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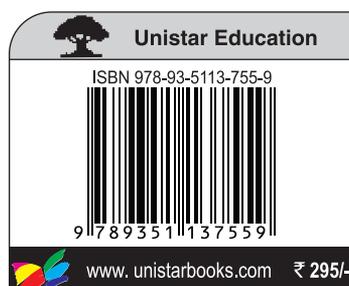


**For JRF and NET**

**Fully Solved Previous**  
**Paper II and III**

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- 600 Solved Questions of Paper-2 of UGC Net
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# June Paper II-2015

1. How many strings of 5 digits have the property that the sum of their digits is 7?  
 (a) 66                                      (b) 330                                      (c) 495                                      (d) 99

*ANS:-B*

Let five digit A, B, C, D, E then  $A + B + C + D + E = 7$  given  $n = 7, r = 5$

we know that  $n + r - 1_{C_{r-1}}$

$$7 + 5 - 1_{C_{5-1}} \Rightarrow 11_{C_4} \Rightarrow \frac{11 \times 10 \times 9 \times 8}{4 \times 3 \times 2} = 330$$

2. Consider an experiment of tossing two fair dice, one black and one red. What is the probability that the number on the black die divides the number on red die?  
 (a) 22/36                                      (b) 12/36                                      (c) 14/36                                      (d) 6/36

*ANS:-C*

Total number of case	36
Red	Black
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.

1. 1 black divide all red (1, 2, 3, 4, 5, 6) = 6
2. 1 black divide all red (2, 4, 6) = 3
3. 1 black divide all red (3, 6) = 2
4. 1 black divide all red (4) = 1
5. 1 black divide all red (5) = 1
6. 1 black divide all red (6) = 1

Add all possible case

$$\Rightarrow 6 + 3 + 2 + 1 + 1 = 14$$

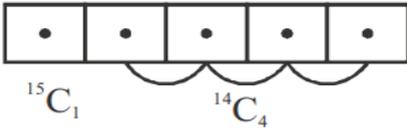
$$\text{Then, Probability} = \frac{\text{fa}}{\text{Total}} = \frac{14}{36}$$

*ANS: C*

3. In how many ways can 15 indistinguishable fish be placed into 5 different ponds, so that each pond contains at least one fish?  
 (a) 1001 (b) 3876 (c) 775 (d) 200

Ans:-A

Explanation:-



$$\begin{aligned} \text{Required ways} &= \frac{{}^{15}C_1 \times {}^{14}C_4}{15} = 15 \times \frac{14!}{15} \\ &= \frac{14 \times 13 \times 12 \times 11 \times 10}{10 \times 4} = \frac{14 \times 13 \times 12 \times 11}{4 \times 3 \times 2 \times 1} \\ &= 77 \times 13 = 1001 \end{aligned}$$

Ans: A

4. Consider the following statements: (1) Depth-first search is used to traverse a rooted tree. (2) Pre-order, Post-order and In order are used to list the vertices of an ordered rooted tree. (3) Huffman's algorithm is used to find an optimal binary tree with given weights. (4) Topological sorting provides a labelling such that the parents have larger labels than their children. Which of the above statement are true?  
 (a) (1) and (2) (b) (3) and (4) (c) (1), (2) and (3) (d) (1), (2), (3) and (4)

Ans:-C

(a) **DES**: is an algorithm for traversing or searching tree or graph data structure, one starts at the root (selecting some arbitrary node as the root in the case of a graph) and explores as far as possible along each branch before backtracking. (c) **Huffman's algorithm**: is a method for building extended binary tree with a weighted path length from a set of given weights initially construct a forest of singleton trees one associated with each weight. (b) Pre-order, In-order, Post-order, Rule of thumb, Breath first, first traversal... visit the root node (generally output traverse to left subtree: traverse to right subtree for sorted binary trees)

Correct option is (c)

5. Consider a Hamiltonian Graph (G) with no loops and parallel edges. Which of the following is true with respect to this Graph (G)?  
 (1)  $\deg(v) \geq n/2$  for each vertex of  $G$   
 (2)  $E(G) \geq (1/2)(n-1)(n-2) + 2$  edges  
 (3)  $\deg(v) + \deg(w) \geq n$  for every  $v$  and  $w$  not connected by an edge.  
 (a) (1) and (2) (b) (2) and (3) (c) (1) and (3) (d) (1), (2) and (3)

Ans:- D

All properties follow. Therefore, correct option is (d).

Various properties of Hamiltonian Graph are as follows:-



4. The equivalent hexadecimal notation for octal number 2550276 is:  
 (a) FADED (b) AEOBE (c) ADOBE (d) ACABE

Sol. Binary equivalent of 2550276 is

A D O B E

010101101000010111110

How writing in pair of 4 bits converting to hexadecimal it becomes ADOBE.

Correct option is (c).

5. The CPU of a system having 1 MIPS execution rate needs 4 machine cycles on an average for executing an instruction. The fifty percent of the cycles use memory bus. A memory read/write employs one machine cycle. For execution of the programs, the system utilizes 90 percent of the CPU time. For block data transfer, an IO device is attached to the system while CPU executes the background programs continuously. What is the maximum IO data transfer rate if programmed IO data transfer technique is used?  
 (a) 500 Kbytes/sec (b) 2.2 Mbytes/sec  
 (c) 125 Kbytes/sec (d) 250 Kbytes/sec

Sol. CPU speed:  $10^6$  instructions/sec  $\rightarrow$  1 MIPS

1 CPU instruction = 4 machine cycles (average)

1 memory access (R/W) = 1 machine cycle

CPU utilization = 90%

Programmed IO

Each byte transfer requires 4 cycle (instruction)

In status

Check status

Branch

Read/Write data is memory

Max. data transfer rate = CPU/4, speed =  $10^6/4 = 250$  Kbytes/sec.

Correct option is (d)

6. The number of flip-flops required to design a modulo - 272 counter is:  
 (a) 8 (b) 9 (c) 27 (d) 11

Sol. For construction a modulo - N counter we need  $\log_2$  number of flip-flops the value rounded to next highest whole number, so  $\log_2 272 = 9$  i.e.  $2^9 > N$ .

Correct option is (b).

7. Let  $E_1$  and  $E_2$  be two entities in E-R diagram with simple single valued attributes.  $R_1$  and  $R_2$  are two relationships between  $E_1$  and  $E_2$  where  $R_1$  is one - many and  $R_2$  is many-many.  $R_1$  and  $R_2$  don't have any attribute of their own. How many minimum number of tables are required to represent this situation in the Relational Model?  
 (a) 4 (b) 3 (c) 2 (d) 1

Sol. Storing entities  $E_1$  and  $E_2$  should be converted into table for  $R_1$ , which is one to many relation there is no need of a separate table. The many side of relation will include the primary key of "one" side as foreign key for  $R_2$ , which is many to many relation a separate table is required by including the primary key of  $E_1$  and  $E_2$  as foreign. Hence, we require a minimum of 3 table.

Correct option is (b).