TED (10) 1003 A
(Revision -2010)

N20 – R01434

Reg. No……
Signature …….

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

APPLIED SCIENCE – I (PHYSICS)

[Maximum Marks: 50] [Time: 1 ½ Hours]

PART-A

[Maximum Marks: 4]
(Answer ***all*** questions in one or two sentences. Each question carries 2 marks)

I. 1. State Hooke's Law.

2. Write Dimensional formula of work, power. (2 x 2 = 4)

PART-B

[Maximum Marks: 16]
(Answer any ***two*** full questions. Each question carries ***8*** marks)

II 1. Distinguish between stress and strain. Deduce the expression for bulk modulus. (4)

2. State parallel and perpendicular axis theorem of moments of inertia. (4)

III 1. Derive the expression for distance travelled by a body during n^{th} second of its motion. (4)

2. Prove the principle of conservation of linear momentum from Newton's second and third law (4)

IV 1. Illustrate Banking of curve with its advantages. (4)

2. Explain recoiling of gun. A gun of mass 1000kg fires a shot of mass 5kg with a velocity 100m/s. Find recoil velocity of gun. (4)

PART-C

[Maximum Marks: 30]
(Answer ***one*** full question from each Unit. Each full question carries 15 marks)

UNIT -I

V (a) Write advantages and disadvantages of Friction. (4)

(b) Derive the expression for range and maximum range covered by a projectile. (6)

(c) A car of mass 2000 kg takes a round turn of radius 50m with a speed 10m/s. Calculate centripetal force needed. (5)

OR

VI (a) What is impulse of force? Show that impulse is equal to change in momentum. (4)

(b) Derive the expression for period simple pendulum by dimensional analysis. (6)

(c) A body is projected with a velocity 49m/s at an angle 30^0 to horizontal. Calculate maximum height attained by body. (5)

UNIT -II

VII (a) Explain the terms elastic limit, elastic fatigue. (4)

(b) Derive the expression for moment of inertia of disc about an axis through its centre and perpendicular to its plane. (6)

(c) A stone of mass 1kg attached to a string of length 0.3m is rotating at 150 rpm. Determine its angular momentum. (5)

OR

VIII (a) Write a short note on geostationary satellite. (4)

(b) Derive the expression for orbital velocity and period of satellite. (6)

(c) Calculate the orbital velocity of a satellite at a height 300Km from the surface of earth. $M = 6 \times 10^{24}$kg, $G = 6.6 \times 10^{-11}$ Nm^2kg^2, R = 6400 Km. (5)

ZD (10) 1003 B

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N20-R01430

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

APPLIED SCIENCE-I (CHEMISTRY)

[Maximum marks: 50] (Time: 1 ½ Hours)

PART – A

[Maximum marks: 4]

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

I. (1). Define normality.

(2). What are nanomaterials? Give two examples. (2 x 2 = 4)

PART – B

[Maximum marks: 16]

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

II. (a). Explain redox reaction with an example.

(b). Distinguish between atom and molecule.

III. (a). Give any four applications of nanomaterials.

(b). What are the disadvantages of hard water?

IV. (a). Calculate the molarity of H_2SO_4 which contains 9.8 g in 100 ml.

(Atomic weight H = 1, S = 32, O = 16)

(b). What is the reason for temporary hardness of water? How it can be removed. (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). Balance the following chemical equations. (4)

(i). $Fe+H_2O \rightarrow Fe_2O_3+H_2$ (ii). $H_2+N_2 \rightarrow NH_3$

(b). Calculate the molecular weight of the following compounds (4)

(i). NH_4OH. (ii). $Ca(OH)_2$. (iii). $C_6H_{12}O_6$. (iv). Na_2CO_3

(Atomic mass : H-1, C-12, O-16, N-14, Ca-40, Na-23)

(c). Explain acidic and basic buffer with one example for each. (4)

(d). Define ionic product of water. Give its mathematical expression. (3)

OR

VI. (a). Explain Arrhenius concept of acids and bases with two examples for each. (4)

(b). Write short notes on (i). Acid-base indicators (ii). Standard solution. (4)

(c). Define pH. Calculate the pH of 0.1 molar NaOH solution. (4)

(d). 20mL of KOH was neutralized by 25ml of 0.4N HNO_3. Calculate the normality of KOH solution. (3)

UNIT-II

VII. (a). Draw a flow chart showing the production of potable water for municipal supply. (4)

(b). Explain the removal of permanent hardness by ion-exchange method. (4)

(c). List any four properties of carbon nanotubes. (4)

(d). Explain any one method for the synthesis of carbon nanotubes. (3)

OR

VIII. (a). Give the characteristics of potable water. (4)

(b). Differentiate between soft water and hard water. (4)

(c). What are carbon nanotubes? Give any two applications. (4)

(d). What is sterilization? Mention any two sterilization methods. (3)

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