

GANPAT UNIVERSITY

B.TECH. SEMESTER – III (CE&IT) CBCS (NEW) REGULAR EXAMINATION NOV – 2015

2HS301: Discrete Mathematics & Probability

TIME: 03 HRS

TOTAL MARKS: 60

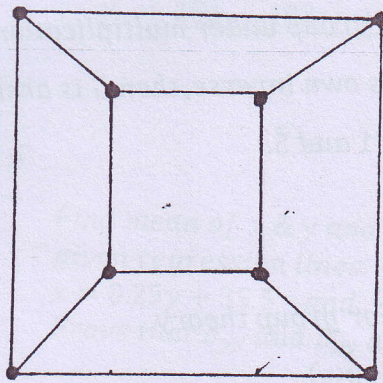
Instruction:

1. This question paper has two sections. Attempt each section in separate answer book
2. Figures on right indicate marks.
3. Be precise and to the point in answering the descriptive question.

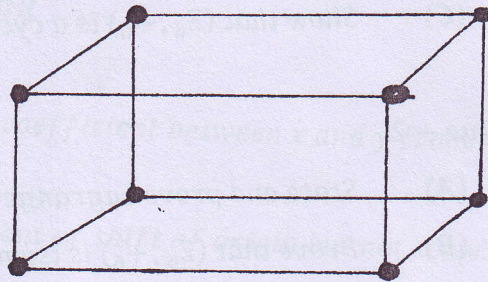
SECTION – I

Que – 1

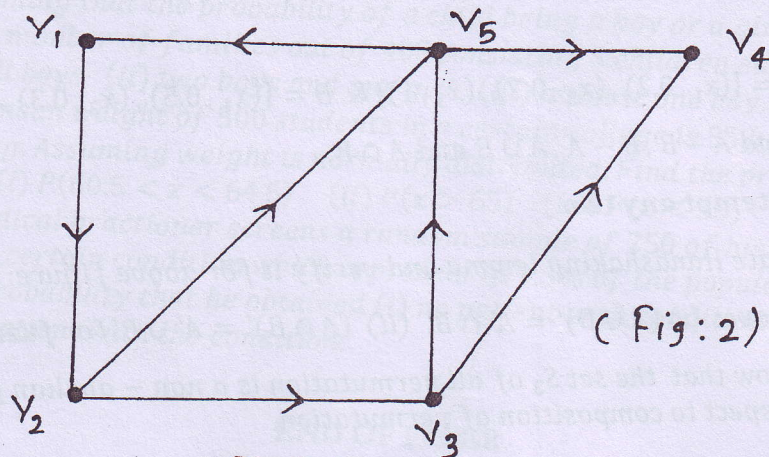
- (A) Define following terms with an examples. (4)
- (i) A Graph (ii) Loop (iii) Degree of a vertex (iv) Pendant vertex
- (B) Define Isomorphic graphs. Check whether the given graphs are isomorphic or not? (3)



(Fig: 1)



- (C) Define Node base and find it for given digraph. (3)



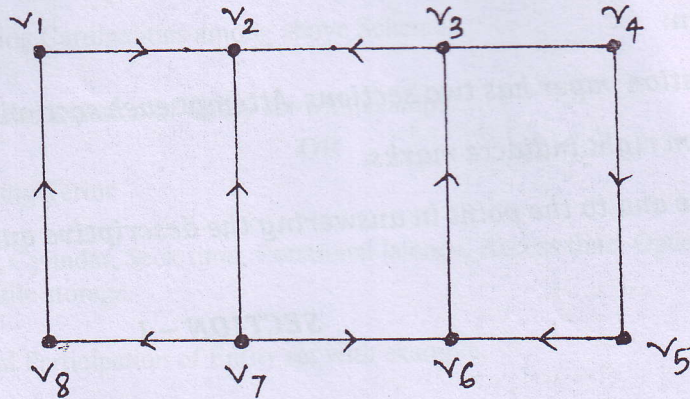
(Fig: 2)

OR

Que - 1

- (A) For a given graph check it is weakly connected or strongly connected or unilaterally connected? why? (4)

(Fig:3)



- (B) Define Adjacency matrix and Incident matrix for digraph with example. (3)
- (C) Prove that, in a undirected graph, the total number of odd degree verices is even. give atleast one example of it. (3)

Que - 2

- (A) Show that fourth root of unity form a group under multiplication. (4)
- (B) Show if every element of group G is its own inverse, then G is abelian (3)
- (C) Show that $(Z_6, +_6)$ is a cyclic group by $\bar{1}$ and $\bar{5}$. (3)

OR

Que - 2

- (A) State and prove Lagrange's theorem for group theory. (4)
- (B) Prove that $(Z_6, +_6)$ is isomorphic to (Z_7, \times_7) . (3)
- (C) Show that intersection of two subgroups is also a subgroup. (3)

Que - 3

- (A) $A = \{(x_1, 0.2), (x_2, 0.7), (x_3, 1)\}$ & $B = \{(x_1, 0.5), (x_2, 0.3), (x_3, 0.1)\}$ then Find $A - B, B - A, A \cup B$ and $A \cap B$. (4)
- (B) Attempt any two
- (1) State Handshaking lemma and verify it for above figure: 2 (3)
- (2) Prove: (i) $(A \cup B)' = A' \cap B'$ (ii) $(A \cap B)' = A' \cup B'$ for fuzzy subsets. (3)
- (3) Show that the set S_3 of all permutation is a non - abelian group with respect to composition of permutation. (3)

SECTION – II

Que – 4

- (A) Compute correlation coefficient and probable error for given data. (5)

x	10	11	14	14	20	22	16	22
y	12	14	15	16	21	26	21	15

- (B) Find rank correlation coefficient for following data. (5)

x	65	63	67	64	68	62	70	66	68	67	69	71
y	68	66	68	65	69	66	68	65	71	67	68	70

OR

Que – 4

- (A) Derive in usual notation. $\rho = 1 - \frac{6 \cdot \sum d_i^2}{n(n^2 - 1)}$ (5)

- (B) Prove that $r_{xy} = r_{uv}$; where r_{xy} is correlation coefficient. (5)

Que – 5

- (A) Derive the equation of regression line of y on x. (5)

- (B) Obtain two regression line for the available information. (5)

x	105	104	102	101	100	99	98	96	93	92
y	101	103	100	98	95	96	104	92	97	94

OR

Que – 5

- (A) Find mean of x & y and correlation coefficient between x and y from given regression lines. (5)

$$x = 0.25y + 35.5 \quad \text{and} \quad y = 2.25x - 58$$

- (B) Prove that b_{yx} and b_{xy} are independent of shift of origin but not scale. (5)

Que – 6 Attempt any two

- (A) Assuming that the probability of a child being a boy or a girl is equal. Find number of families out of 400 consisting 3 children each having (i) all boys (ii) two boys and one girl (iii) at most one boy. (5)

- (B) The mean weight of 500 students in a certain college is 55 kg. and S.D. is 5 kg. Assuming weight is normally distributed. Find the probability that (i) $P(60.5 < x < 64.5)$ (ii) $P(x > 65)$ (iii) $P(x < 50)$ (5)

- (C) A medical practioner screens a random sample of 250 of his patients for a certain condition which is present in 1.5% of the population. Find the probability that he obtained (i) no patient with condition (ii) at least two patient with the condition. (5)

END OF PAPER

Areas under standard normal curve.

Z	0	1	2	3	4	5	6	7	8	9
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0754
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2258	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2518	0.2549
0.7	0.2580	0.2612	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2996	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4818
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990
3.1	0.4990	0.4991	0.4991	0.4991	0.4992	0.4992	0.4992	0.4992	0.4993	0.4993
3.2	0.4993	0.4993	0.4994	0.4994	0.4994	0.4994	0.4994	0.4995	0.4995	0.4995
3.3	0.4995	0.4995	0.4995	0.4996	0.4996	0.4996	0.4996	0.4996	0.4996	0.4997
3.4	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4998
3.5	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998
3.6	0.4998	0.4998	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999
3.7	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999
3.8	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999
3.9	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000