CHOUDHARY'S Sample Question Paper <u>CLASS: XI</u> APPLIED MATHEMATICS

(Subject Code: 241)

<u>Term – 2</u> *SET NO.- 2/2022*

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.

<u>SECTION – A</u>

1	Prove that $(0)! = 1$ **OR** If there are 25 buses plying between places Howrah to Salt Lake. In how many ways can a round trip from Howrah be made if the return journey was made on **(i)** the same bus **(ii)** a different bus.	**2**
2	Find the derivative of $f(x) = 1 + x + x^2 + x^3 + \ldots\ldots + x^{50}$ at $x = 1$.	**2**
3	A sum of ₹8,400 is borrowed to be paid back in 2 years by two equal annual instalments at 10% C.I. Find the annual instalment.	**2**
4	Find the equation of the parabola which is symmetric about the y-axis and passes through the point (2, -3). **OR** Find the equation of the circle, the co-ordinates of the end points of whose diameter are (-1, 2) and (4, -3).	**2**
5	A box contains 10 red marbles, 20 blue marbles and 30 green marbles. 5 marbles are drawn from the box. What is the probability that: **(i)** all will be blue? **(ii)** At least one will be green? (do not simplify the final answer)	**2**

6	The printed price of a carpet is ₹2,500. A wholesaler in West Bengal buys the carpet from a manufacturer in Maharahtra at a discount of 12% on the printed price. The wholesaler sells the carpet to a retailer in Bihar at 32% above the marked price. If the rate of GST on the carpet is 5%. Find: **(a)** The price inclusive of tax (under GST) at which the wholesaler bought the carpet **(b)** The price inclusive of tax (under GST) at which the retailer bought the carpet.	**2**
	SECTION – B	
7	The parabola $y^2 = px$ passes through the point (2, -4). Find its latus rectum and focus. Also find a point on the parabola whose focal distance is 8. **OR** Prove that the radii of the circles: $x^2 + y^2 = 1$; $x^2 + y^2 - 2x - 6y - 6 = 0$ and $x^2 + y^2 - 4x -12y - 9 = 0$ are in A.P.	**3**
8	Mother, father and son line up at random for a family picture. Find $P(A|B)$, if A and B are defined as follows: **A** : Son on one end, **B** : Father in the middle.	**3**
9	Find the probability of drawing a one rupee coin from a purse with two compartment one of which contains 3 fifty paise coins and 2 one rupee coins and other contains 2 fifty paise coins and 3 one- rupee coins.	**3**
10	Mr Choudhary lives in Kolkata. The reading of electric meter of his house is found to be 4670 units. If the previous reading was 4902 units and consumption load is 4KVA, calculate his electricity bill for that month. Assume the following Tariff plan (including Energy tax)	**3**

Monthly consumption	First **25 U**	Next **35 U**	Next **40 U**	Next **50 U**	Next **>**
Gross rate (in Paise)	489	540	641	716	733

Fixed charges =₹/KVA/Month = ₹15
Surcharge = ₹ 0.20 per unit.

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SECTION – C

11	How many words(with or without any dictionary meaning) can be made from the letters of the words '**MONDAY**', assuming that no letter is repeated if:
	    (a) 4 letters are used at a time?
	    (b) all letters are used at a time?
	    (c) all letters are used but the first is a vowel?
		4

12	Evaluate: $\lim\limits_{x \to 2} \dfrac{x^{10} - 1024}{x^5 - 32}$ by using formula. **OR** Evaluate left hand limit and right handed limit of the following function f(x) $= \begin{cases} \dfrac{\lvert x-3 \rvert}{x-3}; & x \neq 3 \\ 0; & x = 3 \end{cases}$, at x = 3 State whether the function is continuous at x = 3 or not?	**4**
13	A bank pays 8% interest per annum compounded half yearly. What equal amount should be deposited at the end of each half year for $1\frac{1}{2}$ years to get an amount of ₹2000 at the end 18 months. [take $1.04^3 = 1.125$]	**4**

14	
	
	In financial year 2019-20 the income of Mr Ashwani Kumar is ₹ 9,70,000 inclusive of HRA. His savings and donations are given below:
	
	SAVINGS
	  • Contribution towards Provident Fund: ₹ 8700per month
	  • Contribution towards LIC premium: ₹ 42,000
	  • Investment in National Savings Certificate: ₹ 15,000
		4

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DONATIONS:

- To Prime Minister's Relief Fund: ₹10,000 (eligible for 100% tax exemption).

- To religious institutions: ₹8000 (eligible for 50% tax exemption)

OTHERS DETAILS:

- He took a home loans of ₹24,00,000 from the State Bank of India, Bhawanipur, Kolkata and paid ₹76,000 as interest on home loans and ₹20,000 as principal of home loan.

Slab for Computation of Income Tax

Taxable income		Income tax
Upto ₹2,50,000	:	Nil
₹2,50,000 - ₹5,00,000	:	5% of taxable income taxable income exceeding ₹2,50,000
₹ 5,00,000 - ₹10,00,000	:	₹12,500 + 20% taxable income exceeding ₹5,00,000
₹10,00,000 and above	:	:₹1,12,500 + 30% of taxable income exceeding ₹10,00,000

Standard deduction: ₹ 50,000

Health and Education Cess: 4% of income tax.

If a sum of ₹4,000 per month was deducted every month towards income tax from his salary for the first 11 months of the year.

    (a) Calculate the taxable income

    (b) Calculate Mr Kumar's income tax liability in the last month of the year.

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

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