Multiple Choice Questions

[MHT-CET 2021]

1. Which of the following is used as green solvent in chemical synthesis ?
   a) $CHCl_3$ b) Supercritical CO_2 c) CH_2Cl_2 d) CCl_4
2. The technique used to determine particle size is
   a) UV – Visible spectroscopy b) Transmission electron microscopy
   c) FTIR d) Scanning electron microscopy
3. Which of the following is used to prepare bottles for soft drinks ?
   a) PETE b) LDPE c) HDPE d) Polystyrene
4. Which polymer is used in manufacturing of microwavable food tray ?
   a) Polystyrene b) Polyethyleneterephthalate
   c) LDPE d) PVC
5. Which among the following polymers is used to obtain drinking straws ?
   a) HDPE b) LDPE c) Polypropylene d) Polystyrene
6. Disposable cups and plates are made from
   a) Polyvinyl chloride b) Polystyrene
   c) Polyethylene terephthalate d) High density polyethylene
7. What is value of percent atom economy if formula weight of product is 46 u and sum of formula weight of all reactants is 92 u ?
   a) 35 % b) 50 % c) 40 % d) 45 %
8. Which from following instruments is used to determine the crystal structure ?
   a) Scanning electron microscope b) FTIR spectrophotometer
   c) X–ray diffractometer d) Transmission electron microscope
9. Sunscreen lotions contain nanoparticles of
   a) Gold b) Pt c) TiO_2 d) Pd
10. Which among the following is NOT an example of one-dimensional nanostructure ?
    a) Nano shells b) Nanowires c) Nanotubes d) Fibres
11. Which from following formulae is a correct formula to determine percent atom economy?
    a) % Atom economy = Formula weight of product × 100
    b) % Atom economy = Sum of formula weights of all reactants × 100
    c) $\%\ \text{Atom economy} = \dfrac{\text{Formula weight of desired product}}{\text{Sum of formula weights of all reactants}} \times 100$
    d) $\%\ \text{Atom economy} = \dfrac{\text{Sum of formula weights of all reactants}}{\text{Formula weight of desired product}} \times 100$
12. Identify the polymer used in making floor tiles.
    a) PETE b) PVC c) HDPE d) LDPE

13. Identify product C in following conversion.

m – Hydroxy Benzaldehyde $\xrightarrow[\text{[Protection of -OH group]}]{C_6H_5CH_2Cl}$ A $\xrightarrow{[O]}$ B $\xrightarrow[\text{[deprotection of -OH group]}]{}$ C

a) Benzoic acid
b) m–Hydroxybenzoic acid
c) Phenol
d) Phenyl benzoate

14. Which of following is used for synthesis of adipic acid enzymatically by Drath and Frost ?

a) Benzene b) Glucose c) Fructose d) Galactose

15. Which of the following polymers is used to obtain shopping bags ?

a) HDPE b) LDPE c) Polypropylene d) PVC

16. What is percentage atom economy during conversion of reactant to product if formula weight of reactants is 246 u and of product is 123 u ?

a) 40.00 % b) 50.00 % c) 47.00 % d) 21.5 %

[MHT-CET 2022]

17. Which among the following statements is NOT true according to principles of green chemistry ?

a) Benzene being volatile compound pollutes air.
b) Carrying out reactions at high temperature and high pressure minimizes use of energy.
c) Use renewable chemicals rather than crude oil.
d) Use of catalyst minimizes waste.

18. Which among the following statements is against the principles of green chemistry?

a) Use of biodegradable polymers help to clean the environment.
b) Unnecessary derivatization should be minimized.
c) Protecting and deprotecting functional groups in organic reactions reduces the number of steps.
d) Use of renewable resources ensures the sharing of resources by future generations.

19. Identify the use of polyethylene terephthalate.

a) To manufacture soft drink bottles b) To obtain disposable cups and plates
c) To prepare bottles to store shampoo d) To obtain bags for bread and shopping

20. Which among following statements is NOT a principle of green chemistry ?

a) Effluents of one industry can be used as coolant for thermal power stations.
b) To develop technology for zero waste.
c) To give priority for prevention of waste.
d) It aims to dump waste product formed in one system instead to use as raw material for other system.

21. Find the formula weight of reactants if the formula weight of product is 54 u and the percent atom economy is 75.

a) 30 u b) 80 u c) 24 u d) 72 u

22. What is percent atom economy if formula weight of reactants and formula weight of products respectively are 45 u and 35 u ?

a) 71.0 % b) 80.5 % c) 90.0 % d) 77.8 %

23. What is the value of percent atom economy if total molar mass of reactants is 36 u and the mass of product is 27 u ?
a) 75 % b) 25 % c) 45 % d) 50 %

24. Which among the following is an example of 2 dimensional nanostructure ?
a) Microcapsules b) Nanorings c) Thin films d) Nanowires

25. Which among following is a zero – dimensional nanostructure ?
a) Thin films b) Nanoparticles c) Nanowires d) Nano rods

26. Identify the use of HDPE.
a) Manufacturing disposable cups and plates.
b) To obtain bags used for shopping.
c) To prepare drinking straw.
d) Manufacturing the bottles to store shampoo.

27. Identify the use of polystyrene for household purposes.
a) To manufacture disposable cups and plates.
b) To prepare shopping bags.
c) To prepare microwavable food trays.
d) To prepare bottles for storage of mouth wash.

28. Which from following statements is not in support of good atom economy ?
a) Very high number of atoms of reactants incorporated in product.
b) High percent of atom economy.
c) Lesser problems of waste disposal.
d) Formation of greater quantity of unwanted byproducts.

29. What is the formula weight of product if percent atom economy is 30 and the formula weight of reactants is 60 u ?
a) 18 u b) 24 u c) 25 u d) 20 u

30. Identify the formula weight of product if percent atom economy is 30% and formula weight of reactants is 90 u.
a) 19 u b) 50 u d) 35 u d) 27 u

31. What is the formula weight of reactants if percent atom economy is 25% and the formula weight of product is 75 u ?
a) 175 u b) 150 u c) 300 u d) 200 u

32. Which among the following statements is NOT true about green chemistry ?
a) It is an approach to minimize human efficiency.
b) It is an approach to minimize hazardous effects on environment.
c) It is study to minimize problems of energy crisis.
d) It is an approach to minimize pollution.

33. What is the formula weight of product if the percent atom economy is 45 % and the formula weight of reactant is 54 u ?
a) 26.4 u b) 15.6 u c) 18.5 u d) 24.3 u

34. Which among following solvents is considered as green solvent ?
a) $CHCl_3$ b) CH_2Cl_2
c) Super critical CO_2 d) CCl_4

35. What is the value of percent atom economy if 180 u is the molar mass of desired product and sum of molar masses of all reactants is 240 u ?
a) 80 % b) 84 % c) 70 % d) 75 %

36. Which among following techniques is used to find particle size ?
a) Scanning electron microscopy b) Transmission electron microscopy
c) UV – visible spectroscopy d) X – ray Diffraction

37. Which among the following statements according to principles of green chemistry is correct ?
a) Use of crude oil is better than renewable sources.
b) When most of the atoms of reactants are incorporated in desired product it is a good atom economy.
c) Waste product of one system may not be used as raw material for other system.
d) Increase in total amount of solvents and auxiliary substances used is favoured.

38. Which from following techniques is used to collect information about crystal structure?
a) X–ray diffraction b) Transmission electron microscopy
c) Scanning electron microscopy d) UV – visible spectroscopy

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39. Identify the last step in wet chemical synthesis of nanomaterial.
a) Thermal decomposition b) Dehydration
c) Aging of the gel d) Drying of the gel

40. Which from following techniques is used to determine structure of surface of material?
a) X ray diffraction b) Scanning electron microscopy
c) Transmission electron microscopy d) UV-visible spectroscopy

41. What is the formula weight of reactants if the formula weight of product is 35 u and the percent atom economy is 40%
a) 11.4 u b) 33.5 u c) 87.5 u d) 67.0

42. Which from following is an example of one dimensional nanostructure?
a) Nanorods b) Microcapsules c) Nanoshells d) Nanofilms

43. Which from following nanoparticle catalysts is used in photocatalysis?
a) TiO_2 b) Pd c) Pt d) Au

44. Which from following is an example of two dimensional nanostructures?
a) Nanoparticles b) Thin films c) Quantum dots d) Nanowires

45. What type of information is collected using scanning electron microscopy?
a) Structure of material surface b) crystal structure
c) Binding nature d) Particle size

[MHT-CET 2024]

46. Which from following techniques is used for preliminary confirmation of nanoparticles?
a) UV- visible spectroscopy b) X ray diffraction
c) Scanning electron microscopy d) Transmission electron microscopy

47. Which from following nanomaterials has two dimensions less than 100 nm?
a) Nano wires b) Microcapsules c) Quantum dots d) Nanorings

48. Which from following statements is NOT true according to principles of green chemistry?
a) It is good to use the technique of protection and deprotection of functional group in organic synthesis.
b) Use of chemicals derived from plant resource is better than crude oil.
c) Use of biodegradable pesticides is advantageous.
d) Use of critical CO_2 as solvent is better than organic solvents.

49. What type of information is collected using FTIR fourier transform infrared spectroscopy?
a) Morphology of nanomaterial b) Absorption of functional group
c) Geometry of particles d) Particle size

50. Which from following compounds is used to prepare adipic acid using enzymes in green technology developed by Drath and Frost?
a) Ribose b) Glucose c) Ribulose d) Benzene

51. Which of the following is used as green solvent? **(MHT - CET - 2025)**
a) H_2O b) CH_2Cl_2 c) $CHCl_3$ d) CCl_4

52. If salicylic acid (138 u) reacts with acetic anhydride (102 u) to from aspirin (180 u) calculate % atom economy. **(MHT-CET - 2025)**
a) 25 % b) 50 % c) 65 % d) 75 %

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