. has the molecular formula $C_{10}H_6O_3$
iii. contains two carbonyl groups
Which one is correct?

(A) i and ii (B) i and iii

(C) ii and iii (D) i, ii and iii

20. Which alcohol is obtained along with gallic acid on hydrolysis of propyl gallate?

(A) Methanol (B) Propan-2-ol

(C) Propan-1-ol (D) Glycerol

21. Which one is most suitable to prevent rancidity due to fat oxidation in oily foods like chips?

(A) Calcium propanoate (B) BHA

(C) KNO_3 (D) Sodium benzoate

22. What is the unstable compound $LOOH$ formed in the intermediate step of lipid oxidation called?

(A) Lipid alkoxide (B) Peroxylipid radical

(C) Lipid hydroperoxide (D) Lipid epoxide

23. How many grams of anhydrous disodium EDTA (Na_2H_2EDTA, $C_{10}H_{14}N_2Na_2O_8$) are needed to completely deactivate 0.02 mol of Fe^{3+} ions by chelation?

(A) 3.36 (B) 1.12 (C) 6.72 (D) 13.44

24. Which metal ion acts as a catalyst in the redox reactions of oils and fats?

(A) K^+ (B) Na^+ (C) Mg^{2+} (D) Cu^{2+}

25. At what temperature is the oxidation of ethanol generally carried out in the presence of acetobacter?

(A) 24°C (B) 75°C (C) 35°C (D) 15°C

26. In the reaction $2C_6H_{12}O_6 \rightarrow xC_2H_5OH + yCO_2$ in the presence of the zymase enzyme, what is the value of $(x + y)$?

(A) 8 (B) 4 (C) 2 (D) 6

27. What is filling hot food directly into cans after blanching called?

(A) Exhausting (B) Retorting

(C) Cold packing (D) Hot packing

28. About vinegar—
i. it contains 90% to 94% water
ii. it is a strong acid
iii. its average pH is about 2.5
Which one is correct?

(A) i and ii (B) i and iii

(C) ii and iii (D) i, ii and iii

29. For which food is canning done by the boiling water bath method?

(A) Fish and vegetables

(B) Highly acidic food, e.g. tomato

(C) Low-acid food, e.g. meat

(D) Dairy food, e.g. milk

30. Which is the correct sequence of the steps of the second and third stages of food canning?

(A) Filling into cans → Blanching → Exhausting and sealing → Adding canning liquid → Retorting

(B) Exhausting and sealing → Blanching → Filling into cans → Adding canning liquid → Retorting

(C) Blanching → Filling into cans → Adding canning liquid → Exhausting and sealing → Retorting

(D) Blanching → Adding canning liquid → Retorting → Filling into cans → Exhausting and sealing

31. What is the cause of Brownian motion of colloid particles?

(A) Uneven collisions with molecules of the dispersion medium

(B) Gravitational force on the particles

(C) Mutual attraction between the particles

(D) Scattering of light

32. In fog, the dispersed phase and the dispersion medium are respectively—

(A) gas and liquid (B) solid and gas

(C) liquid and liquid (D) liquid and gas

33. What is the mass ratio of NH_3 and CO_2 used in stoichiometric proportion in urea production?

(A) 17 : 22 (B) 34 : 22

(C) 1 : 2 (D) 17 : 44

34. The particles of a mixture have a diameter of 750 nm . Which one is correct about the mixture?

(A) It is a true solution; homogeneous

(B) It is a suspension; a sediment settles on standing

(C) It is a colloid; no sediment settles on standing

(D) It is a colloid; it shows Brownian motion

35. What happens to the casein particles when lactic acid is produced in milk during curd formation?

(A) Their positive charge is neutralised by OH^-

(B) Their negative charge is neutralised by H^+ and they coagulate

(C) They break up to form a true solution

(D) They gain even more negative charge

36. Which is the common component of both synthesis gas and producer gas?

(A) H_2 (B) N_2 (C) CO_2 (D) CO

37. The calorific value of a bituminous coal is $12000\ BTUlb^{-1}$. If 400 lb of water absorbs all the heat obtained by burning 1.5 lb of coal, by how many °C will the temperature of the water rise? [1 BTU raises the temperature of 1 lb of water by 1°F]

(A) 81 (B) 13.9 (C) 25 (D) 45

38. $NaOH$ is not used in making glass cleaner, because —

(A) it corrodes the SiO_2 of glass

(B) it forms a layer of oil on glass

(C) it increases the hardness of water

(D) it evaporates quickly

39. If 1000 kg of Portland cement contains 61.5% CaO, how many kg of pure limestone is required to supply this amount of CaO?

(A) 1098.2 (B) 615.0

(C) 1640.0 (D) 344.4

40. In the reaction of glass preparation from salt cake (Na_2SO_4), how many moles of SO_2 are produced when 1 mol of carbon is used?

(A) 1 (B) 2 (C) 3 (D) 4

41. Which metal oxide is added to make blue-coloured glass?

(A) Cu_2O (B) Cr_2O_3 (C) CoO (D) MnO_2

42. Which is the formula of potash feldspar?

(A) $Al_2O_3 \cdot 2SiO_2 \cdot 2H_2O$

(B) $K_2O \cdot Al_2O_3 \cdot 6SiO_2$

(C) $Na_2O \cdot Al_2O_3 \cdot 6SiO_2$

(D) $K_2O \cdot CaO \cdot 6SiO_2$

43. In chrome tanning, if all the Cr^{3+} obtained from 98 g of $Cr_2(SO_4)_3$ is converted into Cr_2O_3 via the hydrated ion, how many grams of Cr_2O_3 and how many moles of H^+ will be produced? [Cr = 52]

(A) 76 g; 3.0 mol (B) 19 g; 1.5 mol

(C) 38 g; 0.75 mol (D) 38 g; 1.5 mol

44. Which is the main protein of raw hide with which the tanning agent combines?

(A) Albumin (B) Keratin

(C) Collagen (D) Casein

45. What does limestone first produce on reacting with SO_2 under heating in an FGD plant?

(A) $CaSO_4 \cdot 2H_2O$ (B) $Ca(HSO_3)_2$

(C) $CaSO_3 + CO_2$ (D) $CaS + CO_2$

46. Which one is not a pollutant of the cement industry?

(A) NO_x (B) Fine dust particles

(C) SO_2 (D) Liquid NH_3

47. Which of the following values falls within the nano range (1 to 100 nm)?

(A) 2×10^{-10} m (B) 5×10^{-6} m

(C) 5×10^{-8} m (D) 0.5 Å

48. Which one is a low-grade coal?

(A) Peat (B) Lignite

(C) Bituminous (D) Anthracite

49. Which is the main raw material of ceramics?

(A) $NaCl$ (B) SiO_2 (C) $CaSO_4$ (D) $NaOH$

50. What is the percentage of N_2 in urea?

(A) 35% (B) 21.2%

(C) 82.4% (D) 46.67%