# KADI SARVA VISHWAVIDYALAYA
## B.E SEMESTER I/II EXAMINATION (December-2023)

Instruction:
(1) Answer each section in separate Answersheet.
(2) Use of Scientific calculator is permitted.
(3) All questions are Compulsory.
(4) Indicate clearly, the options along with respective question number
(5) Use the last page of main supplementary for rough work.

## Section - A

**Q.1**

[A] Each carries equal marks                                                     [5]

a) Frequency of ultrasonics is
i.   0 Hz to 20 Hz                       ii.   20 Hz to 200 Hz
iii. Below 20 kHz                        iv.   Above 20 kHz

(b) The unit of Young's modulus in CGS system is _____.
i.   dyne/cm                             ii.  dyne/cm$^2$
iii. dyne.cm$^2$                         iv.  Dyne$^2$/cm

(c) Which of the following is a unique property of laser?
i.   Force                               ii.  Speed
iii. Coherence                           iv.  power

(d) LED operates in ____.
i.   non-bias region                     ii.  forward bias
iii. reverse bias                        iv.  both forward bias & revers bias.

(e) In an optical fibre light is travelling in the
i.   core                                ii.  cladding
iii. buffer                              iv.  kevlar.

[B] Explain the properties of Laser.                                            [5]
[C] Explain the Nd:YAG Laser with necessary figures and applications           [5]

**OR**

[C] The volume of a room is 1500 m$^3$. The wall area of the room is 260 m$^2$, the floor area is 140 m$^2$ and the ceiling area is 140 m$^2$. The average sound absorption coefficient for the wall is 0.03, for the ceiling is 0.8 and for the floor is 0.06. Find the reverberation time inside the hall.

**Q.2** [A] State the applications of ultrasonic waves. Explain SONAR technique to determine the  [5]
depth of sea.

[B] What is resultant sound level when 70 dB sound is added with 80 dB sound.            [5]

**OR**

**Q.2** [A] Explain how bending moment of beam required to produce a unit radius of curvature   [5]
[B] Describe the basic principle, construction and working of Solar Cell.                [5]

**Q.3** [A] Explain the different types of fibres based on material, modes and index profile.    [5]
[B] For a given SCS fibre, the core and cladding refractive indices are 1.55 and 1.47 [5]
respectively. Find the Critical reflection angle, Numerical Aperture, Acceptance angle, and Fractional index difference of said fibre.

**OR**

**Q.3** [A] What is LDR? Explain the construction and working of it.                             [5]
[B] What is cantilever? Derive an expression for the depression at the free end of a [5]
cantilever.

# Section – B

**Q.4** Each carries equal marks

**[A]** **(a) The SI unit of radioactivity activity is**
i. Becquerel     ii. Kilogram
iii. Kelvin     iv. Second

**(b) The number of crystal systems are**
i. 3     ii. 5
iii. 7     iv. 14

**(c) Digital multimeter is used _____**
i. for measuring a.c. and d.c. current, voltage and resistance
ii. to test the diode
iii. to test the transistor
iv. All of above

**(d) Superconductors have _____ resistivity.**
i. zero     ii. finite
iii. infinite     iv. constant

**(e) Nanomaterials are those which have structured components with at least one dimension**
i. less than 100 nm     ii. Between 100 nm to 200 nm
iii. Above 200 nm     iv. None of these     [5]

**[B]** Differentiate between Type-I and Type-II superconductors.     [5]
**[C]** Explain the Meissner effect in superconductors with diagram. Prove that [5] superconductor exhibits perfect diamagnetism i.e. $\chi = -1$

**OR**

**[C]** Define Hall effect. Derive the expression for Hall coefficient $R_H$ in semiconductors.

**Q.5 [A]** Derive the expression for the interplanar distance ($d_{hkl}$) for a cubic lattice crystal.     [5]
**[B]** Explain how to calculate the atomic radius & packing fraction for SC, FCC and BCC [5] structures.

**OR**

    [5]
**Q.5 [A]** Write a note on artificial radioactivity with suitable examples.     [5]
**[B]** Explain the applications of artificial radioactivity

**Q.6 [A]** What are shape memory alloys? Explain shape memory effect and pseudo-elasticity [5] with suitable diagram.
**[B]** Describe LPI method of NDT with suitable diagrams.     [5]

**OR**

    [5]
**Q.6 [A]** Compare TEM and SEM with suitable figure.
**[B]** Explain GM counter to detect radioactive radiations.     [5]

# KADI SARVA VISHWAVIDYALAYA
## B.E SEMESTER I/II EXAMINATION (JUNE-2023)

| Subject Code: CC107-N | Subject Name: ENGINEERING PHYSICS | |
|---|---|---|
| Date: 23/06/2023 | Time: 10:00 am to 1:00 pm | Total Marks: 70 |

**Instruction:**
(1) Answer each section in separate Answer sheet.
(2) Use of Scientific calculator is permitted.
(3) All questions are Compulsory.
(3) Indicate clearly, the options along with respective question number
(4) Use the last page of main supplementary for rough work.

## Section – I

**Q.1**   **Each carries equal marks**   [5]

[A]   a) How are sound waves with a frequency of 20Hz to 20,000Hz termed?
    i. Inaudible sounds                 ii. Infrasonic
    iii. Ultrasonics                    iv. Audible sound

(b) LDR is also known as
    i. LED                              ii. Laser
    iii. solar cell                     iv. Photoresistor

(c) X-Ray powder method is usually carried for _____ materials.
    i. polycrystalline                  ii. Non-metals
    iii. Single crystal                 iv. amorphous

(d) The ideal super conductors exhibit _____
    i. Meissner effect                  ii. Mesmeric effect
    iii. Mesomeric effect               iv. Monomeric effect

(e) Optical fibers are made up of_____.
    i. Thin glass                       ii. Plastic fibers
    iii. Can be thin glass or plastic fibers    iv. Metals

[B]   Explain the production of ultrasonic waves using magnetostriction method with figure.   [5]

[C]   Describe the principle, construction and working of Solar cell with diagram.   [5]

**OR**

[C]   Describe method to determine the coefficient of rigidity of a wire using torsional pendulum.   [5]

**Q.2**

[A]   Explain construction & working of $CO_2$ laser with necessary diagram.   [5]

[B]   Explain the construction of Optical fiber cable with diagram.   [5]

**OR**

**Q.2**

[A]   Derive the expression of miller indices for the interplanar distance $d_{hkl}$.   [5]

[B]   The distance between the Miller indices ( 1 1 0 ) is 2.86 A°. Calculate the lattice constant.   [5]

**Q.3**

[A]   Explain the characteristic of musical sound as loudness, pitch, and timbre.   [5]

[B]   The refractive index of core and cladding of optical fiber are 1.54 and 1.5 respectively. Calculate the numerical aperture of the optical fibre.   [5]

**OR**

**Q.3**

[A]   Write a short note on Multimeter.   [5]

[B]   Explain Meissner effect and prove that $\chi = -1$.   [5]

**Q.4**

[A] **Each carries equal marks**
(a) Which of the following is a unique property of laser?
  i. Coherence
  ii. Wavelength
  iii. Speed
  iv. Frequency

(b) Echo of sound is more prominent if surface is_____.
  i. soft
  ii. Rigid
  iii. Porous
  iv. smooth

(c) XRD stands for_____
  i. X-ray diffraction
  ii. X-rays dispersion
  iii. X-ray powder diffraction
  iv. X-ray powder dispersion

(d) When does a normal conductor become a superconductor?
  i. At normal temperature
  ii. At Curie temperature
  iii. At critical temperature
  iv. Never

(e) Unit of radioactivity is_____?
  i. pascal
  ii. kelvin
  iii. candela
  iv. Disintegrations/second

[5]
[5]

[B] State the properties of LASER and explain in detail.
[C] What are nanomaterials? Explain Sol-Gel method with diagram.

**OR**

[C] A hall has a volume of 1000 m³. It has a reverberation time of 2.08 sec. What is the average absorbing power of the hall if the total absorbing surface is 400 m².

**Q.5**
[5]
[5]

[A] Differentiate between Type-I and Type-II superconductors with figure.
[B] Define NDT. And compare NDT and DT.

**OR**

**Q.5**

[A] Explain construction & working of Nd:YAG laser with necessary diagram.
[B] Explain the working of fibre optic communication system with block diagram.
[5]
[5]

**Q.6**

[A] Describe Liquid Penetrant method of NDT with suitable diagram.
[B] Describe the principle, construction and working of LED with diagram.
[5]
[5]

**OR**

**Q.6**

[A] List any five Applications of Radioactivity.
[B] Explain the Laue method in X-RAY diffraction technique.
[5]
[5]

Enrol. No. / ID

# KADI SARVA VISHWAVIDYALAYA
## LDRP INSTITUTE OF TECHNOLOGY & RESEARCH, GANDHINAGAR
### B.E. MID-SEMESTER EXAMINATION REG. / ATKT, JUNE - 2022

| | |
|---|---|
| Date : 02 / 06 / 2022 | Branch : All |
| Subject Name & Code: Engineering Physics (CC107N) | Semester : 1/2 |
| Time : 12.00 pm to 1.30 pm | Max. Marks : 30 |

Instructions:  1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of scientific calculator is permitted.
4) Indicate clearly, the options you attempt along with its respective question number.
5) Use the last page of main supplementary for rough work.

10

**Marks**

Q.1 (A) (1) The number of crystal systems are :  1
   i. 5                    ii. 7
   iii. 14                 iv. 21

(2) Type-I superconductors are known as  1
   i. semiconductors          ii. Soft superconductors
   iii. Hard superconductors  iv. None of the above

(3) Light amplification is possible because of  1
   i. spontaneous emission   ii. absorption
   iii. Stimulated emission   iv. All the above

(4) An optical fibre is made up of  1
   i. metal                ii. Glass & Plastic
   iii. Semiconductor      iv. composite material

(5) The effective number of atoms per unit cell in SC is____?  1
   i. 1                    ii. 2
   iii. 3                  iv. 4

[5]

(B) Describe Nd-YAG LASER along with energy level diagram.  5

[5]

Q.2 (A) Explain construction and working of $CO_2$ LASER.  5
   (B) For a given Silicon fiber optics having core and cladding refractive indices of 1.52 and 1.51  5
   respectively. Calculate  (i) critical angle  (ii) acceptance angle  (iii) numerical aperture
   (iv) fractional index difference

**OR**

[5]

Q.2 (A) Describe the working of fiber optic communication system with block diagram.  5
   (B) State any five comparison of Type-I and Type-II superconductors.  5

[5]

Q.3 (A) Explain Hall Effect and derive the formula of the Hall coefficient $R_H$.  5
   (B) Write Full form of LASER. Give four applications of LASER.  5

**OR**

Q.3 (A) Explain the construction of optical fiber cable with suitable diagram.  5
   (B) Derive the expression for the interplanar distance ($d_{hkl}$) for a cubic lattice.  5