

AR16

CODE: 16BS1003

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

I B.Tech II Semester Supplementary Examinations, October / November-2020

ENGINEERING PHYSICS

(Common to CE, EEE & ME Branches)

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place.

UNIT-I

1. a) Define Coherence 2M
- b) How do you test for flatness of surface using concept of interference? Explain with diagram 4M
- c) Derive the conditions for interference in plane parallel films due to reflected light 8M

(OR)

2. a) Define superposition principle 2M
- b) Newton's rings are observed in the reflected light of wavelength 5900 Å. The diameter of 10th dark ring is 0.5 cm. Find the radius of curvature of lens used 4M
- c) Derive the conditions for central maxima and minima obtained due to Fraunhofer's diffraction through single slit 8M

UNIT-II

3. a) Define Population inversion with diagram 2M
- b) Explain the components involved in formation of Laser 6M
- c) State any four differences between Spontaneous emission and stimulated emission with diagram 6M

(OR)

4. a) State the principle of working of optical fiber 2M
- b) List any four differences between step index and graded index optical fibers 4M
- c) Derive the expression for numerical aperture and acceptance angle in optical fiber 8M

UNIT-III

5. a) Define wave particle duality 2M
b) Derive the expression for energy and wave function of an electron in a one dimensional potential box 10M
c) State Heisenberg's uncertainty principle. 2M

(OR)

6. a) Define wave function 2M
b) Explain the physical significance of wave function (any four points) 4M
c) State Heisenberg's uncertainty principle. Also, prove that protons and exist in nucleus of an atom. 8M

UNIT-IV

7. a) Define magnetic field 2M
b) Explain the concept of magnetostriction with diagram(s) 4M
c) Differentiate between diamagnetic and ferromagnetic materials. Also draw the corresponding dipole moment diagrams 8M

(OR)

8. a) Define Intensity of magnetization 2M
b) What are ferrites. Give any two applications 4M
c) Draw and Explain Hysteresis curve in ferromagnetic materials 8M

UNIT-V

9. a) Derive the relation between D, E and P 4M
b) Explain Electronic polarizability with a diagram and derive the expression for electronic polarizability 10M

(OR)

10. a) Give any two possible reasons for dielectric breakdown 4M
b) Explain frequency dependence on polarizability with neat sketch 10M

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SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
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I B.Tech II Semester Supplementary Examinations, October / November-2020

ENGINEERING CHEMISTRY

(Common to ECE, CSE & IT Branches)

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place.

UNIT-I

1. a) Distinguish between thermoplastic and thermosetting plastics. 8M
b) Differentiate between addition and condensation polymers 6M
- (OR)
2. a) Discuss about setting and hardening of cement with suitable chemical reactions. 8M
b) Explain the wet process of manufacturing Portland cement. 6M

UNIT-II

3. a) Give a detailed account on treatment of water for domestic purposes. 8M
b) What is chlorination? Explain in detail about break point chlorination. 6M
- (OR)
4. a) Describe desalination methods with neat diagrams. 8M
b) How do you produce soft water? Explain any one softening method. 6M

UNIT-III

5. a) Define corrosion. What are the causes and consequences of corrosion? 6M
b) Explain various factors influencing rate of corrosion. 8M
- (OR)
6. a) Summarize how proper design of corrosion is used in corrosion control. 8M
b) Give a detailed account on (i) waterline corrosion (ii) stress corrosion 6M

UNIT-IV

7. a) Explain the fractional distillation of refining of petroleum. 8M
b) What are octane and cetane number? Explain their significance. 6M
- (OR)
8. a) What is lubrication? Explain thick film and thin film lubrication. 6M
b) Define and explain flash and fire points; cloud and pour points. 8M

UNIT-V

9. a) What is electrochemical series? Explain its significance. 8M
b) Explain the construction, working and applications of NHE 6M
- (OR)
10. a) Discuss in detail about concentrated power plants with neat diagram. 8M
b) Describe harnessing of solar energy. 6M

AR13

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I B.Tech II Semester Supplementary Examinations, October / November-2020
ENGINEERING PHYSICS
(Common to EEE & ECE)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[10 X 1M = 10 M]

1. a) What is meant by interference of light.
b) What is meant by diffraction of light.
c) What is the principle of laser.
d) Define numerical aperture of optical fiber.
e) What is unit cell.
f) Write the condition for Bragg's law.
g) Define magnetic flux density.
h) What is polarization vector
i) Define drift velocity of electrons.
j) Write one dimensional time independent Schrodinger's wave equation.

PART-B

Answer one question from each unit

[5 X 12M = 60M]

UNIT-I

2. a) Discuss the theory of Newton's rings with relevant diagrams 8M
by reflected light and obtain the expressions for the
diameters of bright and dark rings.
b) In Newton's rings experiment, the diameter of the 5th ring is
0.30 cm and diameter of the 15th ring is 0.62cm. Find the 4M
diameter of the 25th ring.

(OR)

3. a) Obtain the conditions for principle maxima and minima in 8M
Fraunhofer diffraction of light due to a single slit.
b) Mention any four differences between Fresnel and 4M
Fraunhofer diffraction of light.

UNIT-II

4. a) Derive the relation between the probabilities of spontaneous emission and stimulated emission in terms of Einstein coefficients. 8M
- b) Explain the basic components in laser system. 4M

(OR)

5. a) Derive the expressions for numerical aperture and the fractional change in refractive index of optical fiber. 6M
- b) Explain advantages of Fiber optic communication system. 6M

UNIT-III

6. a) Explain Structure and packing factor of Face centered cubic crystal 8M
- b) Define the following. i) Lattice parameters ii) Coordination number iii) Primitive cell and iv) Non primitive cell. 4M

(OR)

7. a) Derive an expression for inter planar separation between successive (hkl) parallel planes for cubic crystal system. 8M
- b) State and explain Bragg's law for X-ray diffraction. 4M

UNIT-IV

8. a) Explain the Domain theory of ferromagnetism. 8M
- b) Define the following. i) Magnetic flux density ii) Magnetic field iii) Intensity of magnetization and iv) Relative permeability. 4M

(OR)

9. a) What is orientation polarization and derive the expression for its polarizability. 8M
- b) Derive relation between electric susceptibility and dielectric constant. 4M

UNIT-V

10. a) Derive an expression for electrical conductivity of metal based on classical free electron theory. 8M
- b) Discuss various draw backs of classical free electron theory. 4M

(OR)

11. a) Obtain the expressions for energy and wave function of an electron confined to move in a one -dimensional potential box. 8M
- b) Calculate the de Broglie wavelength of an electron which has been accelerated from rest on application of potential of 400 volts. 4M

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SET-I

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI (AUTONOMOUS)

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ENGINEERING CHEMISTRY
(Common to CE, ME, CSE & IT)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) List out the constituents on Portland cement.
b) Define functionality.
c) Define PPM.
d) What is disinfectioning of water?
e) Name any four factors that influence rate of corrosion.
f) What is Galvanic series?
g) Define flash and fire point of lubricants.
h) Give the catalyst used in Bergius process.
i) Write any two principles of green chemistry
j) Outline any two applications of silver nanoparticles

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a Distinguish between thermosetting and thermoplastic plastics. 6 M
b Discuss in detail about compression and injection moulding of plastics 6 M

(OR)

3. a Describe the manufacturing of Portland cement with a neat sketch. 8M
b With suitable chemical reactions explain hardening of cement 4M

UNIT-II

4. a Explain the determination of total hardness of water by EDTA method 6M
b Explain the units of hardness of water. 6M

(OR)

5. a Briefly explain the methods of treatment of water for domestic purposes. 8M
- b Calculate the permanent hardness from the following data. 4M
Calcium bicarbonate= 10.0ppm; calcium sulphate = 13.6 ppm; magnesium chloride= 9.5 ppm; magnesium bicarbonate = 12.0ppm.

UNIT-III

6. a With appropriate chemical reactions explain the mechanism of electrochemical chemical corrosion. 8M
- b How nature of metal oxide layer influences rate of corrosion. 4M
- (OR)**
7. a Discuss in detail about sacrificial anodic protection with a neat sketch. 6M
- b Explain how proper design of machine influences rate of corrosion. 6M

UNIT-IV

8. a Discuss the following knocking, anti-knocking, cetane number and octane number 8M
- b With a neat diagram explain fractional distillation of crude oil 4M
- (OR)**
9. a Discuss the mechanism of thick film and thin film lubrication 6M
- b Describe in detail about any three properties of lubricants. 6M

UNIT-V

10. a Write the engineering applications of green chemistry 4M
- b Discuss in detail about solar power plant and its working 8M
- (OR)**
11. a Discuss the engineering and biomedical applications of nanomaterials 6M
- b Explain the synthesis of CNT's 6M