PJ-582

I Semester M.C.A. Examination, February – 2020
(CBCS Scheme)
COMPUTER SCIENCE
MCA – 104T : Discrete Mathematics

Time : 3 Hours

Max. Marks : 70

PART – A

Answer **any five** questions. Each question carries **six** marks. **5×6=30**

1. (a) Suppose A, B ⊆ $\mathbf{Z} \times \mathbf{Z}$ with $A=\{(x, y)|y=5x-1\}$, $B=\{(x, y)|3x-y=-7\}$. **3+3**
      Find $\overline{A \cup B}$.
   (b) For any set A, prove that $A \times \phi = \phi \times A = \phi$

2. (a) Let $A=\{1, 2, 3, 4, 6, 8, 12\}$. On A, define the partial ordering relation R **3+3**
      by xRy if and only if x divides y. Draw the Hasse diagram for R.
   (b) Let $f, g : \mathbf{R} \rightarrow \mathbf{R}$, are defined by $f(x)=3x+7$ and $g(x)=x(x^3-1)$ for all $x \in \mathbf{R}$.
      Verify that f is one-one but g is not.

3. Use mathematical induction to prove that $1^2+2^2+3^2+...+n^2 = \dfrac{n(n+1)(2n+1)}{6}$, **6**
   where $n \in \mathbf{Z}^+$.

4. Prove that $R \rightarrow S$ is a valid conclusion from the premises $P \rightarrow (Q \rightarrow S)$, $\neg R \vee P$, **6**
   and Q.

5. A collection of 10 electric bulbs contain 3 defective ones. **2+2+2**
   (i) In how many ways can a sample of 4 bulbs be selected ?
   (ii) In how many ways can a sample of four bulbs be selected which contain
        2 good ones and 2 defective ones ?
   (iii) In how many ways can the sample of 4 bulbs be selected so that either
         the sample contains 3 good ones and 1 defective ones or 1 good and
         3 defective ones ?

6. Show that the open interval (0, 1) is uncountable. **6**

7. Prove that every set of 37 positive integers contain at least two integers that **6**
   leave the same remainders upon division by 36.

P.T.O.

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S Ashworth

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The Top Books of the Year Nmathematics Question Paper 2july The year 2023 has witnessed a remarkable surge in literary brilliance, with numerous compelling novels captivating the hearts of readers worldwide. Lets delve into the realm of top-selling books, exploring the fascinating narratives that have captivated audiences this year. Nmathematics Question Paper 2july : Colleen Hoovers "It Ends with Us" This touching tale of love, loss, and resilience has gripped readers with its raw and emotional exploration of domestic abuse. Hoover expertly weaves a story of hope and healing, reminding us that even in the darkest of times, the human spirit can triumph. Nmathematics Question Paper 2july : Taylor Jenkins Reids "The Seven Husbands of Evelyn Hugo" This spellbinding historical fiction novel unravels the life of Evelyn Hugo, a Hollywood icon who defies expectations and societal norms to pursue her dreams. Reids absorbing storytelling and compelling characters transport readers to a bygone era, immersing them in a world of glamour, ambition, and self-discovery. Discover the Magic : Delia Owens "Where the Crawdads Sing" This captivating coming-of-age story follows Kya Clark, a young woman who grows up alone in the marshes of North Carolina. Owens crafts a tale of resilience, survival, and the transformative power of nature, entrancing readers with its evocative prose and mesmerizing setting. These top-selling novels represent just a fraction of the literary treasures that have emerged in 2023. Whether you seek tales of romance, adventure, or personal growth, the world of literature offers an abundance of captivating stories waiting to be discovered. The novel begins with Richard Papen, a bright but troubled young man, arriving at Hampden College. Richard is immediately drawn to the group of students who call themselves the Classics Club. The club is led by Henry Winter, a brilliant and charismatic young man. Henry is obsessed with Greek mythology and philosophy, and he quickly draws Richard into his world. The other members of the Classics Club are equally as fascinating. Bunny Corcoran is a wealthy and spoiled young man who is always looking for a good time. Charles Tavis is a quiet and reserved young man who is deeply in love with Henry. Camilla Macaulay is a beautiful and intelligent young woman who is drawn to the power and danger of the Classics Club. The students are all deeply in love with Morrow, and they are willing to do anything to please him. Morrow is a complex and mysterious figure, and he seems to be manipulating the students for his own purposes. As the students become more involved with Morrow, they begin to commit increasingly dangerous acts. The Secret History is a exceptional and suspenseful novel that will keep you guessing until the very end. The novel is a cautionary tale about the dangers of obsession and the power of evil.

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