Aliah University

End-Semester Examination (Spring Semester) - 2024

(For 4th Year 8th Semester BTech (CSE) Programme)

Paper Name: Professional Elective–IV [Operations Research] **Full Marks: 80**

Paper Code: CSEUGPE22 **Time: 3 hrs**

Group - A

(Answer all questions) **5 × 2 = 10**

1. What is a symbolic model? 2
2. Define an optimal solution Linear Programming Problems (LPP). 2
3. Give two examples of assignment problems. 2
4. What is a dummy activity? 2
5. Compare mixed strategy and pure strategy in game theory. 2

Group - B

(Answer any six questions) **6 × 5 = 30**

6. What are the main characteristics of operations research? 5
7. What are the limitations of Linear Programming Problems? 5
8. Write a short note on the Big M method or penalty cost method in linear programming. 5
9. Describe the North West Corner Rule method for solving transportation problems. 5
10. How do you convert an unbalanced transportation problem into a balanced one?. Explain using a suitable example. 5
11. Write down the different phases of a project. 5
12. What are the basic characteristics of a queueing system? 5
13. Write down a short note on a two-person zero-sum game. 5

Group - C

(Answer any four questions) **4 × 10 = 40**

[All parts of the same questions should be written together]

14. Solve the following linear programming problem graphically.

Maximize $z = 5x + 7y$

subject to $x + y \leq 4$,

$3x + 8y \leq 24$,

$10x + 7y \leq 35$

and $x, y \geq 0$ 10

15. Solve the following linear programming problem using the Simplex method.

Maximize $z = 2x + y$

subject to $x - y \leq 10$

$2x - y \leq 40$

$x, y \geq 0$ 10

[Please Turn Over]

16. Determine the initial basic feasible solution for the following transportation problem whose cost and rim requirement table is given below, using least cost method:

Origin/Destination	D_1	D_2	D_3	D_4	Supply
O_1	11	13	17	14	250
O_2	16	18	14	10	300
O_3	21	24	13	10	400
Demand	200	225	275	250	950

10

17. There are four jobs to be assigned to five machines. Only one job can assigned to one machine. The amount of time in hours required for the jobs per machine are given in the following matrix. Find an optimum assignment of hobs to the machines to minimize the total processing time and also find out for which machine no job is assigned. What is the total processing time to complete all the jobs?

Jobs	Machines				
	A	B	C	D	E
1	4	3	6	2	7
2	10	12	11	14	16
3	4	3	2	1	5
4	8	7	6	9	6

10

18. (a) State the maximin-minimax principle. 4

(b) For what value of λ, is the game with following pay-off matrix strictly determinable?

$$\begin{array}{cc} & \text{Player B} \\ & \begin{matrix} B_1 & B_2 & B_3 \end{matrix} \\ \text{Player A} \begin{matrix} A1 \\ A2 \\ A3 \end{matrix} & \begin{bmatrix} \lambda & 6 & 2 \\ -1 & \lambda & -7 \\ -2 & 4 & \lambda \end{bmatrix} \end{array}$$

6

19. A project schedule has the following characteristics.

Activity	1–2	1–3	2–4	3–4	3–5	4–9	5–6	5–7	6–8	7–8	8–10	9–10
Time (days)	4	1	1	1	6	5	4	8	1	2	5	7

a) Construct a network diagram.

b) Compute the earliest event time and latest even time.

c) Determine the critical path and total project duration.

[3+4+3]

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End-Semester Examination (Spring Semester) – 2024

(4th Year 8th Semester 4-yrs B.Tech)

Subject Name: Adhoc & Sensor Networks **Full Marks: 80**

Subject Code: CSEUGPE26 **Time: 3hrs**

Part – A (Answer all questions) 5 x 2 = 10

1. What are the limitation of sensor node?
2. What do you meant by single hop and multiple hop routing?
3. Differentiate WSN routing with traditional routing.
4. Define concept of clustering in WSNs.
5. What is data aggregation?

Part – B (Answer any 6 questions) 6 x 5 = 30

1. Discuss the characteristic requirements of WSNs.
2. Discuss the potential applications of WSNs.
3. Discuss the operation of B-MAC protocol for the MAC layer in WSNs.
4. What is the hidden terminal problem in WSNs? How to overcome from it?
5. Explain how the routing in WSNs is challenging from other wireless networks.
6. Discussed in details the concept of broadcasting and flooding.
7. Write short note on ZigBee.
8. Discuss about the energy consumption of the different components of a sensor node.

Part – C (Answer any 4 questions) 4 x 10 = 40

1. State and discuss the mathematical model of energy consumption during transmission & reception of a transceiver. **10**
2. Explain the design approaches and performance of S-MAC protocol with advantages and disadvantages. **6+4**
3. Draw the architecture of a sensor node and discuss various component of it. **4 + 6**
4. Explain in details how the SPIN protocol is different from the DD protocol? **10**
5. Discuss the functionality of LEACH protocol in details. **10**
6. Design a useful architecture of WSNs for protecting a hill area against landslide and explain how your model is useful for this application? **10**

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End-Semester Examination (Even Semester) - 2024

(CSE 4th Year 8th Semester)

Subject Name: Cryptography and Network Security **Full Marks: 80**

Subject Code: CSEUGPC26 **Time: 3hrs**

Group-A

(Answer all questions) $5 \times 2 = 10$

1.

a) What is Denial of Service Attack?

b) If 40 people need to communicate using symmetric key cryptography, then find out the numbers of symmetric keys needed.

c) Differentiate between threats and attacks.

d) Convert the Given Text "EXAMINATION" into cipher text using monoalphabetic substitution with key=4.

e) Define stream cipher.

Group-B

(Answer any five questions) **5×6= 30**

2. Differentiate between monoalphabetic and polyalphabetic ciphers with example. (6)

3. Explain the algorithm for generating keys in RSA algorithm. Perform encryption and decryption using RSA Alg. for the following. P=7; q=11; e=13; M=8. (6)

4. Draw and explain IPSec ESP Format. (6)

5. Explain DMZ network in details with diagram. (6)

6. Define Caesar cipher with example? Differentiate between block cipher and stream cipher. (3+3=6)

7. Prove that the result of G^{xy} mod N is same as the result of $(G^x \bmod N)^y \bmod N$, using G=7,x=2,y=3 and N=11 (6)

Group-C

(Answer any four questions) **4 × 10 = 40**

8. Describe the DES algorithm with neat diagram and explain the steps. (10)

9. Explain man in the middle attack with diagram. (10)

10. How TLS is different from SSL? Describe TLS protocol in details. (2+8=10)

11. Explain various types of active and passive attacks in details. (10)

12. Illustrate public key cryptography system with neat diagram. (10)

Even (Spring) Semester Examination 2023-2024

Paper Code: MBAUGHU02; Paper name: Professional Values and Ethics

VIIIth Semester

Full Marks: 80; Time: 3Hrs.

(The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as possible)

GROUP: A (*Answer all the questions*) **(1 x 10 = 10)**

1. Choose and write ONLY the correct option (a/b/c/d). DO NOT write full sentences.

I. The rule of ethics is also called as
A. Rule B. Law C. Responsibility D. None of the above

II. Ethical issues that can affect an Engineer's professional and personal life are termed as
A. Macro-ethics B. Micro-ethics C. Morals D. Rights

III. Business malpractice does not include
A. Black Marketing B. Advertisement C. Duplication D. Adulteration

IV. Dowry deaths, wife battering is an example of
A. Criminal violence B. Domestic violence C. Social violence D. Gross violence

V. Ethics is the science of
A. beauty B. conduct C. truth D. mind

VI. Value is
A. response of the society B. enduring belief C. material culture D. non-material culture

VII. The word 'ethics' was derived from the Greek word
A. ethies B. ethos C. ethees D. ethise

VIII. Aesthetics deals with the standard of
A. truth B. beauty C. goodness D. trust

IX. Business ethics has a _____ application.
A. natural B. universal C. practical D. none of the above

X. The relevance of ethics is in its
A. Context B. Applications C. Principles D. Understanding

GROUP: B (*Answer any five questions*) **(5 x 5 = 25)**

2. What do you mean by 'Values' and 'Ethics'?
3. What are the features of 'Rapid Technology growth'? Discuss.
4. Write a short note on 'Solar Energy'.
5. What are the problems of Man machine Interactions?
6. Write a short note on 'Canons of Ethics'.
7. Write the names of five 'Environmental Regulations Acts'?
8. Discuss the problems of Technology Transfers.

GROUP: C (*Answer any three questions*) **(15 x 3 = 45)**

9. Discuss the concept of value crisis in contemporary Indian society.
10. What is the concept of 'Club of Rome'? Discuss with suitable diagram.
11. Justify your view on inclusion of 'Professional Values and Ethics' course in the Engineering domain.
12. Discuss the Appropriate Technology Movement of Schumacher.
13. What do you understand by 'Sustainable Development'? How is 'Sustainable Development' linked with 'Energy Crisis & Renewable Energy Sources'?

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