

**B.Sc. - M.Sc. in Nanoscience and Technology**

**(5 Years Integrated Course)**

**(Semester –VI) Examination Oct-2020**

**Subject: Practice Test**

**Time: 1Hour**

**Total Marks: 50**

**Instructions: Read the instructions carefully.**

- 1) Solve any 25 out 30 Multiple Choice Questions (MCQ).**
- 2) Write correct option in the given box (like A, B, C or D).**
- 3) All questions carry equal marks (i.e. 2 Marks for 1 MCQ).**

1. Which of the following statement about DNA replication is incorrect
  - A. Semiconservative.
  - B. Begins at an origin and proceeds bidirectionally.
  - C. Proceeds 3'-5' direction
  - D. Semidiscontinuous
  
2. Which of the following was not concluded by John Cairns' classical experiment
  - A. E. coli chromosome is 1.7 mm long
  - B. Isolated radioactive DNA showed extra loop which was the result of two daughter strands, each complementary to a parent strand.
  - C. Both ends of loop are not dynamic
  - D. At replication fork, parent DNA is unwound and quickly replicated
  
3. What is incorrect about DNA Pol I
  - A. Molecular wt of 103000.
  - B. Polymerization rate is 16-20 nt/s
  - C. Processivity of 3-200 nt
  - D. 3'→'5 polymerase activity
  
4. Which of the following statement/s is/are correct about the initiation of replication in prokaryotic organisms
  - i. Initiation starts at unique site called OriC,
  - ii. The Initiation starts site i. e. OriC is 245 bp and
  - iii. It has five copies of unique sequences for binding of DnaA protein

- iv. It has tandem array 13 bp, AT rich sequences
- A. Only 'i' is correct
  - B. 'i', 'iii' and 'iv' are correct
  - C. All 'i', 'ii', 'iii' and 'iv' are correct
  - D. Only 'ii' is correct
5. In order to damage DNA, the hydroxyl radical abstracts protons from-----
- A. Deoxyribose sugar
  - B. Nitrogen base
  - C. Phosphate group
  - D. Ribose sugar
6. Paludrin (Proguanil) is a \_\_\_\_\_ drug.
- A. Antifungal
  - B. Antimalarial
  - C. Antineoplastics
  - D. Antibacterial
7. The resistivity of pure SiO<sub>2</sub> is .....
- A. 10<sup>-7</sup> Ωm
  - B. 10<sup>17</sup> Ωm
  - C. 10<sup>7</sup> Ωm
  - D. 10<sup>-17</sup> Ωm
8. The LSPR wavelength for gold nanoparticle is .....
- A. 225 nm
  - B. 390 nm
  - C. 525 nm
  - D. 700 nm
9. In case of the metal nanoparticles, as the mean free path increases, the resistivity .....
- A. increases
  - B. decreases
  - C. remains constant
  - D. becomes zero

10. The value of  $dN/dE$  for the quantum wire is .....
- A.  $E^{-0.5}$
  - B.  $\delta(E)$
  - C. 1
  - D.  $E^{0.5}$
11. In MnO, which type of coupling is present?
- A. Direct coupling
  - B. Super-exchange coupling
  - C. RKKY coupling
  - D. No coupling
12. Single electron transistor (SET) works only when .....
- A.  $(e/2C) > kT$
  - B.  $(e/2C) = kT$
  - C.  $(e/2C) < kT$
  - D.  $(e/2C) \sim kT$
13. In Drude model, the electrical conductivity of the metal depends on .....
- A. Mean free path length
  - B. Charge of electron
  - C. Size of metal sheet
  - D. Number of electrons
14. Which of the following property is only present at the nanometre scale?
- A. Paramagnetic
  - B. Superparamagnetic
  - C. Superconductivity
  - D. Supercapacitors
15. .... is an example of monosachharide
- A. Glucose,
  - B. Sucrose
  - C. Lactose
  - D. Starch
16. ----- is an example of Sulfur containing amino acid
- A. Aspartic acid
  - B. Lactic Acid
  - C. Glutamine
  - D. Cysteine

17. ----- gives few molecules upon hydrolysis.
- A. Oligosaccharides
  - B. Polysaccharide
  - C. Polysaccharides
  - D. None of these
18. ----- is an example of diasacharide
- A. Maltose
  - B. Glucose
  - C. Fructose
  - D. Starch
19. Ploysaccharides upon hydrolysis give ----- molecules upon hydrolysis.
- A. One
  - B. Two
  - C. Few
  - D. Many
20. Covid-19 is ----- disease.
- A. Bacterial
  - B. Fungal
  - C. Viral
  - D. Protozoan
21. In a system of  $N$  particles subjected to ' $K$ ' independent constraints, the number of degrees of freedom of are.....
- A)  $3N - K$
  - B)  $3N + K$
  - C)  $3N$
  - D)  $3N - 2K$
22. In the Langrangian ' $L = T + V$ ',  $T$  is
- A) Tension
  - B) Torque
  - C) Potential Energy
  - D) Kinetic Energy

23. Atwood's machine is an example of conservative system with.....constraints.

- A) Holonomic, Rheonomous
- B) Holonomic, Scleronomous
- C) Holonomic, Non-holonomic
- D) Non-holonomic, Scleronomous

24. This equations shows ,  $Q_j = \sum_i F_i \cdot \frac{\partial r_i}{\partial q_j}$  ,

- A) components of the generalized force
- B) components of the generalized coordinates
- C) components of the generalized velocity
- D) components of the virtual displacement

25. A linear momentum operator is given by.....

- A.  $\hat{P}_x = -i\hbar \frac{\delta}{\delta x}$
- B.  $\hat{P}_x = -i\hbar \frac{\delta}{\delta t}$
- C.  $\hat{P}_x = \frac{\hbar^2}{2m} \frac{\delta^2}{\delta x^2} + V$
- D.  $\hat{P}_x = i\hbar \frac{\delta}{\delta x}$

26. In quantum mechanics, the raising operator is given by.....

- A.  $L_+ = L_x + iL_y$
- B.  $L_- = L_x - iL_y$
- C.  $L_+ = L_z + iL_y$
- D.  $L_- = L_z - iL_y$

27. Endosulphan (Thiodan) is \_\_\_\_\_.

- A. Fungicide and acaricide
- B. Insecticide and bactericide
- C. Insecticide and acaricide
- D. Only Insecticide

28. The "magic numbers" for atoms are

- A. numbers of electrons that confer atomic stability.
- B. numbers of protons and/or neutrons that confer nuclear stability.
- C. n/p ratios that confer nuclear stability.
- D. atomic masses that confer nuclear stability.

29. Emission of which one of the following leaves both atomic number and mass number unchanged? Positron

- A. neutron
- B. alpha particle
- C. gamma radiation
- D. beta particle

30. Diabetes mellitus (sweet urine) is generally known as \_\_\_\_\_.

- A. Diabetics
  - B. Common cold
  - C. Beriberi
  - D. Scurvy
-