MTH601- OPERATIONAL RESEARCH
(SOLVED MCQs)
FROM MIDTERM PAPERS
LECTURE (1-22)

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1- Which of the following correspond to the practical limitation of available resource while modeling a real life situation into a linear program?

- Constraints
- Objective function
- Linear function
- Decision variables

2- Which of the following method follows iterative procedure to solve a linear programming problem?

- Graphical
- Algebraic(Simplex)

3- Solution region of the constraints :2x+3y>12 and 2x+3y<12 will be the_____.

- Point(6,4)
- Straight line:2x+3y-12
- Empty set
- All first quadrant

4- In the graph of the purchasing model with shortages the area under the horizontal axis represents_____.

- Set up cost of item
- Purchase cost of item
- Carrying cost of item
- Shortage cost of item

5- The straight line associated with the constraints 2x+3y<12 will meet x-axis at a distance of_____ units from origin.

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- 2
- 4
- 6
- 3

6- Which of the following value is correct for the expected time of an activity having optimistic, pessimistic and most likely times as 4,8 and 6 days.

- 666 days
- 466 days
- 6 days (not sure)
- 933 days

7- In a network flow a diagram for an activity(I,j) of duration of three days if its earliest start time is of two days then which of the following will be its early finish time?

- One and half day
- One day
- Six days
- Five days (not sure)

8- In a development project. If an activity (m,n) of seven days duration starts late on 5rd day then which of the following will be its latest finish time?

- 7^{th} day
- 5^{th} or 7^{th} day
- 12^{th} day
- 5th day

9- Which of the following is an intermediate step to model a linear programming problem?

- Identify the objective function.

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- Identify the non-negative restrictions and constraints
- Identify the unknown decision variables
- None of these

10- A/An _____ is the collection of inter related activities to be performed in a particular sequence to completion.

- Project
- Branch
- Event
- Node

11- Which of the following times are directly to the activity cost that is by reducing the activity duration the direct cost of the corresponding activity is increased?

- PERT Times
- CPM Times

12- Which of the following is an operation research (OR) process?

- Simplex method
- Linear programming
- Observation
- Networking

13- In the purchasing Model with shortages the cost function C(S,Q) can also be expressed as function of_____.

- (S,D)
- (Q,D)
- (S.t)
- (t,D)

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14- Which of the following would be the objective of the yield per minute in a chemical process which depends upon the temperature 'x' and pressure 'y'?

- Minimization
- Inflection
- Maximization
- Average

15- Which one of the following is not an operations research problem solving steps?

- Observation
- Definition of the problems
- Variable selections
- Model construction

16- In the Dynamic order Quantity if the ratio of setup and carrying costs is 500 and the demands of 2nd and 3rd months are 50 and 130 respectively then which of the following is true about the 2nd months requirement?

- 2nd month demand can be include in 1st month
- 2nd month demand can be included in 3rd month
- 2nd month demand can be included in any month of the year
- 2nd month demand will have to fulfill in 2nd month

17- The mathematical technique which is used to solve a wide class of problems such as allocating scarce resource among competitive activities is known as_____.

- Classical model
- Descriptive model
- Linear programming model
- Mathematical model

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18- Which of the following would be the objective of the cast per unit of producing certain cameras?

- Average
- Minimization AL-JUNAID INSTITUTE OF GROUP
- Inflection
- Maximization

19- In CPM each activity has one deterministic time while in PERT each activity has_____ probabilistic time/times

- Three
- Also one
- Two
- No

20- In the phase of early start and early finish to find the critical path in a network flow diagram the computation are proceeded from_____ to the final event.

- Left to right
- Bottom to top
- Top to bottom
- Right to left

21- In a development project, if an activity(I,j) of six days duration starts late on 3rd day then which of the following will be its latest finish time?

- 18th day
- 9th day
- 3rd day
- 2nd day

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22- If the annul demand of a product is 10000 items , and its set up and inventory costs are 200 and 100 respectively then its economic order quantity is_____ provided that shortage is fulfilled INSTANTANEOUSLY.

- 200units
- 20000units
- 40000units
- 100 units

23- For a LP problem say,Max.z=x+y, under the condtraints xy>=0 the feasible region would be_____.

- All the first quadrant AL-JUNAID INSTITUTE OF GROUP
- All xy-plane
- Empty
- Point(0,0)

24- By which of the following method any complex linear programming problem can be handled?

- Degenerate method
- Graphical method
- Simplex method
- Dual method

25- In the phase of Early start and early finish to find the critical path in a network flow diagram flow diagram, for the first node(event) we start will time_____.

- With strict positive value
- T-0
- T=a(arbitary)
- T=infinity

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26- Solution region of the constraints 2x+3y>12 or 6x+9y=36

Will be the half plane bisected by 2x+3y=12.

- Excluding
- Including

27- which of the following event has no immediate predecessor in any network flow diagram?

- Critical Event
- Head Event
- Tail Event
- Non_criticalmevent

28- Which one of the following is not an operation research problem solving steps?

- Variable selections
- Definition of the problem
- Observation
- Model construction

29- For critical path of a network which of the following is the best suitable answer.

- Its total float is zero
- Its free float is zero
- All of the above AL-JUNAID INSTITUTE OF GROUP
- Its independent float is zero

30- If the economic order quantity and the annual demand of a product are 2500 and 5000 units respectively then without any shortage the time between the consecutive order is _____ months.

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- 02
- 2.50
- 0.50
- 1.50

31- Which of the following quantity will very in case of Dynamic order quantity model?

- Setup Cost
- Carrying Cost
- Item Cost
- Demand

32- Which of the following will be annual optimum cost of a product if the number of annual orders without any shortage is 25 and the total cpst of one cycle is 10,000?

- Rs.400
- Rs.10025
- Rs.9975
- Rs.250000

33- Which of the following would be the objective of the daily loss of heat in a heating system?

- Maximization
- Minimization
- Inflection
- Average

34- While applying Simplex method to a LP of minimization type, we proceed stepwise from one_____ solution to another in such away that the objective function always increase its value.

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- Optimal
- Non-basic feasible
- Basic feasible
- Degenerate

35- The amount of the inventory will always taken to be _____.

- Negative
- Positive

36- Solution of a Linear programming problem is found by_____ methods.

- Analytical
- Probabilistic
- Average
- Pare algebraic AL-JUNAID INSTITUTE OF GROUP

37- A critical path in a network flow diagram____.

- Is unique
- May at most two
- Depends on number of dummies
- May be multiply

38- In the dynamic order quality problem the demands of all succeeding months can be included in the demand of preceding one provide that_____.

- Item and holding costs are balanced
- Shortage and setup costs are balanced
- Setup and holding costs are balanced
- Shortage and item costs are balanced

39- Which of the following property ensures that the decision variables can be divided into any fractional levels so that the rational(fractional) values for the decision variables are permitted?

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- Deterministic
- Additively
- Proportionality
- Divisibility

40- In the ABC analysis the items are classified into three categories with respect their_____

- Cost value
- Demand value
- Turn over value
- Mark up value

41- If for path 1-3-4 times is 5+3-8 days for path 1-2-3-4 time is 6+7+3-16 days and for path 1-2-4 time is 6+6-12 days then which of the followings id ture.

- 1-3-4 is critical path
- 1-2-4 is critical path
- 1-2-3-4 is critical path
- 1-4 is critical path

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42- Under which of the following condition a mathematical program would be non-linear?

- If least objective function is non-linear
- If both objective function and constraints are non-linear

43- In which of the following model the carrying cost per unit of time is reduced in the ratio (1-D/R):1?

- Purchasing model without shortage

- Manufacturing model without shortage
- Purchasing model with allowed shortage
- Manufacturing Model with allowed shortage

44- Which of the following technique to solve the network flow diagrams is activity oriented?

- Programmer evaluation and review technique
- Critical path method

45- In resource leveling when two or more jobs complete for some resource first try to allocate on activity which is of_____ duration end next to the activity which having next____duration.

- Most likely, pessimistic
- Minimum, maximum
- Maximum, Minimum
- Optimistic most likely

46- The objective function and___together from a linear programming problem.

- A set off constraints
- Unrestricted variables
- Feasible region
- Optimal solution

47- Which of the following property must be satisfied by a linear programming model?

- Sensitivity AL-JUNAID INSTITUTE OF GROUP
- Negativity
- Additively
- Probability

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48- In pert the possible variation in activity can be measured from_____ of the corresponding beta distribution.

- Variance
- Mean
- Expected time
- Standard deviation

49- Which of the following is not a categories of the operation research (OR) techniques.

- Linear mathematical programming technique
- Feasible solution
- Inventory techniques
- Networking techniques

50- In a project management if the critical activities of a network are delayed then_____

- Project finish time have to extend(not sure)
- Project cost will increase
- More resource have to employed
- All above choices are equivalent

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51- EST and EFT of activities are calculated in

- Forward pass
- Backward pass
- Path does not effected

52- _____ may be less than most likely time estimate

- Pessimistic time estimate
- Smallest time estimate
- Optimistic Time estimate

53- The dummy activities consume

- No time, no resources
- No time but some resources
- Some resources in minimum time
- None of these

54- If an activity consumes no time and no resources then this activity is called _____

- dummy activity
- sequential activity
- critical activity
- cyclic activity

55- Cost period ------- (No of ordered items)

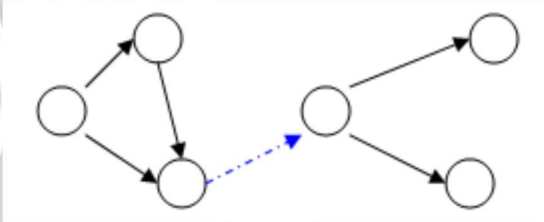
- Holding cost
- Set up cost

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- Stock out cost
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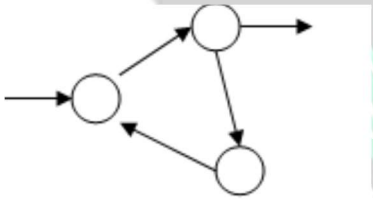
- Item cost

56- The following network is an example of



- Redundancy
- Cycling
- Merging
- Looping

57- The following network is an example of



- Redundancy
- Dangling
- Cycling
- Dummy

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58- Which one is best describe Micro Economic Planning?

- Distribution of fertilizer
- Improving the layout of a workshop in a company
- Investment planning of the country
- PERT

59- If t0 = 6, tm = 12 and tp = 18, then *Vt*= _____

- 12
- 2
- 4
- 144

60- Which inventory model also known as a saw tooth model?

- Purchasing Model with no shortages
- Purchasing Model with shortages
- Manufacturing Model with no shortages
- Manufacturing Model with shortages

61- For backward pass computations

- Earliest start time Latest start time
- Earliest start timeLatest start time

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- Earliest start time Latest start time = 0
- Earliest start time Latest start time

62- For an activity if optimistic time, most likely time estimate and pessimistic time estimate are **3, 6** and **15** respectively then expected time is

- 4
- 3
- 7
- 20

63- In a quadratic programming problem unlike linear programming problem

- Only objective function is quadratic
- Both objective function and constraints are quadratic
- Only constraints are quadratic
- At least one of objective function or constraint must be quadratic

64- Solution region of the constraint $x \geq 0$

- Half plane to the right of straight line x=0
- Half plane to the right of y-axis

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- Half plane to the region where abscissas are non-negative
- All are equivalent

65- A dummy activity is a simulated activity of sorts, one that is of _____duration and is created for the sole purpose of demonstrating a specific relationship and path of action on the arrow diagramming method.

- Zero
- Minimum
- Maximum
- Average

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66- Activity definition refers to the process of parsing a project into a number of individual tasks which must be completed _____ the deliverables can be considered completed. Activity definitions rely on a number of specific input processes.

- before
- both before and after
- after

67- A forward pass is used to determine and calculate the _____ dates, through utilization of a previously specified start date.

- early start and early finish
- late start and early finish

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- early start and late finish
- late start and late finish

68- Total cost per period = Item cost + Order cost + Holding cost + _____.

- Shortage cost
- Optimum Shortage (S*)
- Economic Oreder Quantity. (Q*)
- Maximum Inventory. (I max.)

69- K= Z x (_ _ _)
Where K is called service factor

- $\sqrt{\pi/2}$
- $\sqrt{2/\pi}$
- $\sqrt{2\pi/3}$
- $\sqrt{3\pi/2}$

70- _____ employs a different modeling and solution logic than linear programming

- Transportation Model
- Inventory Control Model
- **Dynamic Programming**

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- None of the above

71- To identify and maintain the proper precedence relationship between activities those are not connected by event, we introduce

- Parallel Activity
- **Dummy Activity**
- Sequential Activity
- None of the above

72- EST and EFT of activities are calculated in

- **Forward pass**
- Backward pass

73- Critical path is obtained by connecting the jobs having

- Activities having same EST and LST
- Activities having same EFT and LFT
- Activities having zero slack
- **All of the above**

74- In LP problems Additively means that

- **The effect of two different programs of production is the same as that of a joint program**
- The doubling (or tripling) the product will exactly double (or triple) the profit and the required

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- resource
- Both (a)& (b)
- None of the

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75- Two of the first steps of OR process encompass the actual use of OR techniques. These steps are

- **Model Construction and Model Solution**
- Observation and Implementation
- Definition of the problem and Model Solution
- Model Solution and Implementation of results

76- Let FS = Free Slack, TS = Total Slack, INDS = Independent Slack, then which relation is true

- TS ≤ FS
- INDS ≤ FS
- FS ≤ TS
- **(d). Both (b) & (c)**

77- Best possible time estimate that a given activity would take under normal conditions which often exist, is called

- **Most Likely time estimate**

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- Pessimistic time estimate
- Smallest time estimate
- None of the above

78- Standard Deviation S.D is

- **One sixth of the difference between pessimistic time estimates and optimistic time estimates**
- One sixth of the difference between pessimistic time estimates and most likely time estimates
- One sixth of the difference between optimistic time estimates and most likely time estimates
- One sixth of the difference between most likely time estimates and optimistic time estimates

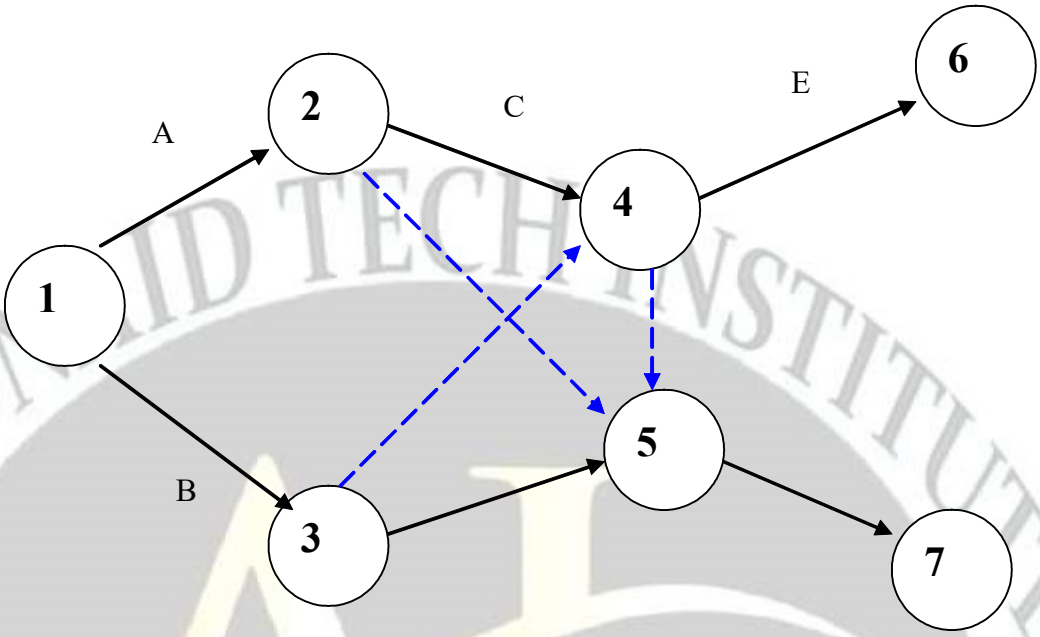
79 _____ may be less than most likely time estimate

- **Pessimistic time estimate**
- Smallest time estimate
- Optimistic Time estimate

80-

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- Yes.
- **No.**

81- In the relation of finding the expected time of an activity, most likely time is weighted more than the other optimistic and pessimistic times and these exist in the ratio of ----------.

- 6:1
- 2:1
- 4:1
- 3:1

82- In PERT, the possible variation in activity times can be measured from ---------- of the corresponding Beta Distribution.

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- Variance
- Mean
- Expected Time
- Standard Deviation

83- Which of the following Probabilistic time in PERT has the same analogical meaning of Deterministic time (time to complete any activity) in CPM?

- Expected
- Optimistic
- Pessimistic
- Most Likely

84- About which of the following it is true that, "they only signify with the passage of time, the beginning and ending of some activities under no consumption of resources" ?

- project
- nodes
- dummy
- branch

85- while solving a network flow problem by PERT, which of the following type of time will be used to measure the length of Critical Path?

- Pessimistic
- Expected
- Most Likely
- Optimistic

86- In a project, a network diagram shows the precedence relations of inter related activities along with their corresponding activity ----------.

- Times

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- Cost
- Profit
- quantity

87- The network flow diagrams for PERT and CPM are same except for ----------.

- dummy activities
- critical Path
- initial and final events
- activity times

88- Which of the following relation is true among the probabilistic times in PERT?

- Most Likely < Optimistic < Pessimistic
- Optimistic < Most Likely < Pessimistic
- Most Likely < Pessimistic < Optimistic
- Pessimistic < Most Likely < Optimistic

89- Which of the following relation is correct for the Standard Deviation of an activity times having optimistic, pessimistic and most likely values as 4, 8 and 6 days respectively?

- 0.666

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- 01
- 0.147
- 7.111

90- In a project, a network diagram shows the ---------- relations of the inter related activities along with their corresponding activity times.

- deterministic and probabilistic
- precedence or succession
- union and intersection
- dummy and artificial

91- The task which is executed by the usage of resources and time is called ----------.

- Node
- Event
- **Project** AL-JUNAID INSTITUTE OF GROUP
- activity

92- If both jobs ‘a(l,n)’ and ‘b(m,n)’ of ‘7’ and ‘8’ days durations respectively, start earlier simultaneously on 4th day, then ‘n’ can start earlier on ----------day.

- 8th
- 11th

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- 15^{th}
- 12^{th}

93- In a network flow diagram, if an event is the predecessor of three other events then how many dummies are inevitable to include in the network?

- One
- **Two**
- Four
- Three

94- In a transportation problem the objective function 'Z' gives____ .

- Total Cost of transportation
- Total time of transportation

95- In two phase method process, first phase___ the sum of artificial variables.

- Minimize
- Maximize

96- which of the following difficult may found while attempting an LP problem by M-method?

- It often leads to infeasible
- Computational error due to large value of M

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97- For finding the maximum profit in an enterprise of selling two products such that freezing the sale of one product and keep selling the other. This scenario is studied under_____.

- Un-roundedness
- Duality
- Degeneracy

98- Which of the following will be an example of degenerate basic feasible solution for an LP problem?

- (2,3-1)
- (0,2,1)

99- Which of the following order pair would minimize the object function of the linear programming problem: z=x+5y subject to x≥ 2, $y \geq 0$?

- (2,3)
- (2,0)
- (0,3)

100- Under which of the following condition to solve an LP by using two phase method we can't proceed for 2nd phase?

- Object function of 1st phase has zero value
- Object function of 1st phase has positive value

101- A balanced transportation model with 5 number of source 7 destinations has ___ number of constraint equations.

- 2
- 12
- 35

102- Dual of a Dual is _____.

- Primal
- Dual

103- Shortcoming of Big M method is that the value of M could be _____.

- Very small
- Very large

104- In simple method to solve an LP problem gauss Jordan Elimination method demands that all the key column enters should be zero except ____.

- 1st row entry
- Key row (pivot)entry

105- The cost coefficient of artificial variable in objective function is _____.

- 0
- M

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