JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2023

B.Tech-VIII Semester (ECE)

COURSE CODE(CREDITS):19B1WEC733(3) MAX. MARKS: 35

COURSE NAME: Optimization Techniques

COURSE INSTRUCTORS: Dr.Neel Kanth MAX. TIME: 2 Hours

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

Q1.Solve the LPP using Big M method

$$Min\ Z = 2x_1 + x_2$$

$$\text{s/t } 3x_1 + x_2 = 3\,, 4x_1 + 3x_2 \geq 6 \text{ and } x_1 + 2x_2 \leq 3$$

$$x_1, x_2 \geq 0$$

[7]

Q2.The ABC company has been a producer of picture tubes for television sets and certain printed circuits for radios. The company has just expanded into full scale production and marketing of AM and AM-FM radios. It has build a new plant that can operate 48 hours per week. Production of an AM radio in the new plant will require 2 hours and production of AM-FM radio will require 3 hours. Each AM radio will contribute Rs.40 in profit while an AM-FM radio will contribute Rs.80 to profit. The marketing department after extensive research has determined that a maximum of 15 AM radios and 10 AM-FM radios can be sold each week. Formulate the problem as linear programming problem in order to maximize the profit. Also solve the problem graphically.

[7]

Q3.A team of 5 horses and 5 riders has entered a jumping show contest. The number of penalty points to be expected when each rider rides the horse is given below:

Horse/Rider	R1	R2	R3	R4	R5
H1	5	3	4	7	1
H2	2	3	7	6	5
H3	4	1	5	2	4
H4	6	8	1	2	3
H5	4	2	5	7	1

How the horses should be allotted to the riders so as to minimize the expected loss of the team.

[4]

Q4.Write mathematical form of transportation problem.

[3]

Q5.Solve the transportation problem [7]

Plant/Market	A	B	C	D	Availability
X	13	11	15	20	2
Y	17	14	12	13	6
Z	18	18	15	12	7
Requirement	3	3	4	5	

Q6.Solve the job sequencing problem in order to minimize the total elapsed time.Also find the idle time for each machine. [7]

Mac/Job	1	2	3	4	5	6
X	18	12	29	36	43	37
Y	7	12	11	2	6	12
Z	19	12	23	47	28	36