Tribhuvan University

Faculty of Humanities and Social Science

Semester: VIII

Subject: Operational Research

2018 Batch

Group B

Attempt any SIX questions

2. What is operational research? Explain the general method of solving OR model.
3. A chair manufacturing company produces two types of chairs, A and B, by using three machines, X, Y and Z. The time required for each chair on each machine and the maximum time available on are given below?

Message. / Machines.	Time required for each type. A	B	Maximum time available Per week in hrs
X	6	8	120
Y	8	4	100
Z	12	4	144

The profit on the A and B are rupees 500 and rupees 300 respectively. What combination of pains should be produced to obtain maximum profit?

4. Write an algorithm to minimize the solution of LPP using simplex method.
5. Given the transportation framework, find the optimal transportation

From ↓	To →	A	B	C	Plant Capacity
W		40	80	80	55
X		160	-	160	25
Y		80	160	240	35
Requirement		35	45	35	115

6. Find the cost per period of individual replacement policy of an installation given in the following table. of 3000 street lamps
   a. Cost of replacing an individual bulb is rupees 5.
   b. Cumulative probability of failure is given below.

Week	0	1	2	3	4	5
Cumulative probability of failure	0	0.1	0.3	0.5	0.7	1.0

7. Discuss single channel queuing model with suitable example? Give its assump
8. Write short notes on (any two)
   a. Kendall's notation
   b. Big M method
   c. Importance and advantage of duality problem

Group C

Attempt any TWO questions.

9. Solve duality to solve the LLP.

Minimize $z = 20x_1 + 40x_2$

Subject to $36x_1 + 6x_2 \geq 600$

$3x_1 + 12x_2 \geq 36$

$20x_1 + 10x_2 \geq 100$

and $x_1, x_2 \geq 0$

10. A City Corporation has decided to carry out Maintenance work in the city. There are four tasks to be completed using 5 contractors. Which of these contractors should be assigned those tasks? Solve the assignment problem to get best result.

Contractor	Task 1	Task 2	Task 3	Task 4
A	19	24	29	25
B	17	27	30	29
C	19	28	31	28
D	20	12	28	29
E	20	25	31	26

11. a) Two types of food manufacturers are competing for an increased market share. The payoff matrix describes the increase in market share of A and decrease share of B. Determine optimal strategies for both the manufacturers and the value of the game.

A	B			
	Give Price	Decrease Price	Maintain present strategy	Increase Advertising
Give Price	25	20	14	30
Decrease Price	27	16	12	14
Maintain present strategy	35	8	15	19
Increase Advertising	-2	8	13	0

b) Write Hungarian algorithm to solve the assignment problem.

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Semester: VIII

Subject: Database Programming

2018 Batch

Group B

Attempt any SIX questions

2. Explain the PL/SQL block structure with an example.
3. What are records and nested records in PL/SQL? Explain benefits of using records.
4. How functions can be created can invoked in database? Explain with examples.
5. What is a cursor? Explain different types of cursors used in database.
6. Why do we need to use trigger in the database? Explain the use of triggers with proper examples.
7. How user defined exceptions can be created in PL/SQL? Explain with proper example.
8. Write short notes (any two):
   a) INSTEAD OF trigger
   b) Packages
   c) Parameterized cursors

Group C

Attempt any TWO questions.

9. Explain PL/SQL architecture. Differentiate between SQL and PL/SQL Also explain the conditional control statements used in PL/SQL.
10. Define stored procedure. Explain different parameter modes used in stored procedures. Also differentiate between functions and stored procedure with examples.
11. Explain row trigger and statement trigger with examples. Explain any five SQL*PLUS commands.

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Semester: VIII

Subject: Geographical Information System

2018 Batch

Group B

Attempt any SIX questions

2. What is GIS? Explain functions and applications of GIS.
3. Define map projection. Describe the techniques used for map projection.
4. What is GPS? Explain components of GPS.
5. Describe about grid-like format and coordinate format for structuring the graphics in GIS.
6. Explain the benefits of a geodetic datum based on ITRF.
7. Describe the role of GIS in agriculture for developing country like Nepal.
8. Write short note on (any two):
   a) Map features
   b) Surface Modeling
   c) Spatial database

Group C

Attempt any TWO questions.

9. Explain the term "Data is fuel to GIS". What are the types and sources of geographic data? Describe different data capturing methods.
10. Define Geodatabase. Briefly describe the steps for geodatabase design.
11. What is hydrology modeling? Explain the role of GIS to solve the challenges in hydrology.

Tribhuvan University

Faculty of Humanities and Social Science

Semester: VIII

Subject: Data Analysis & Visualization

2018 Batch

Group B

Attempt any SIX questions

2. What do you mean by visual encoding? Explain its process.
3. What is the different technique for visual mapping? Explain
4. Write and explain rules for graphical drawing.
5. What is rendering? Explain its transfer functions.
6. Define marks and channels with example.
7. Why hierarchical structure of data visualization is used? Explain.
8. Explain principles of dashboard design using data visualization design.

Group C

Attempt any TWO questions.

9. What is time series data? Write the characteristics of time data and process of visualization time series data mapping with time.
10. What is visualization reference model? Write the steps form design of visualization application.
11. What are the different software tools form data visualization? Explain features of any one with example.

Tribhuvan University

Faculty of Humanities and Social Science

Semester: VIII

Subject: Machine Learning

2018 Batch

Group B

Attempt any SIX questions

2. What constitutes over-fitting, and how can it be prevented? Elaborate with a suitable example.
3. Define perceptron. Explain K-means clustering algorithm.
4. Discuss the strengths and weaknesses of the Naive Bayes algorithm compared to other classification algorithms like Support Vector Machines.
5. Why dimensionality reduction is useful? Considering a Long List of Machine Learning Algorithms, given a Data Set, How Do You Decide Which One to Use? Justify your answer
6. What do you mean by ROC curve? In a credit card fraud detection system, the algorithm flagged 50 transactions as fraudulent. Out of these flagged transactions, 45 were indeed fraudulent. Additionally, the algorithm didn't flag 30 fraudulent transactions. Calculate the precision, recall and FI-score for the fraud detection system.
7. What do you mean by hierarchical clustering? How can regression be used to find best fit line?
8. Write short notes on (any two):
   a) Supervised Vs. Unsupervised Learning
   b) Sensitivity and Speficity
   c) Bayesian Belief Network

Group C

Attempt any TWO questions.

9. What is the need of confusion matrix? Explain the frame work for building machine learning system.

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10. Define entropy and information gain. Construct decision tree (ID3 Algorithm)for the following:

Day	Outlook	Temperature	Humidity	Wind	Decision
1	Sunny	Hot	High	Weak	Yes
2	Sunny	Hot	High	Strong	No
3	Overcast	Hot	High	Weak	Yes
4	Rain	Mild	High	Weak	No
5	Rain	Cold	Normal	Weak	Yes

11. What are bias -variance trade off? Consider the table given below and use K-NN algorithm to evaluate result of Sija= {Machine Learning=60 GIS=80}

S.N	Machine Learning	GIS	Result
1	40	30	Fail
2	60	70	Pass
3	70	80	Pass
4	50	50	Fail
5	80	80	Pass

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Faculty of Humanities and Social Science

Semester: VIII

Subject: Multimedia System

2018 Batch

Group B

Attempt any SIX questions

2. What is meant by multimedia and hypermedia? Explain the method of storing image in vector format?
3. What is speech? Explain speech generation method.
4. What is meant by image analysis? Explain image analysis techniques in details.
5. What is digital video? Describe the methods of controlling animation.
6. Differentiate between lossless and lossy compression.
7. What is the need of interface design? Explain five fundamental rules for interface design in multimedia applications.
8. What is meant by video-on-demand? Explain the application of multimedia in telemedicine.

Group C

Attempt any TWO questions.

9. Explain the global structure of multimedia with block diagram and explain each block in detail.
10. Why 'compression' is necessary for multimedia data? Explain steps involved in JPEG compression.
11. What is MIDI? What features of MIDI makes it suitable for multimedia applications? Calculate the file size in bytes for 10 seconds recording stereo music at 44.1 KHz, 16 bit Resolution.

Tribhuvan University

Faculty of Humanities and Social Science

Semester: VIII

Subject: Knowledge Engineering

2018 Batch

Group B

Attempt any SIX questions

2. Explain the concept of representation. How does probabilistic reasoning handle uncertainty in knowledge representation?
3. What is ontology? How can it be used in knowledge engineering?
4. Explain how predicates can be used for knowledge representation and reasoning with examples.
5. What is semantic web? What are the major challenges in sematic web?
6. What are RDF and linked data? What are the principles of linked data?
7. Differentiate between classification and clustering. Explain four stages of case based reasoning.
8. Write short notes on (any two):
   a) Linear classifier
   b) Parsing
   c) Description logic

Group C

Attempt any TWO questions.

9. Why knowledge acquisition is required? Explain the knowledge acquisition process in detail.
10. What is the role of POS tagging in natural language processing? How NER can be used for information extraction process? Explain.
11. What are support vectors and margins? How these concepts are used in Support Vector Machines to classify the datasets? Explain in detail.

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Faculty of Humanities and Social Science

Semester: VIII

Subject: Information Security

2018 Batch

Group B

Attempt any SIX questions

2. What is security attack? Explain different type of active attack.
3. Find the value of 7^2019 MOD 13 using Fermat's little theorem. Define Euler totient function with example.
4. What is Galois Field? Divide $5x^2 + 4x + 6$ *by* $2x + 1$ over GF (7).
5. What is digital signature? Describe approaches of DSS.
6. What is firewall? Explain different type of firewall.
7. What are user authentication principles? Explain about Role based and Attribute based access control.
8. What is security Audit trial? What are requirements for security auditing? Explain.

Group C

Attempt any TWO questions.

9. What is difference between block cipher and stream cipher? Encrypt and decrypt the message TRIBHUVAN UNIVERSITY with key BEST using playfair and vernam cipher.
10. How does two-factor authentication work? Explain the concept of Trust Frameworks.
11. What is IPSec? What are benefits of IPSec? Explain the IPSec architecture in details.

Tribhuvan University

Faculty of Humanities and Social Science

Semester: VIII

Subject: Internet of Thing

2018 Batch

Group B

Attempt any SIX questions

2. Differentiate between Active Sensors and Passive sensors. Why do we require both analog and digital pins in any microcontroller board?
3. Explain data storage, data processing, data analysis steps in M2M data management.
4. What are the economic impacts of the increased application of IOT in the context of Nepal?
5. Explain the role of IOT in Machine Learning and Big Data Analytics.
6. How might the internet address (ipv6) affect the development and implementation of the internet of thing. Explain usage of IOT in Home Automation in brief.
7. "IOT has several security challenges". Explain the issues alongside with the remedies
8. Write short notes on (any two) :
   a. Actuator
   b. Contact and No-contact sensor
   c. DHT11 sensor

Group C

Attempt any TWO questions.

9. With a proper labelling explain Arduino-Uno Board. Explain the process of monitoring the weather using any microcontroller Boards.
10. IOT comprises of Physical and Logical Design. Explain both in brief.
11. What is Raspberry Pi? Define how it is used in IOT along with installation.
