UPES

UNIVERSITY OF PETROLEUM & ENERGY STUDIES

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Program/Course: MBA (BA)   Semester – IV
Subject: Consultancy Management   Max. Marks   : 100
Code   : MBBA 872   Duration: 3 Hrs
No. of page/s: 4

Note: Try to maintain the sequence while answering.

SECTION –A

Q1. Answer the following MCQs :   (10*2=20)

I.   While plotting constraints on a graph paper , terminal points on both the axes are connected by a straight line because
   a)   the resources are limited in supply
   b)   the objective function is a linear function
   c)   the constraints are linear equations or inequalities
   d)   all of the above
II.   Constraints in a LP problem are active if they
   a)   Represent optimal solution
   b)   At optimality do not consume all the resources
   c)   Both a) and b)
   d)   None of the above
III. Probabilities of occurrence of any state are
   a)   Collectively exhaustive
   b)   Mutually exclusive
   c)   Representing one of the finite number of states of nature in the system
   d)   All of the above
IV.   A problem is classified as Markov chain provided
   a)   There are finite number of states
   b)   States are collectively exhaustive and mutually exclusive
   c)   Long run probabilities of being in a particular state will be constant over time
   d)   All of the above
V.   Markov analysis is useful for :
   a)   Predicting the state of system at some future time
   b)   Calculating transition probabilities at some future time
   c)   All of the above
   d)   None of the above
VI.   Dynamic programming approach
   a)   optimizes the sequence of interrelated decision over a period of time
   b)   provides optimal solution to single period decision problem
   c)   provides optimal solution to long term corporate planning problems
   d)   all of the above
VII. A type of risk making environment is
   a)   Certainty
   b)   Uncertainty

c) Risk
d) All of the above
VIII. The decision making criterion that should be used to achieve maximum long term payoff is
    a) EOL
    b) EMV
    c) Hurwicz
    d) Maximax
IX. Expected value of perfect information is equal to
    a) EPPI-Min (EMV)
    b) EPPI+ Max (EMV)
    c) Max EOL
    d) None of the above
X. Which of the following criteria is not applicable to decision making under risk ?
    a) Maximize expected return
    b) Maximize return
    c) Minimize expected regret
    d) Knowledge of likelihood of occurrence of each state of nature

SECTION –B

Q2. Consider the project example for contractor pre-qualification for manufacturing organization. The various criteria to be considered here are experience, financial stability, quality performance, manpower resources, equipment resource and current workload. Consider the five contractors A, B, C , D and E who wish to prequalify.

Descriptions are presented in the following table:

Criteria	Cont. A	Cont. B	Cont. C	Cont. D	Cont. E
Experience	5 years	7 years	8 years	10 years	15 years
Financial stability	$7 M assets No liabilities	$10 M assets , $5.5.M liabilities	$ 14 M assets $ 6 M liabilities	$ 11 M assets $4 M liabilities Good relation with banks	$6 M assets $1.5 M liabilities
Quality performance	Good organization , good reputation, many certifications	Average organization , Two delayed projects	Good organization	Good organization	Bad organization
Manpower resources	150 labourers , 10 skilled labourers	100 labourers , 200 by sub contract	120 labourers , 25 special skilled labourers	90 labourers , 130 by sub-contract	40 labourers , 260 by sub contract
Equipment resources	4 mixer machines , 1 excavator , 15 others	6 mixer machines , 1 excavator , 20 others	1 batching plant , 2 mixer machines , 1 excavator , 1 bulldozer	4 mixer machines , 1 excavator , 9 others	2 mixer machines , 10 others
Current workload	1 big project ending ; 2 projects in mid	2 projects ending	1 medium project started; 2 projects ending	2 big projects ending ; 1 medium project in mid	2 small project started ; 3 projects ending

As a consultant to the firm your task is to suggest the best contractor. You have decided to choose structural modelling technique AHP to reach to a conclusion.

i)   Given the pairwise judgement matrices for different criteria as well as alternatives (contractors here) construct the normalized matrices
ii)   Construct the priority vector (local weights) for every criteria as well as alternatives
iii)   Calculate the max Eigen value (n max) for each pairwise comparison matrix
iv)   Calculate the consistency index CI and RI for each pairwise comparison matrix and check their consistency ratio to see if the matrices are consistent
v)   Compute the final weights for each alternative and select the best contractor based on that.

(10*5=50 marks)

Pairwise comparison matrices are given below:

Experience	A	B	C	D	E
A	1	1/3	½	1/6	2
B	3	1	2	½	4
C	2	½	1	1/3	3
D	6	2	3	1	7
E	1/2	1/4	1/3	1/7	1

Financial stability	A	B	C	D	E
A	1	6	3	2	7
B	1/6	1	1/4	½	3
C	1/3	4	1	1/3	5
D	½	2	3	1	7
E	1/7	1/3	1/5	1/7	1

Quality performance	A	B	C	D	E
A	1	7	1/3	2	8
B	1/7	1	1/5	1/4	4
C	3	5	1	4	9
D	1/2	4	1/4	1	6
E	1/8	1/4	1/9	1/6	1

Manpower resources	A	B	C	D	E
A	1	1/2	1/4	2	5
B	2	1	1/3	5	7
C	4	3	1	4	6
D	1/2	1/5	1/4	1	2
E	1/5	1/7	1/6	1/2	1

Equipment resources	A	B	C	D	E
A	1	1/6	1/8	2	3
B	6	1	1/4	5	7
C	8	4	1	9	9
D	1/2	1/5	1/9	1	2
E	1/3	1/7	1/9	1/2	1

Current workload	A	B	C	D	E
A	1	1/5	1/3	3	3
B	5	1	5	6	6
C	3	1/5	1	2	2
D	1/3	1/6	1/2	1	2
E	1/3	1/6	1/2	1/2	1

	Experience	Financial stability	Quality performance	Manpower resources	Equipment resources	Current workload
Experience	1	2	3	6	6	5
Financial stability	1/2	1	3	6	6	5
Quality performance	1/3	1/3	1	4	4	3
Manpower resources	1/6	1/6	1/4	1	2	1/2
Equipment resources	1/6	1/6	1/4	1/2	1	1/4
Current workload	1/5	1/5	1/3	2	4	1

SECTION- C

Q3. A firm wants to take a decision   whether to advertise or not its exiting range of products to improve its market share. Following are the transition probabilities associated with the three states (good, fair and poor market condition) and the corresponding revenue matrices.

Action 1: Do not advertise with transition probability matrix P^1 and revenue/reward matrix R^1 and

Action 2: To advertise with transition probability matrix P^2 and revenue/reward matrix R^2.

a) Identify all the stationary policies for the given scenario.

b) Considering this as a finite stage Markov decision Process. Identify the optimal courses of action for the firm for a period of three years and compute the highest accumulated revenue at the end of three years.

(2*15= 30 marks)

$$P^1 = \begin{matrix} 0.2 & 0.5 & 0.3 \\ 0 & 0.5 & 0.5 \\ 0 & 0 & 1 \end{matrix} \qquad R^1 = \begin{matrix} 7 & 6 & 3 \\ 0 & 5 & 1 \\ 0 & 0 & -1 \end{matrix} \qquad P^2 = \begin{matrix} 0.3 & 0.6 & 0.1 \\ 0.1 & 0.6 & 0.3 \\ 0.05 & 0.4 & 0.55 \end{matrix} \qquad R^2 = \begin{matrix} 6 & 5 & -1 \\ 7 & 4 & 0 \\ 5 & 3 & -2 \end{matrix}$$