SUBJECT CODE NO:- P-252
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E. (Mech.) Examination May/June 2017
Project Management and Operations Research
(Revised)

[Time: Three Hours]   [Max.Marks:80]

Please check whether you have got the right question paper.

N.B
        i) Attempt any three questions from each section.
        ii) Assume suitable data if necessary.
        iii) Figure to the right indicates full marks.

Section A

Q.1 a) Explain the phase of OR.   08
    b) Solve the following LPP by graphical method   05
    Maximize $z= 5x_1+4x_2$
    Subject to constraints,
    $x_1-2x_2\leq 1$
    $x_1+2x_2\geq 3$
    $x_1,x_2\geq 0$

Q.2 Solve the following LLP by simplex method.   13
    Maximize $z=4 x_1+3x_2+6x_3$ subject to constraints,
    $2x_1+3x_2+2x_3\leq 440$
    $4x_1+3x_3\leq 470$
    $2x_1+5x_2\leq 430$
    $x_1,x_2,x_3\geq 0$

Q.3 Solve the following LLP by big-M method.   14
    Minimize $Z=4x+2y$
    Subject to constraints,
    $x+2y\geq 2$
    $3x+y\geq 3$
    $4x+3y\geq 6$
    $x, y\geq 0$

Q.4 Solve the following transportation problem using VAM. Find the optimum solution.   13

	A	B	C	D	E	supply ↓
X	36	16	2	32	-	300
Y	20	-	12	22	8	250
Z	8	6	16	-	14	500
Requirement →	150	400	200	100	150	

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Q.5 a) Solve the following assignment model. 06

Jobs

	J₁	J₂	J₃	J₄	J₅
W₁	27	29	30	40	38
W₂	32	25	31	28	30
W₃	28	30	29	20	26
W₄	25	18	27	24	28
W₅	19	24	20	21	15

workers

b) The data collected in running a machine the cost of which is Rs 60,000/- are given below, Determine the   07
optimum period for replacement of the machine

Year	1	2	3	4	5
Maintenance Cost (Rs)	18000	20270	22880	26700	31800

Section B

Q.6 a) A supermarket has two girls serving at the counters. The customers arrive in a Poisson fashion at the rate of   06
12per hour. The service time for each customer is exponential with mean 6 minutes. Find,
   1. The probability that an arriving customer has to wait for service.
   2. The average number of customers in the system, and
   3. The average time spent by a customer in the supermarket.

b) There are five jobs, each of which is to be processed through 03 machins: A,B and C in the order   08
A → B → C processing times in hours are :-

Job	1	2	3	4	5
M/C A	3	8	7	5	4
M/C B	4	5	1	2	3
M/C C	7	9	5	6	10

Find the sequence of jobs, total elapsed time and idle time for each machine.

Q.7 A Solve the following game using dominance property and find the game value (v) along with the strategies of   13
each player.

Player B

		1	2	3	4	5
Player A	1	3	5	1	-4	2
	2	4	2	2	-3	3
	3	5	-1	-1	0	-1

Q.8 Neon lights in industrial parks are replaced at the rate of 100 units per day. The physical plant orders the   13
Neon lights periodically. It costs Rs. 100 to initiate a purchase order. A neon light kept in storage is
estimated to cost about Rs. 0.02 per day. The lead time between placing and receiving an order is 12 days.
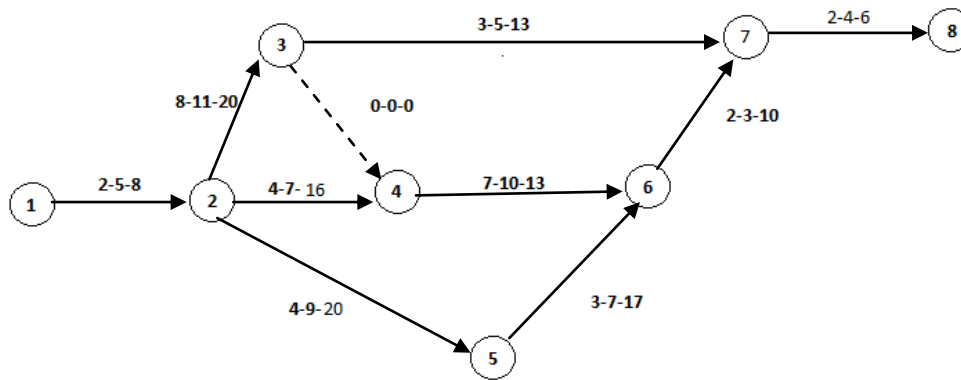Determine the optimum inventory policy for ordering the neon lights.

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Q.9   The table below gives the data about durations and costs, if various activities of the network shown.   13

Activity	Normal duration (weeks)	Normal cost (Rs.)	Crash Duration (weeks)	Crash cost (Rs.)
1-2	4	4000	2	12000
2-3	5	3000	2	7500
2-4	7	3600	5	6000
3-4	4	5000	2	10000

The project overhead costs are Rs. 2000/ week. Find the optimum duration & the cost associated with it.
Also, draw the least cost network.

Q.10   Figure shows the network for a construction project, with the three time estimates of each activity marked.   13
Determine :-
    i.   Critical path and its standard deviation.
    ii.   Probability of completion of project in 40 days.
    iii.   Time duration (T_s) , that will provides 95% probability of its completion in time.

Z	P%
1.744	96%
1.65	95%