09-03-2022_EP-I_FE_Sem-I (R19)_TSEC

1. The question paper will have MCQs (for 12 marks) and subjective/descriptive questions (for 48 marks).

2. MCQ correct options and subjective questions answers to be written on papers. Scan all pages of answer papers of Q1 to Q4 and create single file in pdf format to upload in the link given.

*Required

1. Enter your Name *

2. Enter your Exam Seat Number *

Questions

1. The question paper will have MCQs (for 12 marks) and subjective/descriptive questions (for 48 marks).

2. MCQ correct options and subjective questions answers to be written on papers. Scan all pages of answer papers of Q1 to Q4 and create single file in pdf format to upload in the link given.

3. paste the question

Q1.	**Choose the correct option for the following questions. All the Questions are compulsory and carry equal marks**
1.	The wavelength associated with a particle of mass 'm' moving with a velocity 'v' is
Option A:	hmv
Option B:	h/mv
Option C:	mv/h
Option D:	1/mhv
2.	What are the intercepts of the plane whose miller indices are (0 1 1)?
Option A:	$x=a, y=a, z=a$
Option B:	$x=a, y=\infty, z=a$
Option C:	$x=a, y=a, z=\infty$
Option D:	$x=\infty, y=a, z=a$
3.	The drift velocity produced in a carrier per unit applied electric field is called
Option A:	Mobility
Option B:	Current density
Option C:	Hall effect
Option D:	Density

4. paste the question

4.	A path difference of one half of wavelength corresponds to a phase difference of
Option A:	2π
Option B:	π
Option C:	3π
Option D:	$3\pi/2$
5.	When an electron is accelerated through a potential difference of 100 V, then it is associated with a wave of wavelength equal to
Option A:	0.112 nm
Option B:	1.227 nm
Option C:	0.1227 nm
Option D:	12.27 nm
6.	What will be the critical magnetic field at 5K for a wire of lead if the critical temperature of lead is 8K and critical magnetic field is 5×10^4 A/m at 0K.
Option A:	3.046×10^4 A/m
Option B:	286.9A
Option C:	2.86×10^5 A/m
Option D:	3046×10^4 A

5. paste the question

Q2.	Answer any 4 questions out of 6 (4 marks each)
A	Find the uncertainty in the position of an electron. The speed of an electron is measured to be $4X\ 10^3$ m/s to an accuracy 0f 0.002%
B	Crystal act as three-dimensional grating for X-rays. Explain
C	What is the probability of an electron being thermally excited to the conduction band in Si at 27^0 C? The band gap energy is 1.12ev.
D	If reflected light of wavelength $\lambda = 5900$A.U is used to observe Newton's ring, the diameter of 10th dark ring is 0.5 cm. Find the radius of curvature of the lens .
E	Derive one dimensional time independent Schrodinger's equation.
F	Differentiate between Type I & Type II superconductors.

6. paste the question

Q3.	**Answer any 4 questions out of 6** **(4 marks each)**
A	The Bragg's angle corresponding to the first order reflection from (111) planes of a crystal is 30 degrees. wavelength of X-rays is 1.75A°.Determine interplanar spacing and lattice constant of the crystal.
B	State Heisenberg's Uncertainty Principle. Show that electrons do not exist in the nucleus.
C	Calculate the lowest three energy states of an electron confined in potential well of width 1A°
D	Obtain an expression for path difference between two reflected rays in thin transparent film of uniform thickness and write the conditions for maxima and minima.
E	Explain the principle and construction of LED.
F	Find the resistivity of intrinsic Ge at 300k? (Given the density of carriers as $2.5x10^{19}/m^3$, $\mu_e = 0.392\ m^2$/v-sec and $\mu_h = 0.19\ m^2$/v-sec)

7. paste the question

Q4.	Answer any 4 questions out of 6 (4 marks each)
A	Explain De-Broglie's hypothesis of matter waves and deduce the expression for λ.
B	With Newton's ring experiment, explain how to determine the refractive index of liquid.
C	What are different types of supercapacitors? Explain them.
D	Interference fringes are produced with monochromatic light falling normally on a wedge-shaped air film of cellphone whose refractive index is 1.40. The angle of wedge is 10 seconds of an arc and the distance between successive fringes is 0.5cm. Calculate wavelength of light used .
E	What is Fermi energy? Show that in intrinsic semiconductor Fermi level is at the Centre of forbidden energy gap.
F	What are Miller Indices? Draw the following- a) (1 $\bar{2}$ 3) b) (2 3 $\bar{1}$) c) (0 3 0)

8. Upload all your answers as a single pdf file *

Files submitted:

9. Have you uploaded the required correct files *

Mark only one oval.

Yes