

PDPM Indian Institute of Information Technology, Design &
Manufacturing, Jabalpur

(24)

Mid Semester Examination

Subject Name: Management Concepts & Techniques

Marks: 50

Subject Code: MS301 (Section B)

Time: 2 Hrs.

Instruction: Attempt any five questions and all questions carry Equal marks.
(question number 4 is mandatory)

Assume if any data is missing

Question 1: Describe Short notes on (Any four)

(10)

- a) Capital Budgeting,
- b) Agglomeration
- c) Price Elasticity of Demand
- d) Reorder point and Lead time
- e) Bullwhip effect

Question 2: Suppose a regional medical warehouse is to be established to serve several Veterans Administration hospitals throughout the country. The supplies originate at S_1 and S_2 and are destined for hospitals at H_1 through H_4 . The relative locations are shown on the map grid. Other data are:

Point i	Products	Location	Annual Volume (Cwt.)	Rate (\$/Cwt/mi.)	X_i	Y_i
S_1	A	Seattle	8000	0.02	0.6	7.3
S_2	B	Atlanta	9500	0.02	8.6	3.0
H_1	A & B	New York	5500	0.05	10.6	5.2
H_2	A & B	Chicago	4000	0.05	7.9	5.5
H_3	A & B	Dallas	3000	0.05	5.5	2.4
H_4	A & B	Los Angeles	5000	0.05	2.0	3.0

Determine the location of new distribution centre by COG method and total cost of the location. (scaling factor 1=500 miles).

(10)

Question 3: (a) Describe the economic order quantity and mathematically determine the basic model of EOQ.

(7)

(24)

- (b) (a) A manufacturing company supplies vending machines and sell of soft drink by vending machine is \$ 1.80 per bottle. At that price, customer purchase 1960 bottles per week. In order to increase sell, company's management decide to decrease the price to \$ 0.8, and sales increases to 3000 bottles. so, determine the price elasticity of demand for soft drinks and write the conclusion of result. (3)

Question 4. Faced with court order to desegregate its school, a country school board decides to redistribute its minority students through bussing. The Plan calls for bussing 50 students from each of three cities white, black, brown to the four schools East, West, North and South. For perfect desegregation, the school need 20, 40, 30, and 60 minority students respectively. The dollar cost of bussing each student is given as follows:

City	School				50
	East	West	North	South	
White	7	6	5	4	50
Black	9	7	3	6	50
Brown	8	8	7	3	50

The school board wishes to meet the court with least cost.

- (a) Setup the transportation table/matrix for above problem.
- (b) Find an initial basic feasible solution by North West corner rule.
- (c) Determine the optimal bussing plan using u-v method.
- (d) Because of "detour" near East school for road construction, the bussing cost from every city to that school increase by \$1. Explain how this will affect your optimal solution found in (c). (11)

Question 5: A local distributor for a national tire company expects to sell approximately 8600 steel belt radial tires of certain size and tread design next year. The ordering cost of items \$ 65 and carrying cost is \$1.2 per tire per month. The distributor operates 280 days a year.

- * Determine EOQ?
- * How many times per year does the store re-order?
- * What is the length of an order cycle?
- * What is Total annual cost if EOQ quantity is ordered? (10)

Question 6: (a) Describe the types of supply chain and classification logistic decision method. (6)

- (b) Is it possible to have negative inventory level? If so, explain why? (4)

(36)

Marks: 72

Time: 3 Hrs.

Note : Make suitable assumptions wherever necessary**Answer all questions****Part - I**

Quesiton1. Sheet metal Industries Inc, (SMI) is a Tier 1 supplier to various industries that use components made from sheet metal in their final products. Manufacturers of desktop computers and electronics devices are its primary customers. SMI orders a relatively small number of different raw sheet metal products in very large quantities. The Purchasing department is trying to establish an order policy that will minimize total costs while meeting the needs of firm. One of the highest volume items it purchases comes in precut sheets direct from steel processor. Forecast based on historical data indicate that SMI will need to purchase 200,000 sheets of this product on an annual basis. The sheet producer has minimum order quantity of 1,000 sheets, and offers a sliding price scale based on quantity in each order, as follows:

ORDER QUANTITY	UNIT PRICE (\$)
1,000-9,999	2.35
10,000-29,999	2.20
30,000+	2.15

The purchasing department estimates that it costs \$300 to process each order, and SMI has inventory carrying cost equal to 15 % of value of inventory.

Based on this information, determine the optimal order quantity and post possible option. (10)

Question2. The childfair company has three plants producing child push chairs that are to be shipped to four distribution centres. Plant 1,2, and 3 produce 12, 17 and 11 shipments per month respectively. Each distribution centre needs to receive 10 shipments per month. The distance from each plant to the respective distributing centres is given as:

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	Distance			
	Distribution Centre			
	1 (miles)	2 (miles)	3 (miles)	4 (miles)
Plant 1	800	1,300	400	700
Plant 2	1,100	1,400	600	1,000
Plant 3	600	1,200	800	900

The freight cost of each shipment is \$100 plus 50 cents per mile. How much should be shipped from each plant to each of distribution centres to minimize the total shipping cost?

- a) Formulate the problem as transportation model.
- b) Draw the network representation
- c) Determine the optimal solution.

(12)

Question 3. (a) How does a company achieve strategic fit between its Supply Chain Strategy and its competitive strategy? (3)

(b) What are major driver of Supply Change Performance? State the key metric that track the performance of supply chain in terms of its driver. (3)

Question 4. Short notes (attempt only 4) (12)

- a) Economic order quantity.
- b) Push versus Pull Supply Chain
- c) Classify the logistic decisions on the basis of planning
- d) Bullwhip Effect
- e) E-commerce logistics

Question 5. (i) The Brazilian Coffee Company processes coffee beans into coffee at m plants. The coffee is then shipped every week to n warehouses in major cities for retail, distribution and exporting. The transportation cost from plant i to warehouse k is c_{ik} . The production capacity at plant i is a_i and the demand at the warehouse b_k . It is desired to find the production shipping pattern x_{ik} from plant i to warehouse k , $i=1,2,\dots,m$ and $k=1,2,\dots,n$, that minimize the overall shipping cost.

Formulate the model. (4)

(ii) Tanker Scheduling Problem

A ship line company requires a fleet of ships to service requirements for carrying cargo between six cities. There are four specific routes that must be served daily. These routes and number of ships required for each route are as follows:

Route #	Origin	Destination	No. of ships per day needed
1	Dhahran	New York	3
2	Marseilles	Istanbul	2
3	Naples	Bombay	1
4	New York	Marseilles	1

All cargoes are compatible, and therefore only one type of ship is needed. The travel time matrix between various cities is shown.

	Naples	Marseilles	Istanbul	New York	Dhahran	Bombay
Naples	0	1	2	14	7	7
Marseilles	1	0	3	13	8	8
Istanbul	2	3	0	15	5	5
New York	14	13	15	0	17	20
Dhahran	7	8	5	17	0	3
Bombay	7	8	5	20	3	0

It takes one day to off-load and one day to on-load each ship. *Formulate the mathematical model.*

(* Ensure that ships coming off of some route get assigned to some other route.

* each route gets its required number of ships per day.)

(6)

Part - II

(3+4 marks)

Question 6. Briefly discuss (a) general pricing approaches and (b) factors affecting price sensitivity (4 marks)

Question 7. Discuss the factors influencing consumer behaviour

Question 8. (a) Explain steps used in PERT/CPM. (b) XYZ Company is bringing a new product on line to be manufactured in their current facility in some existing space. The owners have identified 11 activities and their precedence relationships. Develop an AON for the project. Find the critical path

Activity	Description	Immediate Predecessor	Duration (weeks)
A	Develop product specifications	None	4
B	Design manufacturing process	A	6
C	Source & purchase materials	A	3
D	Source & purchase tooling & equipment	B	6
E	Receive & install tooling & equipment	D	14
F	Receive materials	C	5
G	Pilot production run	E & F	2
H	Evaluate product design	G	2
I	Evaluate process performance	G	3
J	Write documentation report	H & I	4
K	Transition to manufacturing	J	2

(4 marks)

Question 9. Explain the techniques used in financial statement analysis. The balance sheet of ABC Bank Ltd. is shown in the table for the years 2003 and 2004 as on 31st March. Use common size analysis technique to prepare financial statement. (3+4)

Liabilities	As on 31st March		(Rs. in thousands)	
	2003 Rs.	2004 Rs.	Assets	2003 Rs.
Capital	2,845	2,845	Cash and Balance with RBI	27,06,808
Reserve and Surplus	39,66,009	47,65,406	Balance with Banks	22,37,601
Deposits	4,08,45,783	4,40,42,730	and Money at call & and short notice	11,36,781
Borrowings			Investments	16,07,975
Other Liabilities	7,27,671	2,84,690	Advances	2,14,21,060
Provisions	16,74,165	17,99,197	Fixed Assets	2,35,37,098
			Other Assets	1,95,99,764
				2,11,29,869
				4,93,996
				5,36,442
				18,58,064
				18,35,883
	4,72,16,473	5,08,94,868		4,72,16,473
				5,08,94,868

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(4)

Time: 30 minutes

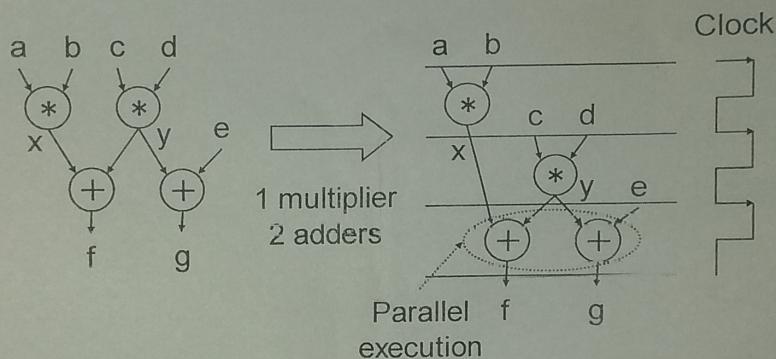
EM603c: Hardware Design Methodologies for IoT Systems

Date: 12.03.2019

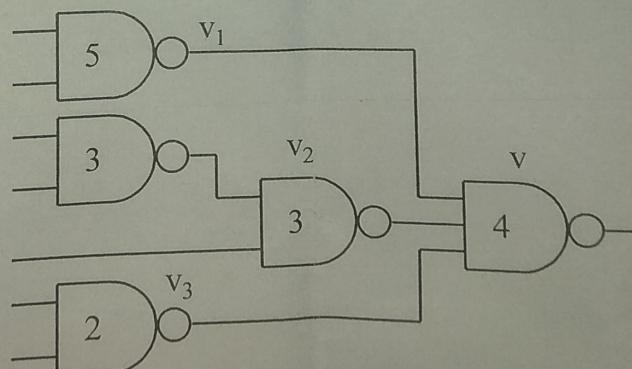
Marks: 30

(1) [Marks 10] What are possible problems if we use the programming language C as a hardware description (design) language? On the other hand, which statements in C are not necessary when describing hardware?

(2) [Marks 10] A data flow graph and its scheduling with one multiplier and two adders are shown below. Suppose that the delay of the multiplier is 10 and the delay of the adder is 2. How much is the total computation time (latency)? Also, with the same resource constraints, discuss whether any faster scheduling is possible or not.



(3) [Marks 10] Compute the maximum and minimum delays of the circuit below. Delay for each gate is the one shown inside the gate.



(50)

Time: 2 Hrs

2019.3.8

Exam for "Dependable Computing"

- * You may open your note and slides.
- * Answers must be **concisely** and **clearly** written, otherwise ignored.

Q1: Three students, Amit, Bella and Chandra, worked together to write an application program, but;

- (a) They missed a variable in a logic expression that should be a condition for a branch in their program.
- (b) They ran the program on a computer for a specified input data.
- (c) The application failed.

Amit said "If error correcting codes were used for all the data in the computer, event (c) could not have occurred".

Bella said "Wrong! Event (c) inevitably occurs once (a) and (b) occurred".

Chandra said "No! event (c) could be avoided if the computer were triplicated".

Who is correct and who is wrong? Explain concisely why you can say so.

Q2: Explain why check part R of low-cost residue code $[D, R]$ can be generated by addition instead of division, where $R = D \bmod (2^b - 1)$.

Q3: Let R_{tmr} and R_m denote the reliability of a TMR and a single module, respectively, and the voter is assumed to be ideal.

- a) Prove that $R_{\text{tmr}} > R_m$ if and only if $R_m > 0.5$.
- b) Prove that the MTTF for TMR is shorter than the single module.

Q4: Prove that the $(n+1, k)$ Hamming codes derived from (n, k) Hamming SEC codes have a minimum distance of 4, and therefore SEC/DED capability.

Q5: Explain why the oral message algorithm OM(m) cannot solve the Byzantine problem for $n < 3m + 1$, and why the signed message algorithm SM(m) can do it for $n \geq m + 2$.

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CS617: Basics of Deep Learning

Mid Semester Examination: Saturday – February 23, 2019

Note: All questions are compulsory. Notations and abbreviations have their usual meanings.

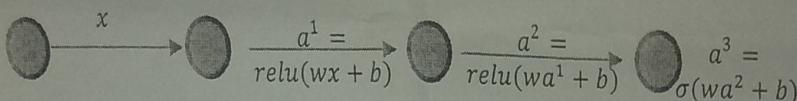
Time: 2 hours

Max. Marks: 60

Q.No.

Marks

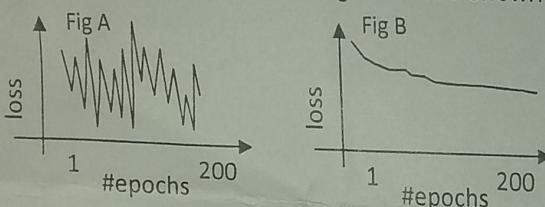
Consider the following network with 2 hidden layers and an output layer for binary classification problem. Each hidden layer contains a single unit and the input layer sends 1-dimensional samples to the network.



- ✓ 1 (a) Find out the expression for derivative of the loss function that would be backpropagated to the input layer. 5

- ✓ 2 (b) If $x = 1$ and $w = 0.1, b = 0.4$. The corresponding label $y = 1$, what will be value of the loss? 3

You have specified a minibatch size in the stochastics gradient descent method. You have used two different learning rates $\alpha_1 = 0.1$ and $\alpha_2 = 0.01$ for optimization of loss function. Graphs of loss functions for both the learning rates are shown below.



- ✓ 3 (a) Which figure might correspond to α_1 and why? 4

- (b) What action will you take in case of Fig A and B? Justify your answer. 4

Input volume in a convolution layer is of size $1024 \times 1024 \times 128$. You want to apply 256 filters, each of size 5×5 with a stride of 1 and padding as 'SAME'.

- ✓ 4 (a) How many multiplications will be performed in the convolution layer? 4

- (b) Can you devise a different method to reduce the number of multiplications? If yes, what changes will you make in the convolution structure / operations? Justify your answer and compute the total reduction in multiplication operations. 4

- ✓ 4 (a) Given the following input image to a pooling layer, what type of pooling will you apply to retain the pattern in the image while reducing the size? Compute the output of the pooling layer devised by you. 4

4	4	4	4
4	0	0	4
4	0	0	4
4	4	4	4

- ✓ 4 (b) How does 'VALID' differ from 'SAME' padding? Use a 3×3 filter with all entries as '1' to show the change in output of the convolution layer using these two different paddings. 4

- ✓ 5 Write the formula for weight update in gradient descent with momentum, specifying each term used in the expression. 4

6
56
What structural changes were made in convolution layers of VGG 6 migrating from VGG 5.
What was the purpose of changing the structure? Justify your answer using an example.

4

7
What are the typical applications when you will employ a many-to-one RNN and a one-to-many RNN? Draw the diagram of each type of RNN with flow directions.

4

8
How does ResNet solve the problem of vanishing gradients using skip \shortcut connections?
Explain by comparing the backpropagation of cost-gradients of a plain network and a network containing skip \ shortcut connections.

4

9
Answer each of the following questions in not more than 1 sentence.

(a) Why is it said that Python is portable?

2

(b) What are different backend supports for Keras?

2

(c) How will you add a 2D convolution layer with 32 filters, each of size of 3×3 , stride = 1, with 'relu' activation function? Input shape is specified already as input_shape.

2

(d) What is the difference between model.fit() and model.compile() in Keras?

2

(e) If you have a multiclass classification problem in an image database and you are using a CNN to build the classification model, which type of layer and activation function will you use in the last (output) layer?

2

10
Is there anything wrong in following code snippets? If yes, identify and write the correct code.

1

(a)

```
import numpy as np
A = np.array([[1, 2, 3, 4],
              [5, 6, 7, 8],
              [9, 1, 2, 3]])
A = A.reshape(3, 2, 3)
```

(b)

```
import numpy as np
a = np.array([[1,1,1],[1,1,1], [1,1,1], [1,1,1]])
b = np.array([2,2,2])
c = a + b
```

1