

1.The reaction cross section $\sigma_c =$ _____

- (a) $2\pi R^2$ (b) $2\pi R$ (c) $2\pi R$ (d) $2\pi^2 R^2$

2.Which of the following is used in electron microscope?

- a) electron beams (b) magnetic fields (c) light waves (d) electron beams and magnetic fields

3.Electron Microscope can give a magnification up to _____

- a) 400,000X (b) 100,000X (c) 15000X (d) 100X

4.Which of the following are true for electron microscopy?

- a) specimen should be thin and dry (b) image is obtained on a phosphorescent screen
c) electron beam must pass through evacuated chamber (d) specimen should be thin and dry, image is obtained on a phosphorescent screen and electron beam must pass through evacuated chamber

5.Degree of scattering in transmission electron microscope is a function of _____

- a) wavelength of electron beam used (b) number of atoms that lie in the electron path
c) number and mass of atoms that lie in the electron path (d) mass of atoms that lie in the electron path

6.Which among the following helps us in getting a three-dimensional picture of the specimen?

- a) Transmission Electron Microscope (b) Scanning Electron Microscope
c) Compound Microscope (d) Simple Microscope

7.The secondary electrons radiated back in scanning microscope is collected by?

- a) specimen (b) anode (c) vacuum chamber (d) cathode

8.Where do we obtain the magnified image of the specimen in SEM?

- a) cathode ray tube (b) phosphorescent screen (c) anode (d) scanning generator

9.Which of the following techniques are used in Transmission Electron Microscopy (TEM) for examining cellular structure?

- a) Negative-Staining (b) Shadow Casting (c) Ultrathin Sectioning
d) Negative-Staining, Shadow Casting, Ultrathin Sectioning, Freeze-Etching

10.Scanning Tunneling Microscope was patented by

- a) Sir Walter Wingfield (b) Sir Heinrich Rohrer (c) Sir Walter Brattain (d) Sir T.J Blachut

11.The resolving power of TEM is derived from _____

- a) electrons (b) specimens (c) power (d) ocular system

12.During TEM, a vacuum is created inside the _____

- a) room of operation (b) specimen (c) column (d) ocular system

13.Image formation in electron microscope is based on

- a) column length (b) electron number (c) differential scattering (d) specimen size

14.Select the wavelength range corresponding to UV-visible region.

- a) 400-800 nm (b) 200-800 nm (c) 25 μm -2.5 μm (d) 2.5 μm – 1mm

15.Beer Lambert's law gives the relation between which of the following?

- a) Reflected radiation and concentration (b) Scattered radiation and concentration
c. Energy absorption and concentration (d) Energy absorption and reflected radiation

16.In which of the following ways, absorption is related to transmittance?

- a) Absorption is the logarithm of transmittance (b) Absorption is the reciprocal of transmittance
c. Absorption is the negative logarithm of transmittance (d) Absorption is a multiple of transmittance

17.Beer's law states that the intensity of light decreases with respect to

- a) Concentration (b) Distance (c) Composition (d) Volume

18.The representation of Beer Lambert's law is given as $A = abc$. If 'b' represents distance, 'c' represents concentration and 'A' represents absorption, what does 'a' represent?

- a) Intensity (b) Transmittance (c) Absorptivity (d) Admittance

19.Transmittance is given as $T = P/P_o$. If P_o is the power incident on the sample, what does P represent?

- a) Radiant power transmitted by the sample (b) Radiant power absorbed by the sample
c. Sum of powers absorbed and scattered (d) Sum of powers transmitted and reflected

20.What is the unit of absorbance which can be derived from Beer Lambert's law?

- a) $\text{L mol}^{-1} \text{cm}^{-1}$ (b) $\text{L gm}^{-1} \text{cm}^{-1}$ (c) Cm (d) No unit

21.Which of the following spectroscopy techniques is associated with molecular emission?

- a) UV-Visible spectroscopy (b) IR spectroscopy (c) Fluorescence spectroscopy (d) X-ray diffraction

22.Which of the following statements regarding IR spectroscopy is correct?

- a) IR radiation is higher in energy than UV radiation (b) IR spectra records the scattering of the radiation

c. IR spectra gives information about the λ_{max} of the molecule

d. IR radiation is higher in wavelength than UV radiation

23.The possible transitions for water molecule in UV-visible region are

- a) $\sigma \rightarrow \sigma^*$ (b) $n \rightarrow \pi^*$, $\pi \rightarrow \pi^*$ (c) $\sigma \rightarrow \sigma^*$, $n \rightarrow \pi^*$ (d) $n \rightarrow \sigma^*$

24.The increment for α alkyl substitution on enones is

- a) 18 (b) 12 (c) 10 (d) 5

25. Which of the following is not true about Absorption spectroscopy?

- a) It involves transmission b. Scattering is kept minimum c. Reflection is kept maximum
d. Intensity of radiation leaving the substance is an indication of concentration

26. _____ is Yukawa potential form for deuteron

- (a) $-\frac{V_0 e^{-r/r_0}}{r/r_0}$ (b) $V_0 e^{-r/r_0}$ (c) $-V_0 e^{-r/r_0}$ (d) None of these

27. The following form of Gaussian Potential $V(r) =$ _____

- (a) $-\frac{V_0 e^{-r/r_0}}{r/r_0}$ (b) $V_0 e^{-r/r_0}$ (c) $-V_0 e^{-r/r_0}$ (d) None of these

28. The Majorana potential is concerned with exchange of

- (a) spin (b) space (c) spin-space (d) none of these

29. The central potential $V(r)$ helps to explain _____

- (a) two nucleon interaction (b) single nucleon interaction (c) Scattering (d) none of these

30. The two nuclear interaction have a lowest energy value is _____

- (a) 13 MeV (b) 10 MeV (c) 49 MeV (d) none of these

31. In a n-p system force exists dependent on a _____

- (a) Orbit (b) shell (c) spin (d) none of these

32. Value of Magnetic moment for deuteron is _____ nm

- (a) 0.85735 ± 0.00003 (b) 0.7535 ± 0.00003 (c) 0.7385 ± 0.00003 (d) 0.35757 ± 0.00003 nm

33. Binding energy of deuteron is

- (a) 2.2 MeV (b) 2.2 KeV (c) 0.2 MeV (d) 7.8 KeV

34. 1 nuclear magneton is

- (a) $e\hbar/2m_p C$ (b) $e\hbar/m_p^2 C$ (c) $\hbar/2m_p C$ (d) $e/2m_p C$

35. The ground state of wave functions is depend upon _____

- (a) Potential (b) depth (c) range and depth (d) none of these

36. The angular distribution of the scattered neutron is _____ in the CM system

- (a) Isotropic (b) anisotropic (c) low energy (d) none of these

37. The small energy neutrons have their de-Broglie wave length becomes _____

- (a) Smaller (b) unchanged (c) larger (d) none of these

38. The DCS $\frac{d\sigma}{d\Omega} =$ _____

- (a) $|f(\theta)|^2$ (b) $|f(\theta)|$ (c) $f(\theta)^2$ (d) $f(\theta)$

39. The process $Pb_{82}^{208} + n \rightarrow Pb_{82}^{208} + n$ shows

- (a) Elastic scattering (b) inelastic scattering (c) no scattering (d) None of these

40. The high energetic particle used to _____, to produce nuclear reactions.

- (a) Alpha particle (b) Beta particle (c) neutrons (d) none of these

41. Which factor can be replaced by weighted sum over the magnetic quantum number _____

- (a) $l+1$ (b) $2l+1$ (c) m (d) none of these

42. The total cross section is the sum of scattering and _____ cross section.

- (a) Elastic (b) reaction (c) inelastic (d) None of these.

43. The amount of energy absorbed by the opaque sphere is the same as amount of the energy can _____

- (a) Diffracted (b) scattered (c) refracted (d) None of these

44. The geometrical cross section of nucleus for a fast neutron are _____ with large nucleus.

- (a) Scattering (b) processing (c) reactive (d) None of these

45. _____ interaction for close collision of fast neutron with a nucleus.

- (a) Coulomb (b) gauss (c) gamma (d) None of these

46. Which resonance reaction produce neutron capture _____.

- (a) β -ray (b) α -ray (c) γ -ray (d) None of these

47. The scattering cross formula known as a _____ single level formula.

- (a) Wigner (b) Breit Wigner (c) complex (d) None of these

48. The potential scattering depends only on the nuclear _____

- (a) Size (b) spin (c) resonance (d) None of these

49. When a direct interaction are assumed to occur only for values of _____

- (a) $R_0 > r_2$ (b) $R_0 < r_2$ (c) $r_{23} > R_0$ (d) None of these

50. Which function gives the angular disintegration product.

- (a) Bessel (b) Hankel (c) step (d) None of these