Indian Institute of Information Technology Sri City (IIITS)

Name of the Exam: DSMA   Duration: 1.5 hrs   Max. Marks: 15

Instructions:

1. Clearly write your **Roll Number** and **Name** in **capital letters** on the **top right corner** of every page of the answer sheets. It is mandatory.
2. **All questions are mandatory.**
3. Marks are indicated in [ ] after each question.
4. Rough Work should be done separately, not in the answer sheet.
5. **Answers should be reasoned and derived clearly, not a single word answer.**
6. You are required to write the answers in **A4 sheets.**
7. Preferably use a **ballpoint pen**. The writing should be **readable after scanning**. (This is very important)
8. This is a proctored exam. You need to keep your **video on** throughout the exam.
9. After finishing the writing part, you are expected to **submit the scanned copy of the hand written answer sheets in one consolidated PDF format to the link provided**. The link will be provided to upload the pdf.
10. Copying in any form will be dealt with strictly. Both "copied to" and "copied from" will be penalized.

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1. Find whether the following statement is a tautology or not, by using truth tables. Show the truth table.   **[2]**

$$[(r \vee q) \wedge (\neg r \vee p)] \rightarrow (q \vee p)$$

2. Let G(m,n) means that student m likes to play game n, where the domain for m consists of all students in your class and the domain for n consists of all online games. Express the following statement by a simple English sentence.   **[2]**

$$\exists m \, \exists z \, \forall n \, (G(m,n) \leftrightarrow G(z,n))$$

3. Verify whether the given argument is valid or not and explain why?   **[3]**

   No UG3 or UG4 student enrolled in Discrete Mathematics class. Raj enrolled in Discrete Mathematics. Therefore Raj is not a UG3 student.

4. Write the converse, inverse and contrapositive of the following statement: **[3]**

   If you work hard, then you will pass the exam.

5. Prove or disprove. For all $x \in R$, If $x^2 + 1 < 0$, then $x^5 \geq 4$. **[1]**

6. Determine whether f is a bijective function from R to R if $f(x) = -3x + 4$. **[2]**

7. Let A and B be two sets. Show that $A = (A \cap B) \cup (A - B)$. (without venn diagram) **[1]**

8. Suppose A = {Red, Blue}, B = $(10 , 12] \cap$ **Z** and C = B $\cup$ {200} , where **Z** is the set of all integers. Find A×C. **[1]**