School of Aeronautics (Neemrana)

I-04, RIICO Industrial Area, Neemrana, Dist. Alwar, Rajasthan

Approved by Director General of Civil Aviation, Govt. of India, All India Council for Technical Education
Ministry of HRD, Govt of India & Affiliated to Rajasthan Technical University, Kota & BTU, Bikaner Rajasthan

Question Paper For Internal Assessment Examination (Theory) - Credit 2 / 17

Instructions For Students / FacultyMid Term I (Total 40 Marks, 1.5 HRS. Syllabus From Beginning Of Session)
• Part A: Total number of questions to be given are four, each carrying 2 marks and are compulsory to attend. There is no choice. They are short answer type questions (**Not More Than 25 Words For Both Question & Answer)**, no objective type or fill in the blanks. Total 8 marks.
• Part B: Total number of questions to be given are five, out of which student has to answer any three. They are long answer type **(Not More Than 50 Words For Question Only)**, each carrying 6 marks. Total 18 marks.
• Part C: Total number of questions to be given are three, out of which student has to answer any two. They are numerical answer type / fully elaborative type* **(Not More Than 70 Words For Question Only)**, each carrying 7 marks. Total 14 marks.
Mid Term II & III (Total 60 Marks, 2 HRS. Syllabus From Beginning Of Session)
• Part A: Total number of questions to be given are ten, each carrying 2 marks and are compulsory to attend. There is no choice. They are short answer type questions **(Not More Than 25 Words For Both Question & Answer)**, no objective type or fill in the blanks. Total 20 marks.
• Part B: Total number of questions to be given are six, out of which student has to answer any four. They are long answer type **(Not More Than 50 Words For Question Only)**, each carrying 5 marks. Total 20 marks.
• Part C: Total number of questions to be given are three, out of which student has to answer any two. They are numerical answer type / fully elaborative type **(Not More Than 70 Words For Question Only)***, each carrying 10 marks. Total 20 marks.
* **LIST OF ELABORATIVE THEORY QUESTION SUBJECTS**: 1 FY1 - 04 Communication Skills (Cr 2), 1 FY1 - 05 Human Values (Cr 2), 2 FY1 - 04 Communication Skills (Cr 2), 2 FY1 - 05 Human Values (Cr 2), 3 AN1 - 02 Technical Communication (Cr 2), 4 MH1 - 02 Technical Communications (Cr 2), 4 MH1 - 03 Economics and Financial Accounting (Cr 2), 5 AN5 - 12 Aircraft Maintenance Practices (Cr 2), 6 AN3 - 01 Mechanics of Composite Materials (Cr 2), 6 AN5 - 12 Aircraft Rules and Regulation (Cr 2), 6 MH3 - 01 Automobile Engineering (Cr 2).
FACULTY MEMBERS, PLEASE ENSURE EXCEPT ABOVE LISTED SUBJECTS, NO THEORITICAL ELABORATIVE QUESTION SHOULD BE GIVEN IN PART 'C' OF QUESTION PAPER.

STUDENT IS ALLOWED TO ENTER LATE NOT MORE THAN 15 MIN AFTER STARTING OF EXAM, AND MAY LEAVE THE EXAM HALL ON EXPIRY OF ATLEAST OF 1 Hr FROM THE STARTING TIME OF EXAMINATION.

Question Paper & Student Details

Mid Term	Mid Term 2	**Date of Submission**	18/08/2020
Name of Faculty	Ms. Shivi Varshney	**Date of Examination**	26/08/2020
Course	B.Tech (Mechatronics Engineering)	**Semester**	SEMESTER : 3
Batch	Fifth (5)	**Subject**	3 MH3 - 04 Electromagnetic Properties of Materials (Cr 2)

COURSE OUTCOMES FOR REFERENCE TO FRAME QUESTION PAPER
(Faculties are required to mention relevant Course Outcome number against the respective question in QP)

Course Outcome	1. Develops understanding of the fundamentals of polarizable solids, ferroelectricity, and magnetism. 2. Is able to relate this to the functioning of device that exploit these properties. 3. Understand how these properties may be used in device design. 4. Understand the basic electrical and magnetic properties of crystalline solids and amorphous materials. 5. Understand the difference between electronic structures and physical properties of semiconductors, metals, and dielectrics. 6. Understand the physics of magnetic phase transitions and superconductivity. 7. Measure and analyze transport characteristics of semiconductors. 8. Measure and analyze basic optical parameters of semiconductors. 9. Understand the physics behind solid state electronics and optoelectronic devices. 10. Understand the basic design of major microelectronic and optoelectronic devices, their features, and limitations. Present the results of study and research		
Email I'd	shivivarshney@soaneemrana.org	**Phone No.**	701-779-6710
Student Name		**Student Reg No.**	

Part A			
Question : 1	What are disadvantages of nanomaterials?		
Lesson Plan No. - 10	Topic - Nanomaterials	Source - Electromagnetic properties of materials by Vimi kaul	CO No. - 1
Question : 2	What are extrinsic semiconductors? (or) What is the effect of impurity states over intrinsic semiconductor?		
Lesson Plan No. - 19	Topic - semiconductor	Source - Electromagnetic properties of materials by Vimi kaul	CO No. - 4
Question : 3	Give the classification of nano material?		

Lesson Plan No. - 11	Topic - Nanomaterials	Source - Electromagnetic properties of materials by Vimi kaul	CO No. - 1
Question : 4	What are donor and acceptor impurities?		
Lesson Plan No. - 17	Topic - semiconductor	Source - Electromagnetic properties of materials by Vimi kaul	CO No. - 5
Question : 5	What are Nanomaterials?		
Lesson Plan No. - 9	Topic - Nanomaterials	Source - Electromagnetic properties of materials by Vimi kaul	CO No. - 1
Question : 6	How to characterized nanomaterials?		
Lesson Plan No. - 10	Topic - Nanomaterials	Source - Electromagnetic properties of materials by Vimi kaul	CO No. - 3
Question : 7	List the potential applications of nano materials?		
Lesson Plan No. - 12	Topic - Nanomaterials	Source - Electromagnetic properties of materials by Vimi kaul	CO No. - 1
Question : 8	Explain the degenerate and non-degenerate semiconductors?		
Lesson Plan No. - 18	Topic - semiconductor	Source - Electromagnetic properties of materials by Vimi kaul	CO No. - 6
Question : 9	Explain direct and indirect band gap semiconductors?		
Lesson Plan No. - 20	Topic - semiconductor	Source - Electromagnetic properties of materials by Vimi kaul	CO No. - 3
Question : 10	Define Hall-effect and Hall voltage.		
Lesson Plan No. - 19	Topic - semiconductor	Source - Electromagnetic properties of materials by Vimi kaul	CO No. - 2
Part B			
Question : 1	Explain five major areas of technology, where nanotechnology can play important roles.		
Lesson Plan No. - 15	Topic - Nanomaterials	Source - Electromagnetic properties of materials by Vimi kaul	CO No. - 3
Question : 2	Distinguish between elemental semiconductors and Compound semiconductors?		
Lesson Plan No. - 21	Topic - semiconductor	Source - Electromagnetic properties of materials by Vimi kaul	CO No. - 5
Question : 3	Explain the bottom – up and top – down techniques with examples. What are their merits and demerits?		
Lesson Plan No. - 14	Topic - Nanomaterials	Source - Electromagnetic properties of materials by Vimi kaul	CO No. - 3
Question : 4	Explain and draw the energy band diagrams for semiconductors.		
Lesson Plan No. - 22	Topic - semiconductors	Source - Electromagnetic properties of materials by Vimi kaul	CO No. - 6
Question : 5	Explain the electronic properties and applications of germanium and silicon.		
Lesson Plan No. - 24	Topic - semiconductors.	Source - Electromagnetic properties of materials by Vimi kaul	CO No. - 6
Question : 6	Discuss the use of nanowires and nanotubes in electronic devices? Give five uses of carbon nanotubes?		
Lesson Plan No. - 16	Topic - Nanomaterials	Source - Electromagnetic properties of materials by Vimi kaul	CO No. - 3
Part C			
Question : 1	In an N-type semiconductor, the concentration of electron is 2 × 1022 m–3 . Its electrical conductivity is 112 –1 m–1. Calculate the mobility of electrons.		
Lesson Plan No. - 24	Topic - semiconductor	Source - Electromagnetic properties of materials by Vimi kaul	CO No. - 2
Question : 2	An N-type semiconductor has hall coefficient = 4.16 × 10–4 m3 C–1. The conductivity is 108 –1 m–1. Calculate its charge carrier density ‘ne’and electron mobility at room temperature.		
Lesson Plan No. - 24	Topic - semiconductor	Source - Electromagnetic properties of materials by Vimi kaul	CO No. - 2
Question : 3	The Intrinsic carrier density at room temperature in Ge is 2.37 × 1019 m3 if the electron and hole mobilities are 0.38 and 0.18 m2 V–1 s–1 respectively, calculate the resistivity.		

Lesson Plan No. - 24	Topic - semiconductor	Source - Electromagnetic properties of materials by Vimi kaul	CO No. - 2
Upload Scanned Document In Case of Numerical or Diagram For Any of The Above Questions. *(Mention question number with relevant fig / numerical / equations. Max 150 KB)*			
I have scrutinized the question paper. There is no spelling mistake or any type of irrelevant question.			

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