

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE – NOVEMBER -2020.

APPLIED SCIENCE -II

(Maximum Marks : 50)

[Time : 1 ½ hours]

PART-A

Marks

(Answer **all** questions in one or two sentences. Each question carries 2 marks)

- I. (a) Explain SONAR
(b) State the laws of refraction. (2x2=4)

PART - B

(Answer any **two** questions . Each question carries 8 marks)

- II. (a) Derive an expression for the workdone by a couple. 4
(b) Engine oil passes through a fine tube of diameter 1.8mm in an engine.
The tube is 0.055 cum long. What pressure difference is needed to maintain
a rate of flow of $5.6 \times 10^{-6} \text{m}^3$ per minute. Coefficient of viscosity of engine
oil = 0.6 Nsm^{-2} . 4
- III. (a) Explain how light travels through an optic fiber. Give two uses of optic
Fibers. 4
(b) Derive the balancing condition for a Wheatstone's bridge. 4
- IV. (a) State Bernoulli's principle and explain the working of atomizer. 4
(b) The work function for a metal is $6.4 \times 10^{-19} \text{J}$. Calculate its threshold
wavelength. 4

PART - C

(Maximum marks : 60)

(Answer one full question from each unit. Each full question carries 15 marks)

UNIT I

- V. (a) Define Simple Harmonic Motion. Give two examples. (3)
(b) Derive the equation of continuity. (3)

- (c) Determine the excess pressure inside a drop of water of radius 2mm. Surface tension of water is 0.072 N/m. (3)
- (d) Derive an expression for the resultant of two forces in magnitude and direction by applying parallelogram law. (6)

OR

- VI** (a) Derive the relation between wave velocity, frequency and wavelength. (3)
- (b) Derive the relation between surface tension and surface energy. (3)
- (c) The resultant of two forces acting at an angle 150 degree is perpendicular to the smaller of the forces. The greater force is 48N. Determine the smaller force and resultant. (4)
- (d) For a body executing uniform circular motion, prove that the projection of it on any diameter executes simple harmonic motion. (5)

- VII.** (a) Write down the lens maker's formula and explain the terms. (3)
- (b) State and explain Kirchoff's laws. (3)
- (c) A galvanometer having a resistance 20Ω gives full scale deflection for a current of 5mA. How will you convert into an ammeter to read upto 1 A. (3)
- (d) Explain the principle and working of a moving coil galvanometer (6)

OR

- VIII** (a) Write down the truth table, logic symbol and Boolean equation for NOR gate. (3)
- (b) Calculate the current through a circular coil of 50 turns and radius 0.2m when the magnetic flux density produced at the centre is 3.14×10^{-4} T. (3)
- (c) Explain the terms induced absorption, spontaneous emission and stimulated emission. (3)
- (d) What are the laws of photoelectric emission and derive Einstein's photoelectric equation. (6)

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**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/
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APPLIED SCIENCE-II (Chemistry)

[Maximum marks: 50]

(Time: 1½ Hours)

PART – A

[Maximum marks: 4]

(Answer all questions in one or two sentences. Each question carries 2 marks)

- I. (a). Define the term vulcanisation.
(b). Write the anode and cathode reaction takesplace in Daniel cell.

(2 x 2 = 4)

PART – B

[Maximum marks: 16]

(Answer any *two* full questions. Each question carries 8 marks)

- II. (a). What are the differences between electroplating and anodizing.
(b). List any four qualities of a good fuel.
- III. (a). What is green house effect? Write two consequences of it.
(b). Explain the theory of electrochemical corrosion.
- IV. (a). What are the differences between thermoplastic and thermosetting plastic.
(b). List any four applications of adsorption.

(2 x 8= 16)

PART – C

[Maximum marks: 30]

(Answer one full question from each unit. Each question carries 15 marks)

UNIT –I

- V. (a). How will you distinguish between physical adsorption and chemical adsorption. (4)
(b). What are primary and secondary cell? Give one example of each. (4)
(c). Explain cathodic protection and barrier protection method inorder to prevent corrosion. (4)
(d). Define corrosion. Write the chemical formula of rust. (3)

OR

- VI. (a). What are the differences between metallic conduction and electrolytic conduction. (4)
(b). Distinguish between galvanic cell and electrolytic cell. (4)
(c). Explain any four factors that affect adsorption. (4)
(d). List any three conditions required for the rusting of iron. (3)

UNIT-II

- VII. (a). Define the following terms.
(i). Catenation. (ii). Isomerism. (4)
(b). Write the monomers present in the following polymers.
(i). Buna-S. (ii). Teflon. (iii). Bakelite. (iv). Neoprene. (4)
(c). Write any four comparison of solid, liquid and gaseous fuels. (4)
(d). List any three harmful effects of acid rain. (3)

OR

- VIII. (a). Explain the reason for the uniqueness of carbon atom. (4)
(b). Differentiate homopolymers and copolymers with one example for each. (4)
(c). What are propellants? Explain the classification of propellants based on physical state. (4)
(d). List any three air pollutants and write one adverse effect of each pollutant on environment. (3)
