Reg. No._____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FOURTH SEMESTER B.TECH DEGREE EXAMINATION, JUNE 2017

Course Code**: EE206**

Course Name**: MATERIAL SCIENCE (EE)**

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions. Each question carries 5 marks.

1. Obtain the expression for the conductivity of an intrinsic semiconductor.
2. What are the common Dielectric materials used in Electrical apparatus.
3. Explain the term Electron Attachment.
4. What is the relevance of Curie – Weiss law?
5. What are organic solar cells?
6. Why certain materials exhibit superconductivity?
7. What is the scope of biomaterials in medicine?
8. Write notes on nano tubes

PART B

Answer any 2 questions. Each question carries 10 marks.

9. a. What is the effect of alloying of metals in their conduction? Illustrate with an example. (6)

   b. What is the effect of imperfections in lattice structure on the resistivity of pure metals? (4)

10. a. What are the applications of thermoplastics and thermo setting plastics? (5)

    b. Write notes on ferrites mentioning their properties and applications. (5)

11. a. Why SF6 gas is used in Circuit breakers? (5)

    b. Which are the materials used in capacitor as insulatotors and why? (5)

PART C

Answer any 2 questions. Each question carries 10 marks.

12. Explain streamer theory of breakdown in air. (10)

13. Explain the phenomenon treeing and tracking in solid insulating materials under Electrical stress. How this leads to breakdown? (10)

14. a. Write notes on hard and soft magnetic materials specifying examples and applications. (5)

    b. Write about the origin of magnetic dipoles. (5)

PART D

Answer any 2 questions. Each question carries 10 marks.

15. a. What do you mean by superconductivity? Explain the application and properties. (7)

    b. What are the materials commonly used for making solar cells? (3)

16. Write notes on a) optical microscopy and b) Electron microscopy. (10)

17. a. Explain various bio materials used in medicine. (6)

    b. What are nano materials? Give two applications. (4)

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Total Pages: 1

Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FOURTH SEMESTER B.TECH DEGREE EXAMINATION, JULY 2017

Course Code: EE206

Course Name: MATERIAL SCIENCE (EE)

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions. Each carries 5 marks.

1		What is meant by electrical and thermal conductivity of metals.	(5)
2		What is ferroelectricity. Give at least two examples.	(5)
3		What are the Townsend's criterion for spark?	(5)
4		Why the magnetisation lost, when the ferromagnetic materials are heated above a certain temperature.	(5)
5		List the merits and demerits of solar cells.	(5)
6		Discuss between solar cell and a solar panel.	(5)
7		What are the applications of optical microscope.	(5)
8		Write short notes on biomaterials.	(5)

PART B

Answer any two questions. Each carries 10 marks.

9		What is meant by polarization in a dielectric. Explain how the variation of dielectric constant with frequency.	(10)
10		Describe the application of various insulating materials used in the following power apparatus: - i) Power transformer ii) Circuit breaker iii) Power iv) Rotating machines	(10)
11	a)	What is Dielectric constant.	(2)
	b)	Explain dielectric loss and loss tangent with the help of a phasor diagram.	(6)
	c)	Mention the factors, which affect the dielectric loss of an insulating material.	(2)

PART C

Answer any two questions. Each carries 10 marks.

12	a)	Explain Townsend's first and second ionisation coefficient.	(10)
13	a)	Discuss the application of magnetic materials used in electrical machines, instruments and relays. Justify with reasons.	(10)
14	a)	Explain the suspended particle mechanism in dielectric breakdown.	(7)
	b)	what is intrinsic breakdown?	(3)

PART D

Answer any two questions. Each carries 10 marks.

15	a)	Explain the mechanism of electricity production in solar cells with construction?	(10)
16	a)	What are the different types of electron microscopy. Explain each of them?	(10)
17	a)	List the factors which affect the characteristic properties of superconductor. Also discuss at least two applications of superconductors.	(10)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FOURTH SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018

Course Code: EE206

Course Name: MATERIAL SCIENCE (EE)

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 5 marks Marks

1		What is electrical conductivity? Obtain the expression for electrical conductivity of a metal.	(5)
2		Explain the properties SF6 gas as an insulator.	(5)
3		List the factors which affect ageing of insulator.	(5)
4		Write short notes on ferrites.	(5)
5		What is superconductivity? Give the applications of superconductor.	(5)
6		What are the classifications of solar cell? Explain.	(5)
7		What is optical microscopy?	(5)
8		What are the limitations of optical microscopy? Give one merit of scanning electron microscopy compared to optical microscopy.	(5)

PART B

Answer any two questions, each carries 10 marks

9		Explain Clausis Mosotti relation.	(10)
10		Describe the applications of following insulating materials used in electricalapparatus: i) Liquid insulator ii) Gaseous insulators iii) Organic insulator iv) Inorganic insulator	(10)
11		Distinguish between electronic an ionic polarization. How do they depend on frequency?	(10)

PART C

Answer any two questions, each carries 10 marks

12		Explain streamer mechanism of spark.	(10)
13		Explain the classification of magnetic materials with example.	(10)
14	a)	Explain the properties and application of alloys of iron.	(7)
	b)	What are the application of vacuum insulation.	(3)

PART D

Answer any two questions, each carries 10 marks

15	a)	What is Type-I and Type-II superconductors?	(6)
	b)	What is atomic absorption spectroscopy?	(4)
16		Explain the construction and working of organic solar cell.	(10)
17	a)	What is biocompatibility?	(2)
	b)	What are the properties of nanotubes?	(3)
	c)	What is photoelectron spectroscopy?	(5)

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Reg. No._____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FOURTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: EE206

Course Name: MATERIAL SCIENCE

Max. Marks:100 Duration: 3 Hours

PART A

Answer all questions.

1. How the dielectrics are thermally classified? (5)
2. What are compound semi conductors ? specify examples with application (5)
3. Explain Townsend criteria for breakdown of gaseous dielectrics (5)
4. Derive Curie- Weiss law for magnetic materials. Explain ferromagnetism (5)
5. What is carbon nano tube? Give its application (5)
6. Define super conductivity. What are the applications of superconductive materials in electrical engineering (5)
7. What are the classification of solar cells based on their technology? (5)
8. Write note on atomic absorption spectrography (5)

PART B

Answer any 2 questions

9. (a). What is meant by mobility, mean freepath, and relaxation time in conduction Phenomenon? (6)

   (b).Why carbon is used as brush in electrical machines? (4)

10. (a) Explain the difference in conduction properties of conductors, semiconductors and insulators on the basis of energy band diagram? (6)

(b) What are ferrites? Give two applications of Ferrites. (4)

11. (a) What are the properties of SF_6 gas as a dielectric material? Give one example.

What is the effect when it is mixed with N_2 ? (6)

(b) Write a note on common insulating materials with their applications? (4)

PART C

Answer any 2 questions

12. What are the mechanisms of breakdown in solid dielectrics? (10)

13. Explain the method of processing of Transformer oil? (10)

14. (a) Enumerate the magnetic materials used in electrical machines and relays? (6)

(b) What is meant by spontaneous magnetization? Give examples of materials exhibiting this property. (4)

PART D

Answer any 2 questions

15. a)Explain the difference between Type I and Type II superconductors on the basis of Messner effect? (6)

b) What are the materials used for making thin film solar cells? Give applications of thin film solar cells . (4)

16. a) Explain photo voltaic conversion. What are the advantages of solar power? (6)

b) Compare and contrast photo thermal conversion and photo voltaic conversion. (4)

17. Explain various techniques used for materials study. (10)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FOURTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), MAY 2019

Course Code: EE206

Course Name: MATERIAL SCIENCE (EE)

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 5 marks

1		Define polarization and what are different polarization processes?	(5)
2		Explain the properties of Mica and Ceramics.	(5)
3		List any five characteristics of SF_6.	(5)
4		Explain Curie Wiess law.	(5)
5		Explain superconductivity and its applications.	(5)
6		What are the materials used for solar cells? Explain.	(5)
7		Write short notes on bio materials.	(5)
8		What is photoelectron spectroscopy? Explain.	(5)

PART B

Answer any two questions, each carries 10 marks

9	a)	Derive Claussius-mosotti relation.	(5)
	b)	What are compound semiconductors?	(5)
10	a)	Differentiate organic and inorganic insulators.	(4)
	b)	Why SF_6 gas is used in circuit breakers?	(3)
	c)	What are the insulating materials used in capacitor materials?	(3)
11	a)	Explain different types of polarizations in dielectrics.	(6)
	b)	What do you mean by insulating materials? Explain its classification based on temperature.	(4)

PART C

Answer any two questions, each carries 10 marks

12	a)	Explain streamer theory of breakdown in gases.	(6)
	b)	Define suspended particle theory.	(4)
13	a)	Explain properties and applications of iron.	(6)
	b)	Explain the applications of magnetic materials in electrical machines.	(4)
14	a)	How breakdown occur in vacuum insulators? Explain any one mechanism.	(6)

b) Explain transformer oil treatment method. (4)

PART D

Answer any two questions, each carries 10 marks

15 Explain

1. Antireflection coating
2. Solar selective coating (10)
3. Cold mirror coating

16 a) Explain atomic absorption spectroscopy. (5)

b) Explain the different characteristic properties of superconductors. (5)

17 Explain different types of electron microscopy and their applications. (10)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FOURTH SEMESTER B.TECH DEGREE EXAMINATION(S), DECEMBER 2019

Course Code: EE206

Course Name: MATERIAL SCIENCE

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 5 marks Mark

1		Explain how the conductivity of conducting materials vary with temperature and composition	(5)
2		What do you mean by ferroelectricity? Name any two ferroelectric materials.	(5)
3		What are the factors influencing ageing of insulators?	(5)
4		Differentiate between soft and hard magnetic materials.	(5)
5		What are the materials used for the solar sell?	(5)
6		Why solar selective coating is used in solar system?	(5)
7		What do you mean by optical microscopy? Explain with diagram.	(5)
8		How the nanomaterials are classified?	(5)

PART B

Answer any two questions, each carries 10 marks

9	a)	Explain the behaviour of dielectrics in alternating field.	(7)
	b)	Name any three alloys of copper and explain its composition.	(3)
10	a)	Explain physical and chemical properties of SF6.	(6)
	b)	What are the polymeric organic materials used in electrical apparatus?	(4)
11	a)	Why SF6 gas is mixing with nitrogen for industrial applications?	(4)
	b)	What are the materials used for solders and contacts?	(6)

PART C

Answer any two questions, each carries 10 marks

12	a)	Explain the mechanism of breakdown in gases dielectrics	(7)
	b)	Why transformer oil testing is so important?	(3)
13	a)	Explain the classification of magnetic material based on magnetic diploes.	(6)
	b)	What is ferrites? Explain its properties	(4)
14	a)	Derive the Townsends current growth equation for primary ionization.	(5)
	b)	Write five applications of iron alloys.	(5)

PART D

Answer any two questions, each carries 10 marks

15	a)	Explain the Photo-thermal solar energy conversion with figure.	(6)
	b)	What are the main applications of superconducting materials?	(4)
16	a)	Draw and explain the schematics of Atomic Absorption Spectroscopy	(10)
17	a)	What are the organic solar cells? Explain its advantages.	(6)
	b)	Write short notes on importance of biomaterials.	(4)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fourth semester B.Tech examinations (S), September 2020

Course Code: EE206

Course Name: MATERIAL SCIENCE (EE)

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 5 marks

1	What are the properties of materials utilised in (i) Rheostats (ii) Solders? Also mention some of the materials used for the above.	(5)
2	Write a short note on 1) spontaneous polarization and 2) ferroelectric materials and its applications	(5)
3	Explain the testing procedure of transformer oil.	(5)
4	Write notes on the magnetic materials used in (i) Electrical machines (ii) Relays	(5)
5	Differentiate Type I and Type II superconductors.	(5)
6	What is the significance of organic solar cells?	(5)
7	Explain optical microscopy.	(5)
8	Define nanomaterial. Highlight any two possible a) applications and b) its limitations or major challenges.	(5)

PART B

Answer any two questions, each carries 10 marks

9	a)	Derive Clausius – Mosotti relation.	(5)
	b)	Define dielectric polarization and write the expression relating polarization P, Electric field E and permittivity $\varepsilon_r\varepsilon_0$. Comment on its physical significance.	(5)
10		Explain a good insulating material in terms of its a) Electrical b) Mechanical c) Thermal. d) Chemical properties.	(10)

11	a)	State properties and applications of any two inorganic insulators.	(5)
	b)	Obtain the expression for conductivity in intrinsic semiconductors.	(5)

PART C

Answer any two questions, each carries 10 marks

12	a)	Define Townsend's first and second ionisation coefficients.	(4)
	b)	Derive the Townsend's criterion for spark	(6)
13	a)	Write short notes on intrinsic breakdown in solid dielectrics.	(5)
	b)	Explain origin of permanent magnetic dipoles.	(5)
14	a)	How magnetic materials are classified?Explain any four types of them with example.	(6)
	b)	State Curie –Weiss Law	(4)

PART D

Answer any two questions, each carries 10 marks

15	a)	Explain the concept of superconductivity. Also draw the magnetic field Vs Temperature characteristics.	(5)
	b)	Describe the fundamental principle behind atomic absorption spectroscopy.	(5)
16	a)	Why solar selective coatings are required? Give examples.	(5)
	b)	Explain the fundamentals of (i) Photo thermal conversion (ii) Photo voltaic conversion	(5)
17	a)	Describe electron microscopy with appropriate schematic diagram.	(5)
	b)	Explain photo electron spectroscopy.	(5)

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