CHOUDHARY'S Sample Question Paper CLASS: XI APPLIED MATHEMATICS

(Subject Code: 241)

Term – 2 *SET NO.- 1/2022*

Session: 2021-22

Time Allowed: 2 hours   **Maximum Marks: 40**

General   Instructions:

1. This question paper contains **three sections – A, B and C**. Each part is compulsory.

2. **Section – A** has **6 short answer type (SA1) questions** of **2** marks each. Internal choice has been provided in two questions.

3. **Section – B** has **4 short answer type (SA2) questions** of **3** marks each. Internal choice has been provided in one question.

4. **Section – C** has **4 long answer type questions (LA)** of **4** marks each. Internal choice has been provided in one question

5. **Q 14** is a **case-based problem** having **2** sub parts of **2** marks each.

SECTION – A

1	**6** boys and **5** girls are to be seated for a photograph in a row such that no two girls sit together and no two boys sit together. Find the number of ways in which this can be done? **OR** How many different words, each containing **2** vowels and **3** consonants, can be formed with **5** vowels and **17** consonants?	2
2	Find the derivative of $\frac{ax+b}{px^2+qx+r}$ with respect to x.	2

3	**Tanishkaa** borrows a certain sum of money and pays it back in two years in two equal annual instalments. If the compound interest at 10% p.a. reckoned and if she pays back annually ₹ 9680, what sum did she borrow?	2
4	Find the coordinates of the centre and the radius of the circle $2(x^2 + y^2) = 4x + 6y + 43$. **OR** Find the equation of the parabola with focus (2, 0) and directrix x = - 2.	2
5	In class **XI** of a school, **40%** of the students study Mathematics and **30%** study Biology. **10%** of the class study both Mathematics and Biology. If a student is selected at random from the class, find the probability that he will be studying Mathematics or Biology.	2
6	A retailer buys a TV from a manufacture for **₹25,000**. He marks the price of the TV **20%** above the cost price and sells it to a consumer at **10%** discount on the marked price. If the sales are intra–state and rate of GST is **12 %**, find: **(a)** Consumer's cost price of TV inclusive of Tax (under GST) **(b)** GST paid by the retailer to the Central and State Government.	2
	SECTION – B	
7	If a parabolic reflector is 20 cm in diameter and 5 cm deep, find the focus. **OR** Find the equation of a circle passing through the point (5, 7), (6, 6) and (2, -2). Also find its centre and radius.	3

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8	A bag contains **3** red and **4** black balls and another bag has **4** red and **2** black balls. One bag is selected at random and from the selected bag a ball is drawn. Let A be the event that the first bag is selected, B be the event that the second bag is selected and C be the event that the ball drawn is red. Find: **(i)** P(A), **(ii)** P(B), **(iii)** P(C│A) and **(iv)** P(C│B).	3
9	One bag contains **4** white and **5** black balls. Another bag contains **6** white and **7** black balls. A ball is transferred from first bag to the second bag and then a ball is drawn from the second bag. Find the probability that the ball drawn is white?	3
10	Find the present value of a regular annuity of ₹1,000 payable for 3 years at 12% per annum compounded annually? [Given $(1.12)^{-3}$ = 0.7119].	3

SECTION – C

11	If the different permutations of all the letters of the word **"EXAMINATION"** are listed as in the dictionary, how many words are there in this list before the first word starting with **E** ?	4
12	Suppose f(x) = $\begin{cases} a + bx, x < 1 \\ 4, \ x = 1 \\ b - ax, x > 1 \end{cases}$ And, if $\lim_{x \to 1} f(x) = f(1)$. What are the possible values of 'a' and 'b'. **OR** G(x) = $(5x^3 + 3x - 1)(x - 1)$, find the derivative.	4

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13	Find the amount of regular annuity of ₹5,000 payable at the end of each year for 3 years at 10% per annum, compounded annually.	**4**
14	Income Tax Department Ministry of Finance Government of India	**4**

14 (continued)

In the financial year 2019-20, Mr Nandy's (45 years old) annual income from the salary was ₹ 9,35,000 (exclusive of HRA) and income from interest on savings account is ₹15,080. He deposited ₹11,000 per month in G.P.F. and paid ₹34,000 as LIC premium. He donated ₹30,000 in National Security Fund. He paid ₹25,000 as interest on education loan for higher studies of his son.

Assume the following for Computation of Income Tax

Taxable Income:	**Income tax**
Up to ₹2,50,000	: Nil
₹ 2,50,000 - ₹5,00,000	: 5% of taxable income exceeding ₹ 2,50,000
₹ 5,00,000 - ₹7,50,000	: ₹12,500 + 10%of taxable income exceeding ₹ 5,00,000
₹ 7,50,000 - ₹10,00,000 and above	: ₹ 37,500+ 15% of taxable income exceeding ₹ 7,50,000

Health and Education Cess = 4% of Income tax
Standard Deduction = ₹ 50,000

(a) Calculate the taxable income

(b) Calculate the income tax he has to pay at the end of the financial year.

(Apply other applicable rules for calculating the income tax liability).

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