

**CHOUDHARY'S Sample Question Paper CLASS: XI  
APPLIED MATHEMATICS**

**(Subject Code: 241)**

**Term - 2 SET NO.- 3/2022**

**Session: 2021-22**

<b>Time Allowed: 2 hours</b>		<b>Maximum Marks: 40</b>
<b>General Instructions:</b>		
1. This question paper contains <b>three sections – A, B and C.</b> Each part is compulsory.		
2. <b>Section – A</b> has <b>6 short answer type (SA1) questions</b> of <b>2</b> marks each. Internal choice has been provided in two questions.		
3. <b>Section – B</b> has <b>4 short answer type (SA2) questions</b> of <b>3</b> marks each. Internal choice has been provided in one question.		
4. <b>Section – C</b> has <b>4 long answer type questions (LA)</b> of <b>4</b> marks each. Internal choice has been provided in one question		
5. <b>Q 14</b> is a <b>case - based problem</b> having <b>2</b> sub parts of <b>2</b> marks each.		
<b>SECTION – A</b>		
<b>1</b>	If $n_{Pr} = 720$ and $n_{Cr} = 120$ , find n and r. <b>OR</b> A question paper has two parts, part A and part B, each containing 10 questions. if the student has to choose 8 questions from Part A and 5 questions from Part B, in how many ways can he choose the question.	<b>2</b>
<b>2</b>	Differentiate $\frac{ax+b}{cx+d}$ with respect to x.	<b>2</b>
<b>3</b>	Determine the rate of interest for a sum that becomes $\frac{216}{125}$ times of itself in 3 years compounded annually.	<b>2</b>
<b>4</b>	Find the equation of the circle whose radius is 4 and which is concentric with the circle $x^2 + y^2 + 2x - 6y = 0$ . <b>OR</b> Find the co-ordinates of the focus, the equation of the directrix and the length of the latus rectum of the parabola $y^2 = 12x$ .	<b>2</b>

<b>5</b>	A and B are events such that $P(A) = 0.42$ , $P(B) = 0.48$ , $P(A \text{ and } B) = 0.16$ . Determine: (i) $P(\text{not } A)$ , (ii) $P(\text{not } B)$ and (iii) $P(A \text{ or } B)$ .	<b>2</b>
<b>6</b>	Manufacturer A sells a washing machine to a dealer B. the dealer B sells it to a consumer at a profit of ₹1,500. if the sales are intra- state and the rate of GST is 12 %, find: (i) the amount of tax (under GST) paid by the dealer B to the Central Government, (ii) the amount that the consumer pays for the machine.	<b>2</b>
<b><u>SECTION - B</u></b>		
<b>7</b>	How high is a parabolic arch of span 24m and height 18m at a distance of 8m from the centre of the span? <b>OR</b> Find the equation of the circle, which passes through the origin and makes intercepts 4 and 2 on the X and Y axes respectively.	<b>3</b>
<b>8</b>	Two coins are tossed. What is the probability of coming up two heads if it is known that at least one head comes up?	<b>3</b>
<b>9</b>	A bag contains 4 red and 3 black balls. a second bag contains 2 red and 4 black balls. one bag is selected at random, from the selected bag one ball is drawn. Find the probability that the ball drawn is red.	<b>3</b>
<b>10</b>	Find the nominal rate (compounded quarterly) which is equivalent to 5% effective rate of interest. [Given $(1.05)^{\frac{1}{4}} = 1.01227$ .]	<b>3</b>
<b><u>SECTION - C</u></b>		
<b>11</b>	If n and r are non-negative integers such that $r \leq n$ , prove that: $n_{C_r} + n_{C_{r-1}} = n + 1_{C_r}$	<b>4</b>

12	<p>Evaluate: <math>\lim_{x \rightarrow 2} \frac{x^3 - 4x^2 + 4x}{x^2 - 4}</math>.</p> <p style="text-align: center;"><b>OR</b></p> <p>If <math>x\sqrt{1+y} + y\sqrt{1+x} = 0</math>, Prove that <math>\frac{dy}{dx} = -\frac{1}{1+x^2}</math>.</p>	4
13	<p>A man borrows ₹10,000 and agrees to pay back in 3 equal instalments of 6 months each, the first payment to be made at the end of 6 months of borrowing. Calculate the value of each instalment, if the interest is charged at the rate of 10% per annum. [Given <math>(1.05)^{-3} = 0.8638</math>].</p>	4
14	<div style="text-align: center;">  </div> <p>The annual income of Sri Abhijeet Sharma from a business in the financial year 2019-20 is ₹33,26,680. His other incomes, savings and donations are given below:</p> <p><b>OTHER INCOMES</b></p> <ul style="list-style-type: none"> <li>• He receives an interest of ₹20,000 on savings bank account and ₹55,000 on the FD with a bank during the financial year.</li> <li>• He receives a rent of ₹3,60,000 on property.</li> </ul> <p><b>SAVINGS</b></p> <ul style="list-style-type: none"> <li>• Investment in NSC: ₹1,00,000</li> <li>• Investment in Equity Linked Saving Scheme (ELSS): ₹10,000 per month.</li> <li>• Annual premium towards his L.I.C. policy: ₹50,000</li> <li>• Premium of Mediclaim: ₹ 40,000.</li> </ul>	4

<b>Slab for Computation of Income Tax Income</b>	<b>Income tax</b>
Upto ₹2,50,000	: Nil
₹2,50,001 - ₹5,00,000	: 5%
₹ 5,00,001 - ₹10,00,000	: 20%
₹10,00,001 and above	: 30%

- Health and Education Cess = 4% of Income tax
- Standard Deduction = ₹ 50,000
- Max deduction allowed U/S 80D (Mediclaime) = ₹ 25,000
- Max deduction allowed U/S 80TTA(Bank Interest) = ₹ 10,000
- Deduction allowed on property rent under Sec 24 = 30% on rent  
(Use other applicable rules for calculating the income tax liability).

**(a)** Calculate the taxable income

**(b)** Total income tax he has to pay at the end of the financial year if his TDS during the year is ₹1,65,000.

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