KUMARAGURU
college of technology
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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 2015

(Regulation 2014)

Second Semester

U14PHT204: APPLIED PHYSICS

(Common to FT & TXT)

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

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Matching the following: [K_2]

List I	List II
A. Mobility	i. $\Omega^{-1}m^{-1}$
B. Lorentz number	ii. $V^{-1}s^{-1}m^2$
C. Electrical conductivity	iii. W/m/K
D. Thermal conductivity	iv. $W\Omega\ K^{-2}$

	A	B	C	D
a)	i	iii	iv	ii
b)	iv	ii	i	iii
c)	ii	iv	i	iii
d)	i	iv	ii	iii

2. Which is the correct for isotope effect of superconductors? [K₁]

   a) $M^{\alpha}T_c$= constant

   (Where, M is atomic mass and α is coefficient of isotopic effect)

   b) $4M^{\alpha}T_c$= constant

   (Where ,M is atomic mass and α is coefficient of isotopic effect)

   c) $3M^{\alpha}T_c$= constant

   (Where, M is atomic mass and α is coefficient of isotopic effect)

   d) $2M^{\alpha}T_c$= constant

   (Where, M is atomic mass and α is coefficient of isotopic effect)

3. The thermal excitation energy produced by an electron in Extrinsic semiconductors at room temperature is [K₁]

   a) 0.050eV

   b) 0.025eV

   c) 0.070eV

   d) 0.010eV

4. Hall effect is associated with [K₁]

   a) Conductors.

   b) Semiconductors.

   c) Thermistors.

   d) Solders.

5. Chemical formula of a simple ferrite is [K₁]

   a) $X^{2+}Fe_2^{3+}O_4^{2-}$

   b) $X^{2+}Fe_2^{4+}O_4^{2+}$

   c) $X^{4+}Fe^{2+}O_4^{3+}$

   d) $X^{2+}Fe_2^{2+}O_4^{3+}$

6. Optical frequency of electronic polarization is about [K₁]

   a) 10 Hz

   b) 10^3 Hz

   c) 10^6 Hz

   d) 10^{15} Hz

7. Assertion (A): Super elasticity is the property of SMA. [K₂]

   Reason (R): When a material is deformed at a temperature slightly greater than its transformation temperature super elasticity property appears.

   a) A is true B is false

   b) B is true A is false

   c) Both A and B are false

   d) Both A and B are correct

8. NITINOL is commercially used SMA of [K₁]

   a) Nickel – Tandulum

   b) Nickel – Titanium

   c) Nichrome – Titanium

   d) Nichrome –Tin

9. Sequencing the following statements: [K$_2$]

    Nano material can be prepared using

    1. Laser Pulses focused on the target material.

    2. Thus synthesized nano particle by PLD method.

    3. Intense beam makes the evaporation and deposition on substrate.

    4. Adjust the environmental conditions and rotation of target for fine deposition.

    a) 1-2-3-4   b) 4-3-2-1

    c) 1-3-4-2   d) 1-4-3-2

10. Electron temperature in cold plasma is..... than the ion temperature   [K$_1$]

    a) Less   b) greater

    c) equal   d) very small

PART B (10 x 2 = 20 Marks)

(Answer not more than 40 words)

11. State Wiedemann –Franz law   [K$_1$]

12. Calculate the critical Magnetic field for a superconducting material.   [K$_2$]

    (Given that H$_o$ =0.0306A/m, T$_c$=3.7K and T=2K)

13. Define: Effective mass of an electron.   [K$_1$]

14. Identify the expression for carrier concentration in an N-type semiconductor.   [K$_1$]

15. Define Hysteresis effect.   [K$_1$]

16. What is dielectric loss?   [K$_1$]

17. Mention any two types of preparation methods of metallic glasses.   [K$_1$]

18. Tell any two applications of Biomaterials?   [K$_1$]

19. List out the different structures of carbon nano tubes.   [K$_1$]

20. Define non thermal plasma.   [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. (i) Obtain an expression for density of energy states.   (12) [K$_1$]

     (ii) List out any two drawbacks of classical free electron theory   (2) [K$_1$]

22. (i) Describe an experiment set-up for the measurement of the Hall Effect and obtain an (10) [K$_1$]

expression for Hall Coefficient in terms of Hall voltage.

(ii) Hall coefficient of certain silicon specimen was found to be $-7.35 \times 10^{-5} m^3 C^{-1}$. (4) [K$_2$] Calculate density and mobility of charge carrier if $\sigma = 200 \Omega^{-1} m^{-1}$.

23. (i) Illustrate domain theory of Ferromagnetism. (10) [K$_2$]

(ii) Distinguish: Soft and Hard magnetic materials. (4) [K$_1$]

24. (i) Illustrate Electronic and Ionic polarization mechanism in dielectric materials (10) [K$_2$]

(ii) List out any four applications of Ferro electric materials. (4) [K$_1$]

25. (i) Discuss in detail about Shape Memory alloys. (10) [K$_2$]

(ii) Mention any four properties of biomaterials. (4) [K$_1$]

26. (i) How to synthesis carbon nano tubes using Pulsed laser Deposition method. (7) [K$_1$]

(ii) Describe the production of glow discharge plasma (7) [K$_1$]

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