Register Number:……………..

KUMARAGURU
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GENERAL INSTRUCTIONS TO THE CANDIDATES

1. Candidates are instructed to answer the questions as per Bloom's Taxonomy knowledge level (K_1 to K_6)
2. Candidates are strictly instructed not to write anything in the question paper other than their roll number.
3. Candidates should search their pockets, desks and benches and handover to the Hall Superintendent/ Invigilator if any paper, book or note which they may find therein as soon as they enter the examination hall.
4. Candidates are not permitted to bring electronic watches with memory, laptop computers, personal systems, walkie-talkie sets, paging devices, mobile phones, cameras, recording systems or any other gadget / device /object that would be of unfair assistance to him / her.
5. Corrective measures as per KCT examination policies will be imposed for malpractice in the hall like copying from any papers, books or notes and attempting to elicit the answer from neighbours.

B.TECH DEGREE EXAMINATIONS: JUNE 2016
(Regulation 2015)
Second Semester
ELECTRICAL AND ELECTRONICS ENGINEERING
U15PHT205: APPLIED PHYSICS

COURSE OUTCOMES

CO1: Apply core concepts in Materials Science to solve engineering problems
CO2: Describe the impact of acoustic engineering solutions in a constructional environmental and social context.
CO3: Determine the position of the acceptor or donor levels and the band gap of an extrinsic semiconductor
CO4: Classify & differentiate the structure and physical properties of conducting materials
CO5: Apply the concepts of nano materials and modern materials for explaining surface properties like adhesion etc. in engineering practice.

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1.   Match the following   CO1 [K_1]

List I	List II
A. Mass of an electron	1. 1.38×10^{-28} JK^{-1}
B. Boltzmann constant	2. 1.602×10^{-19} C
C. Charge of an electron	3. 6.63×10^{-34} Js
D. Planck's constant	4. 9.11×10^{-31} kg

	A	B	C	D
a)	4	1	2	3
b)	3	1	4	2
c)	2	4	1	3
d)	1	4	2	3

2. Electron trapped at negative ion vacancy is   CO1 [K₁]

    a) R –Centre   b) V-Centre

    c) F-Centre   d) M-Centre

3. One Bohr magneton is   CO3 [K₁]

    a) 9.274×10^{-24} Am^2 b) 9.274×10^{-28} Am^2

    c) 9.274×10^{22} Am^2 d) 9.274×10^{-26} Am^2

4. The susceptibility value for diamagnetic material is   CO3 [K₁]

    a) Small and negative   b) Large and negative

    c) Small and positive   d) Large and positive

5. The following items consists of two statements, one labeled as the "Assertion(A)" and other   CO1 [K₁]
    as "Reason(R)".Examine these two statements and select the answers from the following
    codes.(k1)

    Assertion(A):   An n-type semiconductor has a large number of electrons but still it is
    electrically neutral

    Reason(R): An n-type semiconductor is obtained by doping an intrinsic semiconductor with
    a pentavalent impurity.

    a) A is true but R is false   b) A is false but R is true

    c) A is true, R is true, and R is correct   d) A is true, R is true but R is not a
        explanation for A   correct explanation for A

6. The unit of sound intensity is   CO2 [K₁]

    a) Watt-Bel   b) Watt/m^2

    c) Decibel   d) bel

7. Consider the following statements in properties of Super conducting materials   CO3 [K₂]

    1.The electrical resistivity drops to zero

    2.These materials attract the magnetic lines of force

    3.These are also called ferromagnetic material

    4.The magnetic flux lines are expelled from the material.

    Which of these statements are correct?

a)	1,3	b)	2,3
c)	1,4	d)	2,4

8. On heating one end of a rod, the temperature of whole rod will be uniform when the temperature is: CO4 [K$_1$]

a)	1K	b)	0 K
c)	100 K	d)	α K

9. Sequence the following sentences: CO4 [K$_1$]

During Zener breakdown

1. Electrons colliding with the other atoms
2. Breaking covalent bond and more electrons are released
3. Electrons are accelerated to very high velocity
4. Very high electric field is applied to dielectric material

a)	4,2,3,1	b)	4,1,2,3
c)	4,3,1,2	d)	4,3,2,1

10. A Single Sheet of graphite is called as CO5 [K$_1$]

a)	Graphene	b)	Nitinol
c)	Carbon	d)	Metallic Glass

PART B (10 x 2 = 20 Marks)

(Answer not more than 40 words)

11. Distinguish between loudness and intensity of sound. CO2 [K$_1$]

12. How can we control reverberation time of a hall? CO2 [K$_1$]

13. Define Thermal conductivity. CO1 [K$_1$]

14. What are Type –II Supercondutors? CO1 [K$_1$]

15. Compare N-type and P-Type semiconductors CO3 [K$_1$]

16. What are excitons. Give its types CO3 [K$_1$]

17. What is hysteresis curve? CO4 [K$_1$]

18. Define dielectric loss. CO4 [K$_1$]

19. What are two routes through which nanoparticles can be synthesized? CO5 [K$_1$]

20. Mention techniques used to produce carbon nanotubes(CNT). CO5 [K$_1$]

Answer any FIVE Questions:-

PART C (5 x 14 = 70 Marks)

(Answer not more than 300 words)

Q.No. 21 is Compulsory

21.	Derive Sabine's formula for reverberation time.		CO2 [K$_1$]
22.	(i) What is density of states? Derive an expression for density of states and using that obtain an expression for Fermi energy of a metal at 0 K	(10)	CO1 [K$_1$]
	(ii) The thermal conductivity of a metal is 123.92 W/m/K. Find the electrical conductivity and Lorentz number when the metal possess relaxation time 10^{-14} second at 300 K. (Density of electrons = 6 x 10^{28} /m^3)	(4)	CO1 [K$_2$]
23.	(i) Obtain an expression for intrinsic carrier concentration in an intrinsic semiconductor.	(10)	CO3 [K$_1$]
	(ii) How will you determine the energy gap of an intrinsic semiconductor	(4)	CO3 [K$_2$]
24.	(i) What are colour centres? Briefly explain the various colour centres and explain how they are produced by ionizing radiation.	(10)	CO3 [K$_1$]
	(ii) Distinguish between fluorescence and phosphorescence.	(4)	
25.	Discuss the different types of polarization mechanism and polarizability involved in dielectric materials.		CO4 [K$_1$]
26.	(i)What are nanotubes? Describe their synthesis and properties.	(8)	CO5 [K$_1$]
	(ii) Write a short note on Ball milling method.	(6)	CO5 [K$_1$]
27.	(i) Explain the Hysteresis curve on the basis of Domain theory.	(8)	CO4 [K$_1$]
	(ii) Distinguish between Soft and Hard magnetic materials.	(6)	CO4 [K$_1$]

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