

[Time: 3 Hours]

[Marks:80]

- N.B:
- Please check whether you have got the right question paper.
1. Q.1 is compulsory; attempt any 3 questions out of remaining six questions.
 2. Assume any necessary data to justify the same.
 3. Figures to the right indicate full marks.
 4. Use of scientific calculator is allowed.

- Q.1 a) If $A = \{1,2,3,6,12,18\}$ and the partial order relation R is the divides relation i.e. aRb iff (a divides b). 10
- i) Draw the Hasse diagram for the poset (A,R)
 - ii) Find the minimal elements, maximal elements, least & greatest elements if exists.
 - iii) If $B = \{6,12,18\}$ and find all the lower bounds and upper bounds of B and LUB and GLB of B
- Q.1 b) Without using truth table prove $(P \rightarrow Q) \wedge (R \rightarrow Q) \equiv (P \vee R) \rightarrow Q$ 05
- Q.1 c) What are the characteristics of a complex business problem, explain any two. 05
- Q.2 a) The board of directors have to choose a leader for a company whose founder is about to retire. There are three competing candidates TOM, DICK & HARRY and four competing criteria Experience Education, Charisma and Age. Use AHP to choose the most suitable candidate. 15
(The CMI, consistency index and consistency Ratio need not be calculated)

The comparison matrix for pair wise Criteria is given below

CRITERIA	EXPERIENCE	EDUCATION	CHARISMA	AGE
EXPERIENCE	1	4	3	7
EDUCATION	1/4	1	1/3	3
CHARISMA	1/3	3	1	5
AGE	1/7	1/3	1/5	1

Also, the Relative criteria for alternatives is

EXPERIENCE	TOM	DICK	HARRY
TOM	1.00	1/4	4.00
DICK	4.00	1.00	9.00
HARRY	1/4	1/9	1.00

EXPERIENCE	TOM	DICK	HARRY
TOM	1.00	3	1/5
DICK	1/3	1.00	1/7
HARRY	5	7	1.00

CHARISMA	TOM	DICK	HARRY
TOM	1.00	5	9.00
DICK	1/5	1.00	4.00
HARRY	1/9	1/4	1.00

AGE	TOM	DICK	HARRY
TOM	1.00	1/3	5.00
DICK	3.00	1.00	9.00
HARRY	1/5	1/9	1.00

- Q.2 b) Use Mathematical induction to prove the property $P(n)$ 05
 $P(n): 3^n + 2n - 1$ is divisible by 4 $\forall n \in \mathbb{N}$

Q.P. Code :09903

- Q.3 a) Use SAW method to determine the best car. The beneficiary criteria are Durability in years and Resale value, 10 others are non beneficiary criteria.

The measures for different criteria are given in the table below

Type of Car	MAINTANCE COST in Rs.	Purchase PRICE IN Rs.	DURABILITY IN YEARS	RESALE VALUE in Rs.
CAR1	800	350000	6.5	100000
CAR2	1000	1000000	10	450000
CAR3	1250	650000	10	290000

The weights for different criteria are

Type of car	MAINTANCE COST in Rs.	Purchase PRICE IN Rs.	DURABILITY IN YEARS	RESALE VALUE in Rs.
Weight	0.15	0.4	0.25	0.2

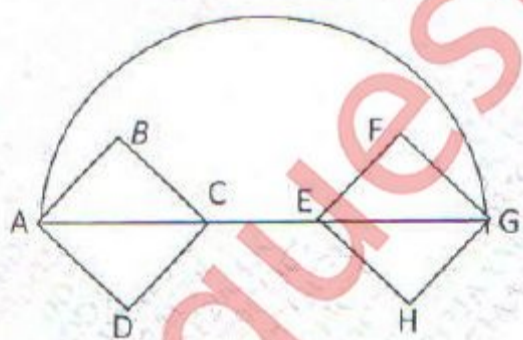
- Q.3 b) In a screening test for a disease. The frequency of the disease in a population is 0.5%. The test is highly accurate with 5% false positive rate and 10% false negative rate. A person takes the test and it comes positive. Construct a decision tree and use Baye's theorem to determine the probability that he has a disease? 10

- Q.4 a) State the "Tower's of Hanoi' problem and obtain the recurrence relation for the same. 10

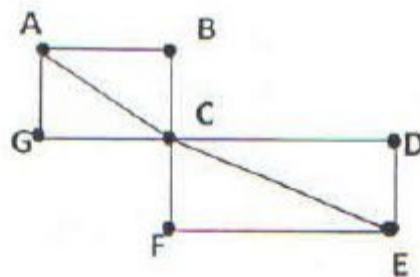
- Q.4 b) Write the truth table for α and find the principal CNF & Principal DNF of α
 $\alpha = (\sim P \vee \sim Q) \rightarrow (P \leftrightarrow Q)$ 10

- Q.5 a) The solution of the Recurrence relation $C_0 a_n + C_1 a_{n-1} + C_2 a_{n-2} = f(n)$ is $2^n + 3^n + 5$, find C_0, C_1, C_2 , 10

- Q.5 b) Find the Euler Path and Euler Circuit in the following graphs if they exists 10



GRAPH G1



GRAPH G2

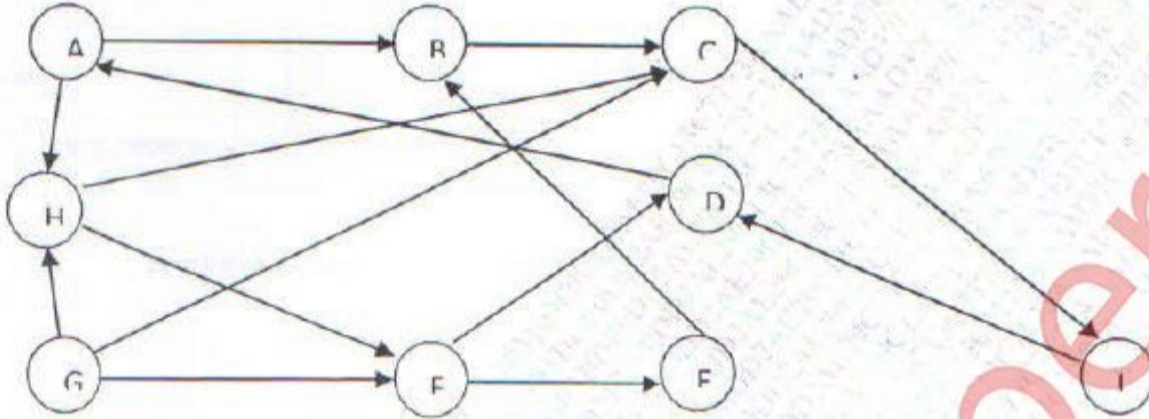
- Q.6 a) $A = \{a, b, c, d, e\}$, $R = \{(a, a), (a, d), (b, b), (c, d), (c, e), (d, a), (e, b), (e, e)\}$
 Determine the R^∞ relation using Warshall's Algorithm. 05

Q.P. Code :09903

Determine whether the relation R on the set A is reflective, irreflexive, symmetric, asymmetric, antisymmetric, transitive, identity relation. Give the necessary explanation to your answer. A=Set of Real numbers and aRb iff $|a-b| \leq 2$ 05

Q.6 c) Find the particular solution of the recurrence relation $a_n - 2a_{n-1} = 3 \times 2^n$ 05

Q.6 d) Find the Adjacency Matrix and Adjacency list for the following graph Vertices are shown in circles 05



DASHBOARD

1. Correction in Program Code:T8632 subject Name:Decision making & Mathematical Modelling Q.P code:09903

please refer below link for correction in the following questions.

Q.2 (a) 2ed Table Education instead of Experience

Q.6 (d) the vertices of the graph as shown in link

<https://drive.google.com/file/d/0ByXTaqID2t11QUJBU19mQVgzOVM/view?usp=sharing>

- Posted by tusharadmin on 2017-05-26 11:24:15

2. Correction in Program Code:T8632 subject Name:Decision making & Mathematical Modelling Q.P code:09903

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- Posted by tusharadmin on 2017-05-26 11:24:15

3. University of Mumbai (DEPDS): Exam Date- 26/05/2017. Question Paper link will be activated between 09:30 AM to 11:00 AM. login to muapps.in>Exam>Active Exam to download papers, if any Queries please contact on 02226534266/63.9766899717

- Posted by aniruddha on 2017-05-26 08:40:53

4. University of Mumbai (DEPDS): Exam Date- 25/05/2017. Question Paper link will be activated between 09:30 AM to 11:00 AM, login to muapps.in>Exam>Active Exam to download papers, if any Queries please contact on 02226534266/63.9766899717

- Posted by aniruddha on 2017-05-25 08:37:16

Q.2 (a)

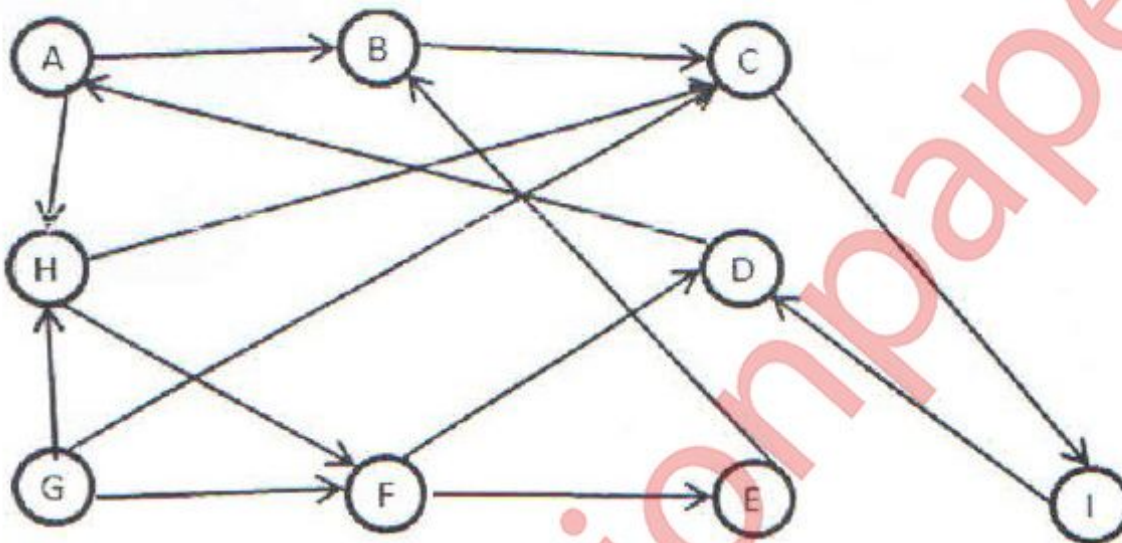
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HARRY	1/5	1/9	1.00

Q.6 (d)



DASHBOARD

1. Correction in Program Code: -T8612 Subject Name:Financial Management
Q.P Code:05091

Read As,

Q.1) (B)

In the table "Factory Electricity" is printed twice.

Change is as follows:

Factory Rent 700

Factory Electricity 1250

- Posted by tusharadmin on 2017-05-26 12:36:10

2. Correction in Program Code:T8632 subject Name:Decision making &
Mathematical Modelling Q.P code:09903

Q 5 a) Please add the following

$f(n)=40$

- Posted by tusharadmin on 2017-05-26 12:16:46

3. Correction in Program Code:T8632 subject Name:Decision making &
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- Posted by animddha on 2017-05-26 08:40:53

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