University of Mumbai

Sample Question Paper

Examination – 2020 Semester -I

0212_R16_FE_I_FEC102_QP1

1) Which of the following experiments could never show quantum mechanical results ?

A. Taking thousands of measurements and forming probabilistic models of those measurements.

B. Taking thousands of identically prepared particles and measuring them one at a time

C. Sending one electron at a time through a double-slit apparatus so that the electron can interfere with itself, and measuring the screen.

D. Sending one electron at a time through a double-slit apparatus and measuring which slit it goes through, so that the electron won't interfere with itself.

2) If I know the position of a subatomic particle precisely, then

A. I know nothing about the particle's momentum.

B. I known a very limited amount about the particle's momentum.

C. The particle must be at rest.

D. The particle can't be at rest.

3) Which of the following is false about quantum mechanics?

A .P article has a chance to be found in a region which should classically be impossible for it to be found in.

B. An electron can seem to interfere with itself when passing through double slits.

C. Energy is quantized.

D. Momentum is quantized E.

4) Electromagnetic waves with minimum wavelength is:

A. Ultraviolet rays

B. X-rays

C .Infrared rays

D. gamma-rays

5. A semiconductor has ..... temperature coefficient of resistance.

A. Positive

B Negative

C. Zero

D. infinite

6. When a pure semiconductor is heated, its resistance .....

A. Goes up

B.Goes down

C. Remains the same

1.D. Can't say

7. Which of the following expression represent the correct formulae for calculating the exact position of the Fermi level for p-type material?

A. $E_F = E_V + kT\ln(N_D / N_A)$

B. $E_F = -E_V + kT\ln(N_D / N_A)$

C. $E_F = E_V - kT\ln(N_D / N_A)$

D. $E_F = -E_V - kT\ln(N_D / N_A)$

8. By which properties, the orientation of molecules in a layer of liquid crystals can be changed?

A. Magnetic field

B. Electric field

C. Electromagnetic field

D. Gallois field

9. The direction of electric field in an LCD is determined by _____

A. the molecule's chemical structure

B. Crystalline surface structure

C. Molecular Orbital Theory

D. Quantum Cellular Automata

10. **In the Hall Effect, the electric field is in x direction and the velocity is in y direction. What is the direction of the magnetic field?**

A. X

B. Y

C. Z

D. XY plane

11. **Calculate the hall voltage when the Electric Field is 5V/m and height of the semiconductor is 2cm.**

A. 10V

B. 1V

C. 0.1V

D. 0.01V

12. For pane (1 0 0) of BCC having a lattice parameter ‘a’, planar atomic density is given by?

A. 1/a3

B. 2/a2

C. 3/a4

D. 1/a2

13. Which of the following equation describes Bragg’s law of diffraction? (Assume that all symbols have their usual meaning.)

A. $2d \sin\theta = \lambda$

B. $2d = n\lambda$

C. $2d = n\lambda \sin\theta$

D. $2d \sin\theta = n\lambda$

14 . **For pane (1 1 1) of BCC having a lattice parameter ‘a’, planar atomic density is given by?**

A.1.07/a2

B. 0.58/a2

C. 2.07/a2

D. 0.78/a2

15 Changing from a 2 MHz to a 5 MHz ultrasound transducer would generally produce:

A. Faster imaging.

B. Deeper penetration.

C. Shorter wavelengths.

D. Shorter ultrasound pulses.

16. W**hich of the following effects can be used to produce ultrasonic waves?**

A. Magnetostriction effect

B. Doppler Effect

C. Magnetic effect

D. Sound effect