Seat No:_____ Enrollment No:_____

PARUL UNIVERSITY

FACULTY OF AGRICULTURE

B.Tech. Agriculture Winter 2019-20 Examination

Semester: 1 **Date: 02/12/2019**
Subject Code: 20103112 **Time: 10:30am to 12:30pm**
Subject Name: Engineering Physics **Total Marks: 50**

Instructions
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Do as Directed.

A. Fill in the blanks. (Each of 0.5 mark) **(05)**

1. Communication system that uses light as a carrier of information from a source to a destination through a guided fibre cable (glass or plastic) are called _____ systems.
2. A step index has a central core with a _____ refractive index.
3. When an external magnetic field is applied to a diamagnetic substance such as bismuth or silver a weak magnetic dipole moment is induced in the direction _____ the applied field.
4. The splitting of a spectrum line into several components by the application of a magnetic field is termed as _____.
5. _____ spectrum is a distinct chemical fingerprint for a particular molecule or material.
6. Adiabatic demagnetization occurs in _____ materials.
7. _____- can be pure elements, such as silicon or germanium, or compounds such as gallium arsenide or cadmium selenide.
8. He Ne is a _____ laser.
9. Population inversion can be achieved by process called _____.
10. The limited time for which a particle or an atom remains in the excited state is known as _____.

B. Multiple choice type questions. (Each of 0.5 mark) **(10)**

1. _____ fibres are capable of wide band widths and are ideally suited for long haul communication.
   a) Single mode c) Multi mode
   b) Mono mode d) Both (a) & (b)

2 Einstein explained the action of laser beam based on _____.
   a) Classical theory c) Quantum theory
   b) Electromagnetic theory d) Newton's laws

3 A _____ substance is one whose atoms have no permanent magnetic dipole moment.
   a) diamagnetic c) Paramagnetic
   b) Ferromagnetic d) None of the given

4 _____ is a ferromagnetic element.
   a) Iron c) Silver
   b) Bismuth d) Copper

5 _____ compounds are attracted to magnetic field.
   a) diamagnetic c) Paramagnetic
   b) Ferromagnetic d) Both (b) & (c)

6 The splitting of a spectral line into several components in the presence of an electric field is termed as _____.
   a) Zeeman effect c) Stark effect
   b) Superconductivity d) None of the above

7 _____ is based upon the interaction of light with the chemical bonds within a material.
   a) Raman spectroscopy c) Stark effect
   b) Zeeman effect d) Superconductivity

8 _____ is a process of cooling. It occurs in magneto-caloric materials.
   a) Adiabatic demagnetization c) Superconductivity
   b) Power loss d) None of the given

9 In _____ the electrons in the valence band are separated by a large gap from the conduction band.

a) Insulators
b) Conductors
c) Semiconductors
d) Metal

10 When a material makes the transition from the normal to superconducting state, it actively excludes magnetic fields from its interior; this is called the _____.
a) Meissner effect
b) Stark effect
c) Zeeman effect
d) None of the above

11 A _____ is an element or metallic alloy which, when cooled below a certain threshold temperature, the material dramatically loses all electrical resistance.
a) superconductor
b) semi metal
c) Non metal
d) None of the given

12 _____ are the energy levels in an atomic system where the life time of atoms is very large.
a) Metastable state
b) Ground state
c)Excited state
d)None of the given

13 _____ is a pair of reflecting surfaces of which one is a perfect reflector and the other is a partial reflector.
a) Optical resonator
b) Pump
c) Resonator
d) None of the above.

14 _____ laser belongs to the class of solid state lasers.
a) Ruby
b) CO_2
c) He Ne
d) None of the above

15 In diamagnetic, susceptibility is _____.
a) Positive
b) Zero
c) Negative
d) None of the above

16 Permeability is very much greater than one in _____ materials.
a) Diamagnetic
b) Ferromagnetic
c) Paramagnetic
d) Magnetic material

17 _____ materials do not have permanent dipole moment.
a) Diamagnetic
b) Ferromagnetic
c) Paramagnetic
d) Magnetic material

18 The temperature at which a material's electrical resistivity drops to absolute zero is called the _____.
a) Critical temperature
b) Transition temperature
c) Absolute temperature
d) None of the above

19 Two superconductors separated by a thin strip of an insulator forms a _____.
a) Josephson junction
b) junction
c) p n junction
d) None of the above

20 Superconductors exhibit perfect _____.
a) diamagnetism
b) ferromagnetism
c) Para magnetism
d) None of the aboves

Q.2 Do as Directed.

A. Define the following. (Any five out of seven) **(05)**

1. Pumping in laser.
2. Superconductivity.
3. Optical fibre.
4. Meissner effect.
5. Population inversion in laser.
6. Index fibre in optical fibre.
7. Wave packet.

B. Answer the following. (Any five out of seven) **(05)**

1. Give full form of LASER.
2. Write time dependant Schrodinger equation.
3. Write time independent Schrodinger equation.
4. Draw the labelled diagram of optical fibre.
5. Graphically represent step index fibre.
6. Graphically represent graded index fibre.
7. State De Broglie's hypothesis.

Q.3 Write short notes. (Any five out of six) **(10)**

1. List out four information provided by Raman spectroscopy.
2. Differentiate type 1 and type 2 superconductors in two points.

3. Differentiate intrinsic and extrinsic semiconductors in two points.
4. Differentiate spontaneous and stimulated emission in three points.
5. State two principles on which light travels in optical fibre.
6. Briefly explain wave particle duality concept.

Q.4 Long Questions (Attempt any three out of four) **(15)**

1. Write in detail about Weiss molecular field theory on ferromagnetism.
2. Give qualitative explanation on Zeeman effect.
3. Write a note on He – Ne laser.
4. Write a detail note on Raman Spectroscopy.