

Test Booklet Series



Test Booklet No.

Test Booklet
(Mechanical Engineering)

Name of Applicant

Answer Sheet No.

Applicant ID/Roll No. :

Signature of Applicant :

Date of Examination :

Signature of the Invigilator(s)

Time of Examination :

1.

2.

Duration : 2 Hour]

[Maximum Marks : 100

IMPORTANT INSTRUCTIONS

- (i) The question paper is in the form of Test-Booklet containing **100 (Hundred)** questions. All questions are compulsory. Each question carries four answers marked (A), (B), (C) and (D), out of which only one is correct. Choose the correct option or the most appropriate option.
- (ii) On receipt of the Test-Booklet (Question Paper), the candidate should immediately check it and ensure that it contains all the pages, i.e., **100** questions. Discrepancy, if any, should be reported by the candidate to the invigilator immediately after receiving the Test-Booklet.
- (iii) A separate Answer-Sheet is provided with the Test-Booklet/Question Paper. On this sheet there are **100** rows containing four circles each. One row pertains to one question.
- (iv) The candidate should write his/her Application ID/Roll number at the places provided on the cover page of the Test-Booklet/Question Paper and on the Answer-Sheet and **NOWHERE ELSE**.
- (v) No second Test-Booklet/Question Paper and Answer-Sheet will be given to a candidate. The candidates are advised to be careful in handling it and writing the answer on the Answer-Sheet.
- (vi) For every correct answer of the question **One (1) mark will be awarded**.
- (vii) Marking shall be done only on the basis of answers responded on the Answer-Sheet.
- (viii) To mark the answer on the Answer-Sheet, candidate should darken the appropriate circle in the row of each question with Blue or Black pen.
- (ix) For each question only **one** circle should be **darkened** as a mark of the answer adopted by the candidate. If more than one circle for the question are found darkened or with one black circle any other circle carries any mark, the answer will be treated as incorrect.
- (x) The candidates should not remove any paper from the Test-Booklet/Question Paper. Attempting to remove any paper shall be liable to be punished for use of unfair means.
- (xi) Rough work may be done on the blank space provided in the Test-Booklet/Question Paper only.
- (xii) *Mobile phones (even in Switch-off mode) and such other communication/programmable devices are not allowed inside the examination hall.*
- (xiii) No candidate shall be permitted to leave the examination hall before the expiry of the time.

DO NOT OPEN THIS QUESTION BOOKLET UNTIL ASKED TO DO SO.

PART-A
(Research Methodology)

1. The main objective of fundamental/basic research is:
(A) To solve an immediate practical problem
(B) To discover new facts and develop theories
(C) To evaluate existing social programs
(D) To study historical events

2. The scientific method of research is characterized by:
(A) Subjectivity and intuition
(B) Empiricism, objectivity, and replicability
(C) Relying solely on authority
(D) Lack of logical reasoning

3. While selecting a research topic, which of the following is the LEAST important consideration?
(A) Feasibility of the study
(B) Researcher's interest
(C) Availability of funds and time
(D) Personal biases of the researcher

4. The ethical principle of "Informed Consent" implies that:
(A) Participants must be forced to participate for the greater good
(B) Participants must be fully aware of the research procedures and agree voluntarily
(C) Researchers can hide the true purpose of the study to avoid bias
(D) Data can be shared publicly without participant knowledge

5. Fabrication, falsification, and plagiarism in research are collectively known as:
(A) Research misconduct
(B) Sampling error
(C) Ethical compliance
(D) Research methodology

6. Which research design is primarily concerned with describing the characteristics of a population or phenomenon?
(A) Exploratory research design
(B) Descriptive research design
(C) Experimental research design
(D) Diagnostic research design

7. In an experimental research design, the variable that is intentionally manipulated by the researcher is the:
(A) Dependent variable
(B) Extraneous variable
(C) Independent variable
(D) Control variable

8. Research conducted to find out the causes of an event that has already happened, without manipulating variables, is known as:
- (A) Action research (B) Ex-post facto research
(C) Applied research (D) Pure research
9. The "Control Group" in an experimental design is used to:
- (A) Introduce the experimental treatment
(B) Serve as a baseline for comparison with the experimental group
(C) Eliminate the dependent variable
(D) Increase the sample size
10. Deductive reasoning in the scientific method moves from:
- (A) Specific observations to general theories
(B) General theories to specific hypotheses
(C) Empirical data to conceptualization
(D) Null hypothesis to alternative hypothesis
11. Internal validity in an experimental design refers to:
- (A) The generalizability of the findings to the real world
(B) The certainty that the independent variable caused the changes in the dependent variable
(C) The consistency of the measuring instrument
(D) The representativeness of the sample
12. If every member of the population has an equal and independent chance of being selected, the sampling technique is called:
- (A) Purposive sampling (B) Convenience sampling
(C) Simple random sampling (D) Quota sampling
13. When the population is heterogeneous with distinct subgroups (strata), the most appropriate probability sampling technique is:
- (A) Simple random sampling (B) Stratified random sampling
(C) Cluster sampling (D) Snowball sampling

- 14.** In cluster sampling, the sampling units selected are:
- (A) Individual elements
 - (B) Natural groupings or categories (e.g., districts, schools)
 - (C) Homogeneous subgroups
 - (D) Volunteers
- 15.** Snowball sampling is specifically used when:
- (A) The population size is very large
 - (B) The sampling frame is readily available
 - (C) The population is hidden, rare, or difficult to access
 - (D) The researcher needs a perfectly representative sample
- 16.** The difference between a sample statistic and the true population parameter is termed as:
- (A) Systematic error
 - (B) Sampling error
 - (C) Measurement error
 - (D) Non-sampling error
- 17.** Which measurement scale classifies data into mutually exclusive categories without any order or ranking?
- (A) Ordinal scale
 - (B) Interval scale
 - (C) Nominal scale
 - (D) Ratio scale
- 18.** A Likert scale (Strongly Disagree to Strongly Agree) is technically an example of:
- (A) Nominal scale
 - (B) Ordinal scale
 - (C) Interval scale
 - (D) Ratio scale
- 19.** Which scaling technique asks respondents to rate an object on a series of bipolar adjectives (e.g., Good-Bad, Fast-Slow)?
- (A) Likert scale
 - (B) Guttman scale
 - (C) Semantic Differential scale
 - (D) Thurstone scale

- 20.** The key difference between a questionnaire and a schedule is:
- (A) A questionnaire is filled by the enumerator, a schedule is filled by the respondent
 - (B) A questionnaire is filled by the respondent, a schedule is filled by the enumerator/interviewer
 - (C) A schedule is mailed, a questionnaire is given face-to-face
 - (D) There is no difference between them
- 21.** Data collected by the researcher themselves for the specific purpose of the current study is called:
- (A) Secondary data
 - (B) Primary data
 - (C) Official data
 - (D) Documentary data
- 22.** The process of checking the raw data to ensure completeness, accuracy, and consistency before analysis is called:
- (A) Coding
 - (B) Editing
 - (C) Tabulation
 - (D) Classification
- 23.** Assigning numerical values or symbols to the responses for computational purposes is known as:
- (A) Editing
 - (B) Coding
 - (C) Transcription
 - (D) Tabulation
- 24.** A histogram is used to graphically represent the distribution of:
- (A) Discrete/categorical data
 - (B) Continuous data grouped into class intervals
 - (C) Qualitative characteristics
 - (D) Proportions of a whole
- 25.** A pie chart is most effective for representing:
- (A) Trends over time
 - (B) The relationship between two continuous variables
 - (C) The percentage breakdown of a whole
 - (D) Frequency distribution of continuous data

26. A hypothesis that states there is no significant difference or relationship is called:
- (A) Directional hypothesis
 - (B) Non-directional hypothesis
 - (C) Null hypothesis
 - (D) Alternative hypothesis
27. "Students who study using method A will score significantly higher than those who study using method B." This is an example of:
- (A) Null hypothesis
 - (B) Directional alternative hypothesis
 - (C) Non-directional alternative hypothesis
 - (D) Ex-post facto hypothesis
28. A Type I error in hypothesis testing occurs when:
- (A) We fail to reject a true null hypothesis
 - (B) We reject a true null hypothesis
 - (C) We fail to reject a false null hypothesis
 - (D) We reject a false null hypothesis
29. The probability of committing a Type I error is denoted by:
- (A) Beta (β)
 - (B) Alpha (α)
 - (C) P-value
 - (D) Standard error
30. A statistical test that makes assumptions about the population parameters (like normal distribution, homogeneity of variance) is called:
- (A) Non-parametric test
 - (B) Parametric test
 - (C) Chi-square test
 - (D) Distribution-free test
31. The Chi-square (χ^2) test is primarily used to test:
- (A) The difference between means of two groups
 - (B) The association between two categorical variables
 - (C) The significance of regression coefficients
 - (D) The variance within a single group

32. In a Chi-square test of independence, if the calculated value of χ^2 is greater than the critical/ table value at the 0.05 level, we:
- (A) Accept the null hypothesis
 - (B) Reject the null hypothesis
 - (C) Conclude the variables are independent
 - (D) Conclude the sample is biased
33. The formula for calculating expected frequency (E) in a Chi-square contingency table cell is:
- (A) (Row Total $\times$ Column Total) / Grand Total
 - (B) (Row Total + Column Total) / Grand Total
 - (C) Grand Total / (Row Total $\times$ Column Total)
 - (D) Row Total / Column Total
34. Analysis of Variance (ANOVA) is used instead of multiple t-tests to compare the means of three or more groups because:
- (A) ANOVA is easier to calculate
 - (B) Multiple t-tests increase the risk of Type I error
 - (C) ANOVA does not require normal distribution
 - (D) ANOVA uses nominal data
35. In a one-way ANOVA, the "one way" refers to:
- (A) One dependent variable and one independent variable with multiple levels
 - (B) One independent variable and multiple dependent variables
 - (C) Only one sample being tested
 - (D) One-tailed test of significance
36. The F-ratio in One-way ANOVA is calculated as:
- (A) Within-group variance / Between-group variance
 - (B) Between-group variance / Within-group variance
 - (C) Total variance / Residual variance
 - (D) Mean square error / Mean square total
37. The degrees of freedom for "Between Groups" in a One-Way ANOVA with 'k' groups is:
- (A) $N - 1$
 - (B) $N - k$
 - (C) $k - 1$
 - (D) $(N - 1) - (k - 1)$

38. Which of the following is a non-parametric alternative to One-way ANOVA?
- (A) Kruskal-Wallis test (B) Mann-Whitney U test
(C) Wilcoxon signed-rank test (D) Chi-square goodness of fit
39. A multivariate statistical technique used to reduce a large number of interrelated variables to a smaller set of unobservable factors is:
- (A) Cluster Analysis (B) Factor Analysis
(C) Discriminant Analysis (D) Conjoint Analysis
40. In Factor Analysis, the proportion of variance in a specific variable explained by the common factors is called:
- (A) Communality (B) Eigenvalue
(C) Factor loading (D) Uniqueness
41. Which concept in Factor Analysis represents the total variance explained by a specific factor across all variables?
- (A) Communality (B) Eigenvalue
(C) Factor score (D) Rotation
42. Multiple Regression is used to:
- (A) Classify objects into groups
(B) Predict the value of a dependent variable based on two or more independent variables
(C) Reduce the number of variables
(D) Determine the association between two categorical variables
43. In Multiple Regression, the coefficient of multiple determination (R^2) represents:
- (A) The correlation between two independent variables
(B) The proportion of variance in the dependent variable explained by all independent variables
(C) The regression coefficient of the strongest predictor
(D) The standard error of the estimate
44. Pearson's correlation coefficient (r) measures:
- (A) The causal relationship between two variables
(B) The linear association between two continuous variables
(C) The association between two categorical variables
(D) The variance of a single variable

45. If the Pearson correlation coefficient between X and Y is -0.85 , it indicates:
- (A) A weak positive relationship (B) A strong positive relationship
(C) A strong negative relationship (D) No relationship
46. Which multivariate technique is used to group objects or individuals so that objects in the same group are highly similar to each other but different from objects in other groups?
- (A) Discriminant Analysis (B) Factor Analysis
(C) Cluster Analysis (D) Conjoint Analysis
47. The main difference between Cluster Analysis and Discriminant Analysis is that:
- (A) Cluster analysis requires predefined groups, discriminant analysis does not
(B) Discriminant analysis requires predefined groups, cluster analysis does not
(C) Cluster analysis uses metric data, discriminant analysis uses non-metric
(D) Discriminant analysis is for data reduction, cluster analysis is for prediction
48. Conjoint Analysis is primarily used in marketing research to:
- (A) Determine the optimal number of clusters
(B) Measure how consumers value different features of a product by analyzing trade-offs
(C) Reduce the dimensions of product features
(D) Classify customers into predefined demographic groups
49. The standard format for writing a quantitative research report is generally known by the acronym:
- (A) IMRAD (Introduction, Method, Results, And Discussion)
(B) PEST (Political, Economic, Social, Technological)
(C) SWOT (Strengths, Weaknesses, Opportunities, Threats)
(D) APA (American Psychological Association)
50. Which section of the research report contains a brief summary of the entire study, including the problem, methodology, major findings, and conclusions?
- (A) Introduction (B) Abstract/Executive Summary
(C) Literature Review (D) Discussion

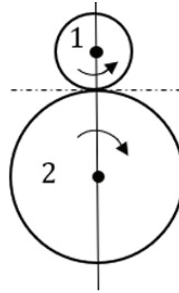
PART-B

(Mechanical Engineering)

- 51.** Friction between two surfaces always acts:
- (A) Along the normal reaction (B) Along applied force
(C) Opposite to motion (D) Perpendicular to motion
- 52.** In a statically determinate plane truss, the number of joints (j) and the number of members (m) are related by:
- (A) $j = 2m - 3$ (B) $m = 2j + 1$
(C) $m = 2j - 3$ (D) $m = 2j - 1$
- 53.** The efficiency of a screw jack increases with:
- (A) An increase in the load
(B) A decrease in the pitch of the threads
(C) An increase in the pitch of the threads
(D) An increase in the coefficient of friction
- 54.** As the slenderness ratio of a column increases, its compressive strength:
- (A) Increases (B) Decreases
(C) Remains unchanged (D) None of the above
- 55.** Euler's formula for buckling load is applicable to:
- (A) Columns with eccentric loading (B) Short columns only
(C) For both short and long columns (D) For long columns only
- 56.** Which of the following is usually not used where the distance between the shafts is large?
- (A) Belt (B) Rope
(C) Chain (D) Gear
- 57.** A bullet of mass 10 g is fired from a gun of mass 1 kg with recoil velocity of gun 5 m/s. The magnitude of muzzle velocity will be:
- (A) 500 km/s (B) 500 m/s
(C) 50 km/s (D) 50 m/s

58. If T is the total kinetic energy of the system, V is the total potential energy of the system and L is Lagrangian, which of the following holds true:
- (A) $L = T - V$ (B) $L = T + V$
(C) $L = T/V$ (D) $L = V/T$
59. The Poisson's ratio of a material having Young's modulus of 120 GPa and shear modulus of 50 GPa is:
- (A) 1 (B) 0.2
(C) 1.2 (D) 0.5
60. A cylinder of internal diameter 0.50 m contains air at a pressure of 7 N/mm² (gauge). If the maximum permissible stress induced in the material is 80 N/mm², find the thickness of the cylinder. (Approximate the answer to the nearest integer)
- (A) 17 mm (B) 32 mm
(C) 10 mm (D) 22 mm
61. When the axes of the first and the last gears are co-axial, then gear train is known as:
- (A) Simple gear train (B) Compound gear train
(C) Reverted gear train (D) Epicyclic gear train
62. In an automobile if the vehicle makes a left turn, the gyroscopic torque:
- (A) Increases the forces on outer wheels
(B) Decreases the forces on outer wheels
(C) Does not affect the forces on outer wheel
(D) None of the above
63. The point on a bat or racket where it may be struck without causing reaction at the point of support is called:
- (A) Center of Gravity (B) Center of percussion
(C) Center of Moment of Inertia (D) None of the above

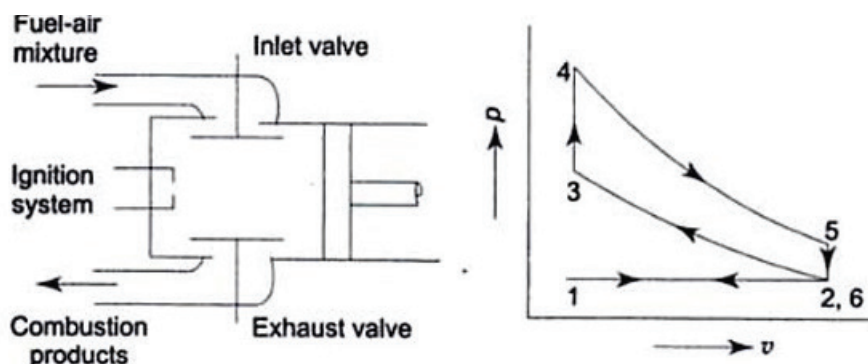
64. As shown in figure, two meshing spur gears 1 and 2 with diametral pitch of 8 teeth per mm and an angular velocity ratio $|\omega_2|/|\omega_1| = 1/4$, have their centers 30 mm apart. The number of teeth on the driver (gear 1) is



- (A) 120 (B) 96
(C) 72 (D) 48
65. The graphical representation of stress amplitude versus the number of stress cycles before fatigue failure is referred to as:
- (A) Load Curve (B) Stress Strain Curve
(C) B Spline (D) S-N Curve
66. If the Mach Number is 0.7, the flow is:
- (A) Subsonic Flow (B) Sonic Flow
(C) Supersonic Flow (D) Hypersonic Flow
67. For a floating body, the buoyant force acts at the:
- (A) centroid of the floating body
(B) center of gravity of the body
(C) centroid of the fluid vertically below the body
(D) centroid of the displaced fluid
68. Bernoulli's equation CANNOT be applied between:
- (A) any two arbitrary points in the flow field for steady incompressible rotational flow
(B) any two arbitrary points in the flow field for steady incompressible irrotational flow
(C) any two points along a streamline for steady incompressible flow
(D) any two points along a streamline for steady incompressible rotational flow

69. Which method for heat exchanger analysis is preferred when the inlet temperatures and mass flow rates are known, but the outlet temperatures are unknown?
- (A) MTD method (B) LMTD method
(C) Effectiveness NTU method (D) None of the above
70. Which of the following describes the total emissive power of a black body?
- (A) Stefan–Boltzmann law (B) Wien's displacement law
(C) Kirchoff's law (D) Fourier's law
71. The negative gradient of temperature and the time rate of heat transfer is proportional to the area at right angles of that gradient through which the heat flows. This statement is given by:
- (A) Stefan–Boltzmann law (B) Wien's displacement law
(C) Kirchoff's law (D) Fourier's law
72. The amount of heat transfer required to cause a phase change in a unit mass of a substance at a constant pressure and temperature is:
- (A) Latent heat (B) Specific heat
(C) Work done (D) None of the above
73. The efficiency of a heat engine receiving heat Q_1 and rejecting heat Q_2 is given by:
- (A) $1 - Q_2/Q_1$ (B) $1 - Q_1/Q_2$
(C) $Q_2/Q_1 - 1$ (D) $Q_1/Q_2 - 1$
74. The Ericsson cycle is made up of:
- (A) Two reversible isotherms and two reversible isochores
(B) Two reversible isotherms and two reversible isobars
(C) Two reversible isotherms and two reversible adiabatics
(D) Two reversible isochores and two reversible adiabatics

75. For the given indicator diagram of the SI Engine, which process represents combustion?



- (A) Process 1-2 (B) Process 2-3
(C) Process 3-4 (D) Process 4-5

76. A cold storage is to be maintained at -5°C while the surroundings are at 35°C . The heat leakage from the surroundings into the cold storage is estimated to be 29 kW. The actual COP of the refrigeration plant used is one-third that of an ideal plant working between the same temperatures. Find the power required (in kW) to drive the plant.

- (A) 3 kW (B) 13 kW
(C) 23 kW (D) 33 kW

77. The mass of water vapour (or moisture) per unit mass of dry air in a mixture of air and water vapour is called :

- (A) Sensible Heating (B) Sensible Cooling
(C) Specific Humidity (D) Specific Ratio

78. Consider the following statements:

- (i) Steam Turbines are based on Rankine Cycle.
- (ii) Steam Turbines are based on Brayton Cycle.
- (iii) Gas Turbines are based on Rankine Cycle.
- (iv) Gas Turbines are based on Brayton Cycle.

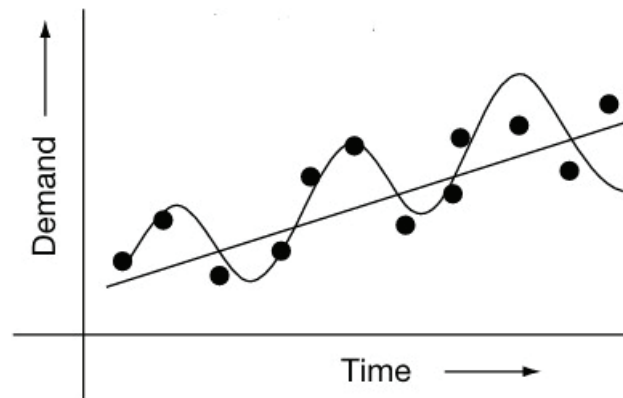
Which of the above statements are true?

- (A) (i) and (iv)
- (B) (ii) and (iii)
- (C) (i) and (iii)
- (D) (ii) and (iv)

- 79.** Which of the following turbines is best for high water heads?
(A) Francis (B) Kaplan
(C) Pelton Wheel (D) None of the above
- 80.** The process of heating a metal and cooling it rapidly is called
(A) Annealing (B) Quenching
(C) Tempering (D) Normalising
- 81.** The tendency of a solid material to undergo slow deformation while subject to persistent mechanical stresses is called:
(A) Fatigue (B) Toughness
(C) Reactivity (D) Creep
- 82.** The point at which the material starts to deform plastically is called:
(A) Elastic Point (B) Yield Point
(C) Ultimate Stress point (D) Fracture
- 83.** The allowance provided to a pattern for easy withdrawal from a sand mould is:
(A) Finishing allowance (B) Shrinkage allowance
(C) Distortion allowance (D) Shake allowance
- 84.** The welding process commonly used for fabricating tailor-welded blanks of dissimilar thickness for automotive applications is:
(A) Gas welding (B) Laser welding
(C) Arc welding (D) Friction welding
- 85.** CAPP is used for:
(A) Preparation of route sheet (B) Determining the sequence of operations
(C) Both (A) and (B) (D) None of these
- 86.** Which of the following is a cobalt–chromium–tungsten alloy?
(A) Stellite (B) Monel
(C) Nichrome (D) HSS

87. Find the cutting speed of a 50 mm diameter bar being turned with a spindle speed of 178 rev/min. (Approximate the answer to the nearest integer)
- (A) 28 m/s (B) 28 m/min
(C) 35 m/s (D) 35 m/min
88. Which of the following is a device to hold irregular shaped work pieces in a lathe machine?
- (A) 4-Jaw independent chuck (B) 3-Jaw self centering chuck
(C) Bench Vice (D) None of the above
89. Which of the following is normally used for angular measurements?
- (A) Plug Gauge (B) Micrometer
(C) Dial Indicator (D) Bevel Protractor
90. In relation to additive manufacturing, Stereolithography is related to which of the following layer creation technique?
- (A) Injection of powder stream (B) Extrusion of melted polymer
(C) Liquid layer curing (D) Sheet material deposition

91. Which data pattern should be considered for Time series forecasting in the given figure?



- (A) Increasing linear trend (B) Seasonal pattern with linear growth
(C) Cyclic pattern (D) No recognizable pattern

92. Match the following:

- | | |
|--------------|---|
| 1. KAIZEN | (a) organizing and maintaining a productive workspace |
| 2. POKA YOKE | (b) error-proofing |
| 3. 5S | (c) regulating the flow of goods |
| 4. KANBAN | (d) incremental improvements in the manufacturing process |

(A) 1-a, 2-b, 3-c, 4-d

(B) 1-d, 2-b, 3-a, 4-c

(C) 1-b, 2-c, 3-d, 4-a

(D) 1-c, 2-d, 3-a, 4-b

93. Which one of the following is NOT a form of inventory?

- | | |
|--------------------|-------------------------------|
| (A) Raw materials | (B) Work-in-process materials |
| (C) Finished goods | (D) CNC Milling Machines |

94. In a Flow Process Chart, which of the following symbols is used for “STORAGE”?

- | | |
|---|---|
| (A) O | (B) D |
| (C)  | (D)  |

95. The inventory holding cost of an item is Rs. 0.50 per unit per month and the ordering cost per order is Rs. 550. A stockist needs to supply 10000 units of the item per year to the customers. Assume demand is fixed and shortage cost is infinite. Using classical economic order quantity (EOQ) model, the optimal lot size is: (Approximate the answer to the nearest integer)

- | | |
|----------|----------|
| (A) 1354 | (B) 1789 |
| (C) 858 | (D) 756 |

96. In a transportation problem, a feasible solution to an $m \times n$ transportation problem is a Basic Feasible Solution if the number of positive allocations is equal to :

- | | |
|-----------------|-----------------|
| (A) $m - n + 1$ | (B) $m - n - 1$ |
| (C) $m + n - 1$ | (D) $m + n + 1$ |

97. Consider the following LPP:

$$\text{Minimize } Z = 25X_1 + 30X_2 + 40X_3$$

Subject to

$$2X_1 + 4X_2 + 6X_3 \geq 4$$

$$4X_1 + 9X_2 + 8X_3 \geq 10$$

$$8X_1 + 8X_2 + 2X_3 \geq 25$$

$$X_1, X_2, X_3 \geq 0$$

What would be the objective function of the dual?

(A) Maximize $Z = 4Y_1 + 10Y_2 + 25Y_3$

(B) Minimize $Z = 4Y_1 + 10Y_2 + 25Y_3$

(C) Maximize $Z = 25X_1 + 30X_2 + 40X_3$

(D) Minimize $Z = 25X_1 + 30X_2 + 40X_3$

98. The time estimates for an activity of a PERT network indicate: Optimistic time: 3 days, Most likely time: 6 days, Pessimistic time: 15 days. For the given activity Estimated time in days would be:

(A) 6 days

(B) 7 days

(C) 8 days

(D) 24 days

99. For a network, the normal duration and normal cost is 5 days and Rs. 200 respectively whereas the crash duration and crash cost is 3 days and Rs. 360 respectively. What would be the cost slope?

(A) 160

(B) 2

(C) 80

(D) 70

100. Maximize $Z = 15X_1 + 20X_2$

subject to

$$12X_1 + 4X_2 \geq 36$$

$$12X_1 - 6X_2 \leq 24$$

$$X_1, X_2 \geq 0$$

The above linear programming problem has

(A) infeasible solution

(B) unbounded solution

(C) alternative optimum solutions

(D) degenerate solution

ROUGH WORK