

University of Mumbai

Examinations Commencing from 22nd November 2021 to 5th January 2022

Program: ALL Institute Level Optional Course 1

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: ILO 7015 and Course Name: Operations research

Time: 2 hour 30 minutes

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	The LP problem will not have a feasible solution.
Option A:	If all elements in the pivot column are positive.
Option B:	If all the elements in the pivot row are negative.
Option C:	If all the elements in RHS column are non-negative.
Option D:	If an artificial variable is present in the basis.
2.	In LPP, to convert \geq inequality constraint into equality constraint, we must
Option A:	add a surplus variable
Option B:	subtract a surplus variable and add an artificial variable
Option C:	subtract a surplus variable and an artificial variable
Option D:	subtract a slack variable
3.	The optimality of current solution to a transportation problem with m rows and n columns can be checked if the number of positive allocations is
Option A:	$m \times n$
Option B:	$m + n$
Option C:	$m + n - 1$
Option D:	$m + n + 1$
4.	The problem of assigning n workers to n tasks has
Option A:	$n!$ solutions.
Option B:	$(n-1)!$ Solutions.
Option C:	n solutions.
Option D:	n^2 solutions.
5.	The dual of the primal maximization LP problem having m constraints and n non-negative variables is
Option A:	minimization LP problem having n constraints and m non-negative variables.
Option B:	minimization LP problem having m constraints and n non-negative variables.
Option C:	maximization LP problem having m constraints and n non-negative variables.
Option D:	maximization LP problem having n constraints and m non-negative variables.
6.	As order size increases,
Option A:	total inventory costs will increase, reach a maximum and then decrease.
Option B:	total inventory cost will decrease, reach a minimum and then increase.

Option C:	ordering cost and inventory carrying cost, both will increase.
Option D:	ordering cost and total inventory cost, both will increase.
7.	In real life queuing system, if an arrival refuses to join the queue even if there is a space to join then this phenomenon is called as
Option A:	Balking
Option B:	Reneging.
Option C:	Jockeying.
Option D:	Dissenting.
8.	Any game can be solved by using
Option A:	Graphical method.
Option B:	Dominance principle.
Option C:	Linear Programming method.
Option D:	Game transpose method.
9.	When minimax and maximin values of the game are same
Option A:	No solution exists
Option B:	Solution has mixed strategies
Option C:	Solution has pure strategies
Option D:	Multiple solutions exist
10.	A stage in a dynamic programming problem represents
Option A:	number of decision alternatives
Option B:	different time periods in the planning period
Option C:	status of the system at a particular state
Option D:	condition of the decision process

Q2	Solve any Two Questions out of Three	10 marks each
A	<p>Write Dual of following LPP and solve it using graphical method. Find values of decision variables in primal using complementary slackness theorem.</p> <p>Maximize</p> $Z = 3x_1 + x_2 + 4x_3$ <p>Subject to</p> $6x_1 + 3x_2 + 5x_3 \leq 25$ $3x_1 + 4x_2 + 5x_3 \leq 20$ $x_1, x_2, x_3 \geq 0$	
B	<p>Solve the following linear program by the dual simplex method.</p> <p>Minimize</p> $Z = 2x_1 + 3x_2 + 5x_3 + 6x_4$ <p>Subject to</p> $x_1 + 2x_2 + 3x_3 + x_4 \geq 2$ $-2x_1 + x_2 - x_3 + 3x_4 \leq -3$ $x_1, x_2, x_3, x_4 \geq 0$	

C	<p>The owner of a chain of grocery store has purchased six crates for fruits. The following table gives the estimated profit at each grocery store when it is allocated various numbers of crates.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">No of crates</th> <th colspan="3">Stores</th> </tr> <tr> <th>1</th> <th>2</th> <th>3</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>4</td> <td>2</td> <td>6</td> </tr> <tr> <td>2</td> <td>6</td> <td>4</td> <td>8</td> </tr> <tr> <td>3</td> <td>7</td> <td>6</td> <td>8</td> </tr> <tr> <td>4</td> <td>7</td> <td>8</td> <td>8</td> </tr> <tr> <td>5</td> <td>7</td> <td>9</td> <td>8</td> </tr> <tr> <td>6</td> <td>7</td> <td>10</td> <td>8</td> </tr> </tbody> </table> <p>The owner does not want to split the crates among stores, but willing to make zero allocations. Find the allocations of crates to stores to maximize the profit.</p>	No of crates	Stores			1	2	3	0	0	0	0	1	4	2	6	2	6	4	8	3	7	6	8	4	7	8	8	5	7	9	8	6	7	10	8
No of crates	Stores																																			
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3	7	6	8																																	
4	7	8	8																																	
5	7	9	8																																	
6	7	10	8																																	

Q3 Solve any Two Questions out of Three 10 marks each

A	<p>Find the optimal transportation plan.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Sources</th> <th colspan="5">Destinations</th> <th rowspan="2">Supply</th> </tr> <tr> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>5</td> <td>4</td> <td>2</td> <td>3</td> <td>7</td> <td>80</td> </tr> <tr> <td>B</td> <td>6</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>60</td> </tr> <tr> <td>C</td> <td>4</td> <td>6</td> <td>7</td> <td>4</td> <td>3</td> <td>40</td> </tr> <tr> <td>D</td> <td>3</td> <td>5</td> <td>5</td> <td>6</td> <td>4</td> <td>20</td> </tr> <tr> <td>Demand</td> <td>60</td> <td>60</td> <td>30</td> <td>40</td> <td>10</td> <td>Total 200</td> </tr> </tbody> </table>	Sources	Destinations					Supply	1	2	3	4	5	A	5	4	2	3	7	80	B	6	3	4	5	6	60	C	4	6	7	4	3	40	D	3	5	5	6	4	20	Demand	60	60	30	40	10	Total 200
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B	<p>A company is engaged in manufacturing different types of equipment for various consumers. The company has two assembly lines to produce its product. The processing time for each of the assembly lines is regarded as random variable and is described by the following distributions:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Processing time in min</th> <th>Assembly X</th> <th>Assembly Y</th> </tr> </thead> <tbody> <tr> <td>40</td> <td>0.10</td> <td>0.20</td> </tr> <tr> <td>42</td> <td>0.15</td> <td>0.40</td> </tr> <tr> <td>44</td> <td>0.40</td> <td>0.20</td> </tr> <tr> <td>46</td> <td>0.10</td> <td>0.15</td> </tr> <tr> <td>48</td> <td>0.25</td> <td>0.05</td> </tr> </tbody> </table> <p>Using the following random numbers, generate data on the processing times for the 10 units of the product and compute the expected processing time for the product and average in process waiting time. 5936, 8723, 1973, 3649, 9081, 2863, 3529, 4173, 5721, 6257.</p> <p>For the purpose, read the numbers horizontally, taking the first two digits for the processing time on assembly X and the last two digits for processing time on</p>	Processing time in min	Assembly X	Assembly Y	40	0.10	0.20	42	0.15	0.40	44	0.40	0.20	46	0.10	0.15	48	0.25	0.05
Processing time in min	Assembly X	Assembly Y																	
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	assembly Y.
C	An owner of car service station on highway purchases cans of engine oil at the rate of Rs. 400 per can. He needs 40 cans every day. The holding cost can be approximated to Rs.2 per can per day. The shortage cost is Rs.10 per can per day. The ordering and other cost is Rs.1000 per order. Decide minimum cost procurement quantity. What is the maximum level of inventory? Sketch the inventory system. Also find optimal total estimated system cost and reorder point if lead time is 2 days.

Q4.	Solve any Two Questions out of Three 10 marks each																															
A	<p>Reduce the following game using Principle of dominance and graphical method to determine optimal strategies for A and B. Find value of game.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td colspan="2" rowspan="2"></td> <td colspan="4" style="text-align: center;">B</td> </tr> <tr> <td>Y1</td> <td>Y2</td> <td>Y3</td> <td>Y4</td> </tr> <tr> <td rowspan="4" style="text-align: center;">A</td> <td>X1</td> <td>20</td> <td>7</td> <td>8</td> <td>6</td> </tr> <tr> <td>X2</td> <td>8</td> <td>44</td> <td>15</td> <td>10</td> </tr> <tr> <td>X3</td> <td>13</td> <td>9</td> <td>19</td> <td>5</td> </tr> <tr> <td>X4</td> <td>9</td> <td>8</td> <td>14</td> <td>-1</td> </tr> </table>			B				Y1	Y2	Y3	Y4	A	X1	20	7	8	6	X2	8	44	15	10	X3	13	9	19	5	X4	9	8	14	-1
				B																												
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A	X1	20	7	8	6																											
	X2	8	44	15	10																											
	X3	13	9	19	5																											
	X4	9	8	14	-1																											
B	<p>Four different jobs are to be processed on four different machine. The machining cost associated with jobs and machine combination is given in the following table. Please provide optimal allocation of jobs on machines so that the total cost of processing is minimum. An asterisk represents restricted allocation.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Jobs/Machines</td> <td>M1</td> <td>M2</td> <td>M3</td> <td>M4</td> </tr> <tr> <td>J1</td> <td>6</td> <td>8</td> <td>*</td> <td>7</td> </tr> <tr> <td>J2</td> <td>9</td> <td>6</td> <td>10</td> <td>7</td> </tr> <tr> <td>J3</td> <td>5</td> <td>8</td> <td>11</td> <td>8</td> </tr> <tr> <td>J4</td> <td>11</td> <td>5</td> <td>9</td> <td>4</td> </tr> </table>	Jobs/Machines	M1	M2	M3	M4	J1	6	8	*	7	J2	9	6	10	7	J3	5	8	11	8	J4	11	5	9	4						
Jobs/Machines	M1	M2	M3	M4																												
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J4	11	5	9	4																												
C	<p>A bank has two counters for withdrawals. One counter handles withdrawals of value less than 1000 rupees and the other counter above 1000 and above. Analysis of service time shows an exponential distribution with mean service time of 6 minutes per customer for each counter. Arrival of customers follow Poisson distribution with mean 8 per hour for the first counter and 5 per hour for the second counter.</p> <ol style="list-style-type: none"> i) What are the average waiting times per customer of each counter? ii) If each counter could handle all withdrawals irrespective of their value, how would the average waiting time change? 																															

University of Mumbai

Examination Second Half 2021 under cluster All (Lead College: All)

Examinations Commencing from 22nd November 2021 to 5th January 2022

Program: Mechanical Engineering

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: ILO7013 and Course Name: Management Information System

Time: 2 hour 30 minutes

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	The web development technique that enables portions of web pages to reload with fresh data rather than requiring the entire Web page to reload is known as:
Option A:	AJAX
Option B:	RSS
Option C:	Tagging
Option D:	Web 2.0
2.	Social computing forces companies to deal with customers _____
Option A:	Reactively
Option B:	Proactively
Option C:	Neutrally
Option D:	Economically
3.	Which function provides information about the quality of in-process semifinished and finished products in an organization.
Option A:	Quality Control.
Option B:	Planning Production and Operations
Option C:	Investment Management.
Option D:	Inventory Management.
4.	Types of data warehouse does not include ____
Option A:	Enterprise data warehouse

Option B:	Data marts
Option C:	Data acquisition center
Option D:	Operational data warehouse
5.	Which of the following is an example of the business value of collaborative CRM?
Option A:	Provides all users with the tools and information that fit their individual roles and preferences
Option B:	Improves efficiency and integration throughout the supply chain
Option C:	Empowers all employees to respond to customer demands more quickly
Option D:	Synchronizes customer interaction with greater convenience through a variety of channels, including phone, fax, e-mail, chat, and mobile devices
6.	A manufacturing approach that integrates several computerized systems, such as computer-assisted design (CAD), computer assisted manufacturing (CAM)
Option A:	Sales force automation
Option B:	Computer-integrated manufacturing
Option C:	Product Lifecycle Management
Option D:	Management of interdependent items
7.	A business strategy that enables manufacturers to share product-related data that support product design and development and supply chain operations is _____
Option A:	Planning Production and Operations
Option B:	Quality Control
Option C:	Product Lifecycle Management.
Option D:	Control and Auditing
8.	_____ act as online intermediaries that harness the power of social networks for introducing, buying, and selling products and services.
Option A:	Group shopping sites
Option B:	Shopping Communities

Option C:	Social marketplaces
Option D:	Peer-to-peer shopping models
9.	Which of the following statements is false?
Option A:	Companies that use Software-as-a-Service are running applications on the vendor's hardware.
Option B:	Application service providers are similar to Software-as-a-Service providers.
Option C:	Companies that purchase open-source software cannot modify it.
Option D:	Outsourcing refers to acquiring IT applications from outside contractors.
10.	Place the stages of the systems development life cycle in order:
Option A:	Investigation – analysis – design – programming/testing – implementation – operation/maintenance
Option B:	Investigation – design – analysis – programming/testing – implementation – operation/maintenance
Option C:	Analysis – design – investigation – operation/maintenance – programming/testing – implementation
Option D:	Investigation – analysis – design – programming/testing – operation/maintenance – implementation

Q2 (20 Marks)	Solve any Two out of Three	10 marks each
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A	What is Cloud Computing? Explain its models.?
B	Explain the types of information system in business organization.
C	Identify the three major types of controls that organizations can use to protect their information resources, and provide an example of each one?

Q3 (20 Marks)	Solve any Two out of Three	10 marks each
A	Explain Data warehouse and Data mart in detail.	
B	Differentiate between knowledge and information and explain the significance of knowledge for a business firm.	
C	Differentiate computer network wired and wireless technology with example?	

Q4 (20 Marks)	Solve any Two out of Three	10 marks each
A	Explain the various phases of SDLC models.	
B	What are the functional areas of information system?	
C	Describe how cloud computing can help organizations expand the scope of their business operations.	

University of Mumbai
Examination Second Half 2021 under cluster ALL (Lead College: ALL)

Program: Computer Engineering
Curriculum Scheme: Rev2016
Examination: BE Semester VII

Course Code: CSC702 and Course Name: Mobile Communication and Computing
Time: 2 hour 30 minutes Max. Marks: 80

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Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	LTE Mac layer responsible for
Option A:	re-segmentation of RLC data PDUs
Option B:	Mapping between logical channels and transport channels, Multiplexing of MAC SDUs
Option C:	Carries all information from the MAC transport channels over the air interface
Option D:	Re-segmentation and carries all information
2.	In Bluetooth - Authentication, pairing and encryption performed by
Option A:	Radio layer
Option B:	Baseband layer
Option C:	Link Manager Protocol
Option D:	Service discovery protocol
3.	Which is similar to RNS component of UMTS in GSM system architecture?
Option A:	BTS
Option B:	MSC
Option C:	BSC
Option D:	OMC
4.	In _____ procedure, the mobile node periodically sends specific signals to inform the network of its current location so that the location database is kept updated.
Option A:	location registration
Option B:	call delivery
Option C:	paging
Option D:	location discovery
5.	Cellular IP implements _____ Handover
Option A:	Mobile controlled handover
Option B:	Intra BTS handover
Option C:	Intra Cell handover
Option D:	Inter BTS handover
6.	In HIPERLAN-2, Each access point contains _____ and _____
Option A:	Access point controller, Access point Transceiver
Option B:	Access point radio , Access point sector
Option C:	Access point EC , Access point CL
Option D:	Access point CM , Access point DM

7.	The IEEE 802.11 standard for wireless LANs defines two services: _____ and _____.
Option A:	BSS; ASS
Option B:	ESS; SSS
Option C:	BSS; ESS
Option D:	BSS; DCF
8.	In the IPv6 header, the traffic class field is similar to which field in the IPv4 header?
Option A:	Fragmentation field
Option B:	Fast-switching
Option C:	ToS field
Option D:	Option field
9.	In slow hoppingare transmitted using same.....
Option A:	bits,frequency
Option B:	frequency,bit
Option C:	frequency,power
Option D:	bits,power
10.	Each _____ is a base station that controls the mobiles in one or more cells.
Option A:	eND
Option B:	eNB
Option C:	eMB
Option D:	eNS

Q2. (20 Marks)	Solve any Four out of Six	5 marks each
A	Discuss different multiplexing techniques.	

B	What are the different types of Handovers supported by GSM? Explain in short.
C	What is Snooping TCP? List advantages and disadvantages of Snooping TCP.
D	Discuss the different interframe spacing between transmission of frame in IEEE 802.11.
E	What are the problems with standard mobile IP protocol? Explain how MIPv6 overcome these problems.
F	Draw a high-level architecture of LTE. Explain in short, the functions of EPC component

Q3. (20 Marks)	Solve any Two Questions out of Three	10 marks each
A	Draw a system architecture of GPRS. What is the role of SGSN, GR and GGSN Components?	
B	Discuss the PHY frame format of IEEE 802.11 using FHSS technique.	
C	What do you mean by Self Organizing Networks? Explain SOIN Architecture.	

Q4. (20 Marks)		
A	Solve any Two Questions out of Three	5 marks each
i.	Explain Piconet and scatternet with respect to Bluetooth protocol.	
ii.	Discuss how tunneling work for mobile IP using IP in IP Encapsulation.	
iii.	What is the need of VoLTE? Explain VoLTE.	
B	Solve any One Question out of Two.	10 marks each
i.	Differentiate between DSSS and FHSS	
ii.	Discuss the functions of authentication and encryption in GSM? How is system security maintained?	

University of Mumbai

Examination Second Half 2021 under cluster All (Lead College: All)

Examinations Commencing from 22nd November 2021 to 5th January 2022

Program: Computer Engineering

Curriculum Scheme: Rev 2016

Examination: BE Semester VII

Course Code: CSC701 and Course Name: Digital Signal and Image Processing

Time: 2 hour 30 minutes

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks																
1.	Digitizing Amplitude values is called																
Option A:	Filtering																
Option B:	Illumination																
Option C:	Quantization																
Option D:	Sampling																
2.	Which of the following is not an edge detection Mask?																
Option A:	Robert cross gradient																
Option B:	Prewitt mask																
Option C:	Low pass Averaging mask																
Option D:	Sobel mask																
3.	Perform Contrast stretching on a 4 bpp image with values $r_1=4$, $r_2= 9$, $s_1= 2$, $s_2 = 13$ and what will be the resulting values of Gray level 7																
Option A:	6																
Option B:	7																
Option C:	5																
Option D:	9																
4.	Find out the m-path from P1 to P10 in the given binary image Where P1 to P10 indicate the Pixel Number(Location) and 0 and 1 are the intensity values																
	<table border="1" style="border-collapse: collapse; margin: auto;"> <tr> <td style="padding: 2px;">P8 1</td> <td style="padding: 2px;">P9 1</td> <td style="padding: 2px;">0</td> <td style="padding: 2px;">P10 1</td> </tr> <tr> <td style="padding: 2px;">0</td> <td style="padding: 2px;">P6 1</td> <td style="padding: 2px;">0</td> <td style="padding: 2px;">P7 1</td> </tr> <tr> <td style="padding: 2px;">0</td> <td style="padding: 2px;">P3 1</td> <td style="padding: 2px;">P4 1</td> <td style="padding: 2px;">P5 1</td> </tr> <tr> <td style="padding: 2px;">P1 1</td> <td style="padding: 2px;">0</td> <td style="padding: 2px;">P2 1</td> <td style="padding: 2px;">0</td> </tr> </table>	P8 1	P9 1	0	P10 1	0	P6 1	0	P7 1	0	P3 1	P4 1	P5 1	P1 1	0	P2 1	0
P8 1	P9 1	0	P10 1														
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Option A:	P1 - P3 - P2 - P5 - P7 - P10																
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Option C:	P1 - P3 - P4 - P2 - P5 - P7 - P10																
Option D:	P1 - P3 - P2 - P4 - P5 - P7 - P10																
5.	Which operation of a signal can be obtained by folding the signal about $n=0$																
Option A:	Amplitude scaling																
Option B:	Time Reversal																
Option C:	Time Scaling																
Option D:	Time advancing																

6.	$\delta(n) =$
Option A:	$u(n) + u(n-1)$
Option B:	$u(n) u(n-1)$
Option C:	$u(n)-u(n-1)$
Option D:	$u(n-1) - u(n)$
7.	Image can be blurred using
Option A:	Low Pass Averaging filter
Option B:	High pass filter
Option C:	Median Filter
Option D:	High Boost filter
8.	What is the Nyquist rate of the following signal $x(t) = 3\cos(50\pi t)+10\sin(300\pi t)-\cos(100\pi t)$?
Option A:	50 Hz
Option B:	100 Hz
Option C:	200 Hz
Option D:	300 Hz
9.	The multiplication of two DFTs is same as
Option A:	Linear convolution of the sequences
Option B:	Correlation of sequences
Option C:	Cross-correlation of the sequences
Option D:	Circular convolution of sequences
10.	In an N-point sequence if $N=16$,the total number of complex additions and multiplications using Radix-2 FFT are,
Option A:	64 and 80
Option B:	80 and 64
Option C:	64 and 32
Option D:	24 and 12

Q2	Solve any Two Questions out of Three	10 marks each
A	What are the different connectivities and distance measures with respect to digital Images? Explain in detail. Also explain their use in Image processing	
B	Find whether the signal is a power signal or an energy signal. Also find the energy and power of the signal $x(n) = \begin{cases} n^2 & 0 \leq n \leq 3 \\ 10 - n & 4 \leq n \leq 6 \\ n & 7 \leq n \leq 9 \\ 0 & \text{otherwise} \end{cases}$	
C	Explain DFT properties	

Q3	Solve any Two Questions out of Three	10 marks each																		
A	<p>What is a histogram? What information does a histogram give? Can two or more images have the same histogram? Following is the pixel distribution of an 8 bpp image. Perform Histogram Equalization and give the new distribution after histogram equalization.</p> <table border="1" data-bbox="268 414 1437 562"> <tr> <td>Gray Level</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> </tr> <tr> <td>Number of Pixels</td> <td>100</td> <td>50</td> <td>250</td> <td>75</td> <td>150</td> <td>125</td> <td>50</td> <td>200</td> </tr> </table>	Gray Level	0	1	2	3	4	5	6	7	Number of Pixels	100	50	250	75	150	125	50	200	
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Number of Pixels	100	50	250	75	150	125	50	200												
B	Explain in detail Image segmentation based on discontinuities																			
C	<p>Find the linear convolution of the signals using Formula Method</p> $x(n) = \begin{cases} 2 & n = -2, 0, 1 \\ 3 & n = -1 \\ 0 & \text{elsewhere} \end{cases}$ $h(n) = \delta(n) - 2\delta(n-1) + 3\delta(n-2) - \delta(n-3)$																			

Q4	Solve any Two Questions out of Three	10 marks each
A	What are zero memory operations? Why are they called so? Explain with examples Dynamic range Compression and Bit plane slicing.	
B	Find the 4-point DFT of $x(n) = \{1, -2, 3, 2\}$. Draw magnitude and Phase spectrum.	
C	Given a sequence $x(n) = \{1, 2, 3, 4, 4, 3, 2, 1\}$, determine $X(k)$ using DIT FFT algorithm.	

University of Mumbai

Examination Second Half 2021 under cluster 4 (Lead College: Fr.Agnel Vashi)

Examinations Commencing from 22nd November 2021 to 5th January 2022

Program: 1T01427 // BE (Mechanical Engineering) (SEM VII)(Choice Base Credit Grading System)(R2016)

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: **ILO 7016** and Course Name: **Cyber Security and Laws**

Time: 2 hour 30 minutes

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	Which of the following phase is not part of the planning Cybercrime ?
Option A:	Social-engineering attack
Option B:	Launching an attack
Option C:	Scanning and scrutinizing
Option D:	Reconnaissance
2.	Every Promise and set of promises forming the consideration for each other called as _____
Option A:	Consideration
Option B:	Promise
Option C:	Agreement
Option D:	Acceptance
3.	Which of the following is NOT a Intellectual Property
Option A:	Industrial Design
Option B:	Patents
Option C:	Testimony
Option D:	Trademarks
4.	What does a trademark protects?
Option A:	an invention
Option B:	the look, shape and feel of a product
Option C:	a secret formula
Option D:	logos, names and brands
5.	_____known as the Financial Services Modernization Act ?
Option A:	GLBA
Option B:	HIPPA
Option C:	ISO
Option D:	SOX
6.	_____aim to start the interaction with the victim directly with the help of the internet.
Option A:	Offline Stalkers

Option B:	Online Stalkers
Option C:	Passive attack
Option D:	Virus
7.	If you use your mobile phone for purchasing goods/services and for banking, you could be more vulnerable to a _____
Option A:	Smishing
Option B:	Spamming
Option C:	Mishing
Option D:	Vishing
8.	Sending a fake e-mail to the user and asking him to reenter a password in a web page to confirm it is type of the_____.
Option A:	Cyberstalking
Option B:	Path Scanning
Option C:	Human based social-engineering
Option D:	Computer based social-engineering
9.	Which of the Following is NOT a Type of a E-commerce
Option A:	Citizen to Government
Option B:	Consumer to Consumer
Option C:	Business to Consumer
Option D:	Business to Business
10.	Which of the following is NOT a objective of Information Technology Act, 2000 ?
Option A:	Grant legal recognition to E-Transactions
Option B:	Provide legal recognition to Digital Signatures for authentication
Option C:	Allow Electronic storage of data
Option D:	Reject E-Filing of data and information due to attack

Q2.	Solve any Four out of Six	5 marks each
A	Explain different types of intellectual property.	
B	Explain various security challenges posed by mobile devices.	
C	What do you understand by DOS and DDOS attack?	
D	Explain types of credit card fraud and protection against it ?	
E	Explain in detail active and passive attacks with examples.	
F	Explain about IT Act. 2008 and its Amendments ?	

Q3.	Solve any Two Questions out of Three	10 marks each
A	What are digital Signatures?.Explain the legal architecture required for the validity of digital signature.	

B	Explain in detail Attacks on Wireless Networks ?
C	Explain How criminal plan the attacks with examples ?

Q4.	
A	Solve any Two 5 marks each
i.	Identify and explain Security Implications for Organizations ?
ii.	Explain about the Cybercrime and Indian ITA 2000 ?
iii.	Differentiate between Trojan Horse and Backdoors.
B	Solve any One 10 marks each
i.	Explain Information Security compliance HIPAA and ISO ?
ii.	What is E-commerce? Explain different types of e-commerce with suitable examples.

University of Mumbai

Examination Second Half 2021 under cluster _ (Lead College: ALL)

Examinations Commencing from 22nd November 2021 to 5th January 2022

Program: **Computer Engineering**

Curriculum Scheme: Rev 2016

Examination: BE Semester VII

Course Code: 42155 and Course Name: Big Data & Analytics (DLOC - III)

Time: 2 hour 30 minutes

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks.
1.	Which of the following is a core concept of Hadoop?
Option A:	Applications depend on the network infrastructure
Option B:	High level of communication exists between the various nodes.
Option C:	All data are distributed in advance
Option D:	If a node fails performance will dip
2.	Which of the following is not a feature of stream data?
Option A:	Ordered
Option B:	Continuous
Option C:	Huge
Option D:	Persistent
3.	Which of the following NoSQL data store will be suitable for storing customers shopping cart information on ecommerce site?
Option A:	Cassandra
Option B:	Riak
Option C:	Hbase
Option D:	MongoDB
4.	_____ is the node that holds the user data in the form of Data Blocks.
Option A:	Name Node
Option B:	Secondary Name Node
Option C:	Data Node
Option D:	Server Node
5.	Consider a stream as: $S = \{4, 2, 1, 3, 5\}$ Let hash function be $(3x + 2) \bmod 4$, find the no. of distinct elements using Flajolet Martin algorithm?
Option A:	4
Option B:	8
Option C:	2
Option D:	1
6.	Calculate Edit distance between “Knock” and “Flock”.
Option A:	1
Option B:	2

Option C:	3
Option D:	4
7.	_____ problem is associated with content based filtering.
Option A:	Cold Start
Option B:	First Rater
Option C:	Scalability
Option D:	Sparsity
8.	In _____ type of sampling recently added elements are most likely to be in sample than long ago arrived elements.
Option A:	Reservoir Sampling
Option B:	Concise Sampling
Option C:	Random Sampling
Option D:	Biased reservoir sampling
9.	Which of the following would be an example of Who-Talks-To -Whom type of graph?
Option A:	Co-authoring a paper
Option B:	Web
Option C:	Microsoft Instant Messenger
Option D:	Co-occurrence of actors in the movie
10.	“Finding maximum temperature every hour” is a type of _____ query.
Option A:	Continuous
Option B:	One Time
Option C:	Periodic
Option D:	Ad Hoc

Q2	
A	Solve any Two 5 marks each
i.	Why is it difficult to work with stream data?
ii.	Give a brief overview of hadoop core components and Hadoop Ecosystem Components.
iii.	What do you mean by Cosine similarity? Illustrate with example any two applications that can use Cosine similarity.
B	Solve any One 10 marks each
i.	Describe any one Community detection algorithm for social media with an example.
ii.	Explain the architecture of Data Stream Management Systems. How is it different from DBMS?

Q3	
A	Solve any Two 5 marks each
i.	What are the properties and limitations of Hadoop?

ii.	What are combiners? When should a combiner be used in a mapreduce job explain with an example?
iii.	Compare KeyValue No-SQL datastore with Document based NoSQL datastore.
B	Solve any One 10 marks each
i.	Explain how Hadoop's mapper and reducer work, with an example of performing any relational algebra operation using Map Reduce.
ii.	Illustrate how dead ends are handled in PageRank.

Q4.	
A	Solve any Two 5 marks each
i.	Explain the components of the web's Bow-tie structure.
ii.	Investigate problems in Flajolet-Martin (FM) algorithm to count distinct elements in a stream.
iii.	Explain in detail any two Big data Applications based on NoSQL.
B	Solve any One 10 marks each
i.	Explain the DGIM algorithm and solve the following problem : Consider the data stream shown below with N=14. 10011010101011101 i) Show one way of how the above initial stream will be divided into buckets and count distinct 1's. ii) The following bits enter the window one at a time: 10101. What is the bucket configuration in the window after this sequence of bits has been processed by DGIM and count distinct 1's.
ii.	Explain any one Big Data Clustering algorithm.

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Examination Second Half 2021 under cluster __ (Lead College: _____)

Examinations Commencing from 22nd November 2021 to 5th January 2022

Program: Computer Engineering (Technology)

Curriculum Scheme: Rev 2016

Examination: BE Semester VII

Course Code: CSDLO7031 and Course Name: Advance System Security & Digital Forensics

Time: 2 hour 30 minutes

Max. Marks: 80

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Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	What resources certain users can access is called where the type of access control that is used in Local, dynamic situations where subjects have the ability to specify
Option A:	Sensitivity-based access control
Option B:	Discretionary access control
Option C:	Rule-based access control
Option D:	Mandatory access control
2.	Useful of Role based access control is as follows
Option A:	Access must be determined by the labels on the data.
Option B:	There are frequent personnel changes in an organization.
Option C:	Rules are needed to determine clearances.
Option D:	Security clearances must be used.
3.	Information conveyed by covert channels using?
Option A:	Changing a system's stored data characteristics
Option B:	Generating noise and traffic with the data
Option C:	Performing a covert channel analysis
Option D:	Modifying the timing of a system resource in some measurable way
4.	What type of User account you create for the user, if you want user enter a administrator password to perform administrative activities?
Option A:	Standard User account
Option B:	Power User account
Option C:	Authenticated User account
Option D:	Administrator User account
5.	Which is not a substantial port scan type
Option A:	Windows Scanning
Option B:	Fin Scanning
Option C:	IGMP Scan
Option D:	ACK Scanning
6.	To prevent dictionary attacks on password hashes which mechanism is used.

Option A:	Use Salting the hash
Option B:	Use an encryption algorithm you wrote yourself so no one knows how it works
Option C:	Hashing the password twice
Option D:	Encrypting the password using the private key
7.	SQL injection vulnerability can be prevented if one of the following things can be done
Option A:	Data Validation
Option B:	Secure Cookies
Option C:	Encryption
Option D:	Comprehensive exception handling
8.	Common component used in WPA and WPA2
Option A:	CCMPN
Option B:	AES
Option C:	TKIP
Option D:	RC4
9.	In many countries which of the following key principle used in evolution of computer crime laws
Option A:	All members of the United Nations have agreed to uniformly define and prosecute computer crime.
Option B:	Existing laws against embezzlement, fraud, and wiretapping cannot be applied to computer crime.
Option C:	The definition of property was extended to include electronic information.
Option D:	Unauthorized acquisition of computer-based information without the intent to resell is not a crime.
10.	To transfer encrypted data from victim machine to forensic machine which tool is used.
Option A:	netstat
Option B:	cryptcat
Option C:	md5sum
Option D:	netcat

Q 2) A	Solve any Two	5 marks each
i.	Define threat and attack. What is the difference between both? List some examples of attacks which have arisen in real world cases.	
ii.	What are different types of attacks on web applications.	
iii.	What are two common techniques used to protect a password file?	
Q 2) B	Solve any One	10 marks each
i.	Explain Key factors that contribute to security problems in wireless networks.	
ii.	What do you mean by Cross Site Scripting attack? What is the potential of Cross Site Script attack on client and server?	

Q 3) A	Solve any Two	5 marks each
i.	What kind of attack would attacker try to eavesdrop on all the wireless network traffic?	
ii.	What is the use of SSL protocol? Explain SSL record protocol operation with SSL record format.	
iii.	How sniffer is placed & configured for preservation, collection & documentation of digital evidence at physical layer?	
Q 3) B	Solve any One	10 marks each
i.	Explain ethical and legal issues in software privacy.	
ii.	What is session hijacking? What are the steps to hijack a session? What are the dangers posed by hijacking a session?	

Q 4) A	Solve any Two	5 marks each
i.	What is single sign-on? Give guidelines for selecting a password.	
ii.	What is electronic cash? How does cash based transaction system differ from credit card-based transactions?	
iii.	What are the different ways in which computer gets infected with virus? What are the techniques used for infecting computers with viruses?	
Q 4) B	Solve any One	10 marks each
i.	What is network forensics? If a company wants to tap an employee, is it permitted? Justify the decision with relevant cyber law?	
ii.	What is packet sniffing? How is it done? What are the threats due to packet sniffing?	

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Examination Second Half 2021 under cluster all (Lead College: all)

Examinations Commencing from 22nd November 2021 to 5th January 2022

Program: Computer Engineering

Curriculum Scheme: Rev 2016

Examination: BE Semester VII

Course Code: CSC 703 and Course Name: Artificial Intelligence and Soft Computing

Time: 2 hours 30 minutes

Max. Marks: 80

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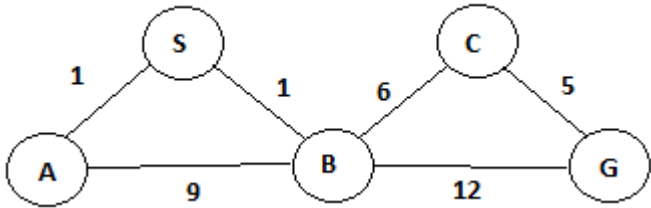
Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	You are designing a Route recommendation system which solves for the 'best' route to reach a destination. Which of the following agent architecture will be suitable for this?
Option A:	Model Based Agent
Option B:	Goal Based Agent
Option C:	Simple reflex Agent
Option D:	Utility Based Agent
2.	The process that makes different logical expression looks identical is called.....
Option A:	Lifting
Option B:	Unification
Option C:	Inference process
Option D:	Branching process
3.	FOPL expression for " Some that glitters is gold " is_____
Option A:	$\exists x \text{ glitters}(x) \wedge \text{is_gold}(x)$
Option B:	$\forall x \text{ glitters}(x) \wedge \text{is_gold}(x)$
Option C:	$\exists x \text{ glitters}(x) \vee \text{is_gold}(x)$
Option D:	$\forall x \text{ glitters}(x) \rightarrow \text{is_gold}(x)$
4.	The core of a fuzzy set A is a crisp subset of X consisting of all elements with membership grades equal to
Option A:	Zero
Option B:	Two
Option C:	Three
Option D:	One
5.	For a perfect binary tree if BFS visits the nodes in following order: A, B, C, D, E, F, G then what will be order for DFS ?
Option A:	A, B, C, D, E, F, G
Option B:	A, B, D, C, F, G, E
Option C:	A, B, D, E, C, F, G
Option D:	A, B, D, E, G, C, F
6.	Which of the following search belongs to totally ordered plan search?

Option A:	Forward state-space search
Option B:	Hill-climbing search
Option C:	Depth-first search
Option D:	Breadth-first search
7.	Select the Agents whose Environments are Fully Observable
Option A:	Automated taxi Driver
Option B:	Crossword
Option C:	Medical Diagnosis System
Option D:	Finding fault in Assembly line
8.	Implement a MP neuron with threshold activation function to simulate working of logical OR gate. Give the correct values of weights and threshold.
Option A:	$w_1 = 1, w_2 = 1, T = 1$
Option B:	$w_1 = -1, w_2 = 1, T = -2$
Option C:	$w_1 = -1, w_2 = -1, T = -3$
Option D:	$w_1 = 1, w_2 = -1, T = -1$
9.	A 4-input neuron has weights 1, 2, 3 and 4. The transfer function is linear with the constant of proportionality being equal to 2. The inputs are 4, 10, 5 and 20 respectively. What will be the output?
Option A:	238
Option B:	119
Option C:	110
Option D:	1
10.	In Hill Climbing approach, when the heuristic value of current state and all its successors is same then it is ----- problem.
Option A:	Local Maxima
Option B:	Plateau
Option C:	Ridge
Option D:	Local Minima

Q2 (20 Marks)	
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A	Solve any Two	5 marks each
i.	Give the formulation of a “ N-Queens problem ” as a problem-solving agent in terms of its states, initial state, successor function, goal test and path cost. Illustrate with an example where N=4.	
ii.	Write a PEAS description for an agent which serves as a “ House cleaning Robot ”. Characterize the Agent’s environment.	
iii.	<p>Let $X = \{a, b, c\}$ $Y = \{1, 2, 3\}$ and $A = \{(a, 0.1), (b, 0.6), (c, 0.1)\}$ $B = \{(1, 0.3), (2, 0.2), (3, 1.0)\}$ Determine the implication relation: If x is A then y is B</p>	
B	Solve any One	10 marks each
i.	Consider the following statements: (i) All people who are playing cricket are happy. (ii) All happy people smile. (iii) Someone is playing cricket. Prove the sentence “ Is someone smiling? ” using resolution by refutation.	
ii.	Draw and explain the architecture of ANFIS	

Q3 (20 Marks)		
A	Solve any Two	5 marks each
i.	Define partial order planning. Explain by taking suitable example	
ii.	Draw the architecture of an expert system. Describe the working of each of the blocks in the architecture.	
iii.	Evaluate the value of the neural network with a 3-3-1 architecture (2-dimensional input with 1 node for the bias term in both the layers). The parameters are as follows $\alpha = [1 \ 0.2 \ 0.4 \ -1 \ 0.8 \ 0.5]$ $\beta = [0.8 \ 0.4 \ 0.5]$ Using Sigmoid function as an activation function at both the layers, calculate the output of the network for an input of (0.8, 0.7).	
B	Solve any One	10 marks each
i.	Consider the graph given in Figure 2 below. Assume that the initial state is S and the goal state is G . Show how A* Search would create a search tree to find a path from the initial state to the goal state:	

	 <p>At each step of the search algorithm, show which node is being expanded, and the content of fringe. Also report the eventual solution found by the algorithm, and the solution cost. Assuming the straight-line distance as the heuristics function: $h(S)=7$, $h(A)=10$, $h(B)=9$, $h(C)=5$ and $h(G)=0$.</p>
ii.	<p>Let $U = \text{Flowers} = \{\text{jasmine, Rose, Lotus, Daffodil, Sunflower, Hibiscus, Lily}\}$ be a universe on which two fuzzy sets, one of Beautiful flowers and the other one of Fragrant flowers are defined as follows</p> <p>$P = 0.3/\text{jasmine}, 0.9/\text{Rose}, 1.0/\text{Lotus}, 0.7/\text{Daffodil}, 0.5/\text{Sunflower}, 0.4/\text{Hibiscus}, 0.6/\text{Lily}$ $Q = 1.0/\text{jasmine}, 1.0/\text{Rose}, 0.5/\text{Lotus}, 0.2/\text{Daffodil}, 0.2/\text{Sunflower}, 0.1/\text{Hibiscus}, 0.4/\text{Lily}$</p> <p>Compute the fuzzy sets $P \cup Q, P \cap Q, P', Q', P - Q, P' \cap Q'$.</p>

Q4. (20 Marks)	
A	Solve any Two 5 marks each
i.	Convert the following sentence into CNF <i>If two people are friends then they are not enemies</i>
ii.	What are different membership functions of fuzzy logic?
iii.	What are the frustrations that occur in Hill Climbing Algorithm?
B	Solve any One 10 marks each
i.	Define the terms chromosome, fitness function, crossover and mutation as used in Genetic algorithms
ii.	Solve the following classification problem using the Perceptron learning rule. The input/target for our test problems are $(P_1 = [2 \ 2]^t, t_1 = 0), (P_2 = [1 \ -2]^t, t_2 = 1), (P_3 = [-2, \ -2]^t, t_3 = 0), (P_4 = [-1, \ -1]^t, t_4 = 1)$. Initial weight vector $w(0) = [0, 0]^t$ and bias $b(0)=0$. Assume learning rate $c=1$ and unipolar binary activation function. Show only 2 cycles.