Seat Number

कांजी - 025

PHYSICS PAPER - I (NEW) : PHY- 241
Modern Physics
(24125)

P. Pages : 3

Time : Two Hours

Max. Marks : 40

Instructions to Candidates :
1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory & carry equal marks. Figures to the right indicate full marks.
5. Use of log table / electronic calculator is allowed.

1. Attempt **any eight** of the following.   8

i) Davisson & Germer Expt confirms the ....
   a) wave nature   b) particle nature
   c) wave particle nature   d) none of the above

ii) The standard value of solar constant is ....
   a) 1053 W/m^2 b) 1353 W/m^2
   c) 1653 W/m^2 d) 1953 W/m^2

iii) In metastable state, electrons have mean life time of ....
   a) 5 ns   b) 5 µs
   c) 5 ms   d) 5 s

iv) Cosmic rays in solar spectrum are ....
   a) visible   b) invisible
   c) both visible & invisible d) none of the above

v) High monochromaticity is the characteristics of ....
   a) LASER rays   b) Solar rays
   c) UV rays   d) Ordinary rays

vi) The energy of a quantum is ....
   a) Equal to hv   b) Greater than hv
   c) Less than hv   d) Equal to zero

vii) The earth revolves around the sun once in a year in ....
   a) Elliptical orbit
   b) Circular orbit
   c) Both elliptical & circular orbits
   d) none of the above

viii) Principal quantum number gives total number of ....
   a) Elliptical orbits
   b) Circular orbits
   c) Both elliptical & circular orbits
   d) none of the above

ix) In any energy level, total number of circular orbits are ....
   a) 1   b) 2
   c) 3   d) 4

x) To obtain large Voc, we should use of semiconducting material with .... energy gap.
   a) Large   b) Small
   c) Zero   d) none of the above

2.   Attempt **any four** of the following.

a) State Heisenberg's uncertainty principle.

b) What are the limitations of Bohr's model ?

c) What do you meant by LASER ?

d) Define fill factor & efficiency of solar cell.

e) Calculate de-Broglie wavelength of an electron moving with velocity 1/20th of the velocity of light.

f) State the characteristics of LASER.

3.   Attempt **any two** of the following.

a) Describe optical pumping in case of LASER.

b) Write a note on liquid flat plate collector.

   c) A 10 gm bullet shoots through a cylindrical tunnel of 5 cm diameter. What would be the uncertainty in the velocity of bullet.

4. a) Attempt **any two** of the following.   6

   i) What do you meant by terrestrial and extra terrestrial radiations.

   ii) Describe metastable state in LASER.

   iii) Explain I-V characteristics of solar cell in dark & illuminated conditions.

  b) Explain the term monochromaticity in LASER.   2

5. a) Describe Davisson & Germer Experiment in detail for the existence   6
of matter waves.

OR

Describe Bohr-Sommerfeld's model of H-atom in detail.

  b) State the results of Frank-Hertz experiment.   2

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