SECTION I (MECHANICAL ENGINEERING)

1. If P(E) = 0.07, then what is the probability of 'not E'?

   A) 0.93

   B) 0.95

   C) 0.89

   D) 0.007

2. Let the Eigenvector of the matrix $\begin{bmatrix} 1 & 2 \\ 0 & 2 \end{bmatrix}$ be written in the form $\begin{bmatrix} 1 \\ a \end{bmatrix}$ and $\begin{bmatrix} 1 \\ b \end{bmatrix}$. What is the value of (a+b)?

   A) 0

   B) 1/2

   C) 1

   D) 2

3. The probability that cannot exist among the following:

   A) 2/3

   B) -1.5

   C) 15%

   D) 0.7

4. A bag has 3 red balls and 5 green balls. If we take a ball from the bag, then what is the probability of getting red balls only?

   A) 5/3

   B) 1.5

   C) 3/5

   D) 3/8

5. The dendrite structure is observed while solidification for

   A) Low cooling rate

   B) Zero cooling rate

   C) High cooling rate

   D) None of above

6. The principal plane carries

   A) Maximum shear stress

   B) No shear stresses

   C) No normal stress

   D) None of above

7. Tool chatter may be controlled by

   A) Tool tightening

   B) Workpiece material selection

C) Process parameter optimization

D) All of the above

8. What is the range of carbon content in steel

A) 0-0.8%

B) 0-2%

C) 0-4.4%

D) 0-6.67%

9. Resistance welding cannot be used for

A) Ferrous materials

B) Non-Ferrous materials

C) Dielectrics

D) Any of the above

10. The procedure adopted in the Gauss-Jordan method in solving linear simultaneous equation is

A) It is required to assume initial approximate value of variables

B) It reduces the given system of equation to diagonal matrix

C) It reduces the given system of equation to equivalent triangular system

D) None of above

11. Resilience of material is important when it is subjected to

A) Combined loading

B) Fatigue

C) Thermal stresses

D) Shock loading

12. Which kind of resistance is experienced in upset butt welding?

A) Electric resistance

B) Magnetic resistance

C) Thermal resistance

D) Air resistance

13. Arc stability is better with

A) DC welding

B) AC welding

C) Both AC and DC welding

D) Rectified supply

14. Gases used in TIG welding are

A) Argon and helium

B) Argon and neon

C) Ozone and neon

D) None of the above

15. Grey iron is usually welded by

    A) Gas welding

    B) MIG welding

    C) TIG welding

    D) Arc welding

16. Mechanical step-less regulation device is also known as

    A) Variators

    B) Regulators

    C) Turbulator

    D) None of the above

17. The angle between the face and flank of the single-point cutting tool is known as

    A) Rake

    B) Clearance

    C) Lip

    D) Point

18. To obtain a surface finish in the range of 0.75 μm to 1.25 μm, the operation used is called

    A) Grinding

    B) Lapping

    C) Buffing

    D) Honing

19. For arc welding, DC supply is produced by

    A) Welding rod

    B) Motor

    C) Substrate

    D) Motor-generated set

20. Which of the following equipment is generally used for arc welding?

    A) Single phase alternator

    B) Two- phase alternator

    C) Three- phase alternator

    D) Transformer

21. Which of the following is the full form of CIPMS

    A) Computer-integrated production management system

    B) Computer-induced planning for management system

    C) Computer-integrated process for machining science

    D) None of the above

22. Which of the following is a component of TQM

    A) Standardization

    B) Process control

    C) Training and Quality

    D) All of the above

23. Engg. stress is the same as the

    A) True stress

    B) Conventional stress

    C) Av. stress

    D) Final stress

24. The neutral axis of the beam is the axis at which

    A) The shear force is zero

    B) MOI is zero

    C) Bending stress is zero

    D) Bending stress is max

25. Kelvin's plank statement shows the impossible of which type of machines.

    A) Perpetual motion machine 1

    B) Perpetual motion machine 2

    C) Perpetual motion machine 3

    D) None of the above

26. The refrigerator and heat pump work on which principle

    A) First law of thermodynamics

    B) Second law of thermodynamics

    C) Third law of thermodynamics

    D) Zeroth law of thermodynamics

27. The temperature at which the volume of gas becomes zero is called

    A) Absolute scale of temperature

    B) Absolute zero temperature

    C) Absolute temperature

    D) None of the above

28. Numerical control

    A) applies only to milling machines

    B) is a method for producing the exact number of parts per hour

    C) is a method for controlling through a set of instructions

    D) none of the mentioned

29. Which of the following is not the advantage of CNC machines?

   A) Improved strength of the components

   B) Reduced scrap rate

   C) Higher flexibility

   D) Improved quality

30. The lower pairs are_____ pairs

   A) Self closed

   B) Forced closed

   C) Friction closed

   D) None of above

31. Which one of the following is correct assumption of Bernoulii's equation

   A) Flow is compressible

   B) Viscosity is zero

   C) Flow is unsteady

   D) Flow is rotational

32. In fluid flow line of constant piezometric head passes through two points which have the same

   A) Elevation

   B) Pressure

   C) Velocity

   D) None of above

33. Internal combustion engine is the example of

   A) Cyclic heat engine

   B) Non-cyclic heat engine

   C) Both A and B

   D) None of above

34. A feed pump in steam power plant is used to pump

   A) Water to boiler

   B) Water to condenser

   C) Water to cooling tower

   D) None of above

35. The recommended cycle for steam power plant is

   A) Rankine

   B) Otto

   C) Carnot

   D) None of above

36. If in stress-strain curve of material ultimate tensile strength point and fracture point are very close the material is said to be

    A) Ductile

    B) Brittle

    C) Soft

    D) Hard

37. Longitudinal strain can be produced only in

    A) Solid

    B) Liquid

    C) Gas

    D) None of above

38. The last point on stress-strain curve that occurs after ultimate stress point is

    A) Elastic point

    B) Upper yield point

    C) Lower yield point

    D) None of above

39. The difference between the maximum and minimum permissible limits of the sizes is called

    A) Tolerance

    B) Deviation

    C) Allowance

    D) None of above

40. If the allowance is negative, which of the following is true between the mating parts?

    A) Maximum interference

    B) Maximum clearance

    C) Minimum clearance

    D) None of above

41. What is basis of PERT analysis?

    A) Optimistic time

    B) Pessimistic time

    C) Most likely time

    D) All above

42. What is the definition of a critical path?

    A) It is a path that connects the starting and ending nodes

    B) It is a path with shortest route

    C) It combines all the paths

    D) None of above

43. CPM stands for

A) Critical path method

B) Clean path method

C) Clear path method

D) None of above

44. The most common used spring for truck is

A) Leaf spring

B) Compression spring

C) Expansion spring

D) None of above

45. Laminated springs are also called

A) Helical springs

B) Semi-elliptical springs

C) Torsion springs

D) None of above

46. Single plate clutches are generally used in

A) Scooters

B) Trucks

C) Train

D) None of above

47. Which type of clutch does not require a clutch pedal?

A) Single plate

B) Multi plate

C) Cone

D) Centrifugal

48. The energy absorbed by brake is

A) Kinetic energy

B) Pressure energy

C) Internal energy

D) None of above

49. The excessive steering stiffness is due to

A) Worn out rubber pads

B) Semi-elliptical springs

C) Faulty wheel alignment

D) None of above

50. Gyroscopic effect is not noticed in ships during _____

A) Banking

B) Rolling

C) Pitching

D) None of above

SECTION II (RESEARCH METHODOLOGY)

51. Research is
    A) Producing available knowledge again and again
    B) Finding solution to any problem
    C) Working in a scientific way to search for truth of any problem.
    D) None of the above

52. Computed measure of how much scores vary around the mean score.
    A) range
    B) standard deviation
    C) normal curve
    D) skewed distribution

53. Which of the following statements is true?
    A) The mean is a continuous variable.
    B) The variance and standard deviation of a normal population are equal.
    C) For large samples, the distribution of scores is approximately normal.
    D) None of the above

54. Taking someone else's words or ideas and taking credit for them as your own.
    A) cite
    B) plagiarism
    C) paraphrase
    D) credit

55. What steps are involved in a central tendency test?
    A) Addition, subtraction, and division.
    B) Determination of mean, median, and mode.
    C) Addition, subtraction, multiplication, and division.
    D) None of the above

56. Random sampling is also called _____.
    A) Availability sampling
    B) Probation sampling
    C) Probability sampling
    D) Prospect sampling

57. What is the Median of the following data sample?
    2, 7, 4, 8, 9, 10, 6, 12, 13
    A) 8
    B) 11
    C) 9
    D) 10

58. Which of the following statements is CORRECT?
    A) Research is a hurried activity.
    B) Research starts with a problem and ends with a problem.
    C) Research is not a contributing factor of progress.
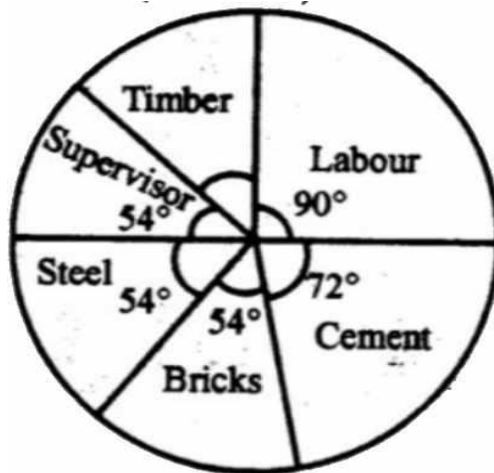   D) Research is an investigation where you look for answers that are already there.

59. Which of the following has same mean median and mode?
    A) 6,5,2,4,3,4,1
    B) 4,2,2,1,3,2,3
    C) 2,3,7,3,8,3,2
    D) 4,3,4,3,4,6,4

60. Resource libraries, economic census, trade shows & associations would be examples of what kind of data sources?
    A) Tertiary
    B) Secondary
    C) Primary
    D) Unprofessional

61. The purpose of correlation research is to:
    A) study the relationship between two or more than two variables
    B) predict the criterion variable on the basis of predictor variable
    C) Both (1) and (ii)
    D) Neither (i) Nor(ii)

62. It is sometimes called "central location" or just "center". It is a way to describe what's typical for a set of data. It is called.
    A) Middle destination
    B) Center fold
    C) Central Tendency
    D) Mid frequency

63. Which is NOT a step of the scientific method?
    A) Hypothesis
    B) Analyse data
    C) Count items
    D) Report Findings

64. In order to pursue the research, which of the following is priorly required?
    A) Developing a research design
    B) Formulating a research question
    C) Deciding about the data analysis procedure
    D) Formulating a research hypothesis

65. Every person in the population has an equal chance of being selected -which sampling method
    A) Systematic sampling
    B) Quota sampling
    C) Volunteer sampling
    D) Random sampling

66. When a distribution of scores is skewed, which of the following is the most representative measure of central tendency?
   A) Inference
   B) Standard deviation
   C) Mean
   D) Median

67. An even spread of a variable that is symmetrical about the mean median and mode.
   A) bar graph
   B) histogram
   C) scatter graph
   D) normal distribution

68. A diagram with rectangles showing values or numbers.
   A) Pictogram
   B) Pie chart
   C) Bar chart
   D) Line graph

69. Type of research that solve practical issues is;
   A) Fundamental research
   B) Exploratory research
   C) Applied research.
   D) Empirical research

70. What should not be included in the conclusion?
   A) literature review
   B) summary
   C) implication
   D) major findings

71. A variable that is being manipulated is____
   A) Independent variable
   B) dependent variable
   C) confounding variable
   D) extraneous variable

72. What is qualitative research?
   A) Observation and description of activities, situations, attitudes, or behaviors of a specific group of people.
   B) Analysis of numerical data.
   C) Numerical comparisons and statistical inferences.
   D) None of above

73. A standard deviation can never be
   A) positive
   B) negative
   C) zero
   D) None

74. The sample standard deviation is denoted by:
   A) s
   B) p
   C) Σ
   D) σ

75. First step of an investigation is _____ .
   A) collection of data.
   B) presentation of data.
   C) analysis of data.
   D) explanation of data.

76. The sum of absolute deviations about median is _____.
   A) the least
   B) the greatest
   C) zero
   D) equal

77. When the value of r=0, it is said to be _____.
   A) no correlation.
   B) positive.
   C) perfect positive.
   D) perfect negative.

78. The straight-line trend is represented by the equation _____.
   A) y=a+bx
   B) y=mx
   C) y=ax/ay
   D) y=a*bx

79. In discrete and continuous frequency distributions N= ___ .
   A) the sum of frequency.
   B) number of observations.
   C) minimum value.
   D) maximum value.

80. _____ is used to compare the variability of two or more than two series.
   A) Mean.
   B) Standard deviation.
   C) Coefficient of variation.
   D) Mean deviation.

81. The simplest device for ascertaining whether two variables are related is to prepare a dot chart is called_____ .
   A) graphical method.
   B) scatter diagram method.
   C) method of least square.
   D) concurrent deviation method.

82. A bag contains 10 black and 20 white balls; a ball is drawn at random. What is the probability that it is black?
    A) 1/2
    B) 1/3
    C) 0
    D) 3

83. Diagrams are for _____
    A) the use of exports.
    B) better quantitative picture.
    C) better mental appeal
    D) the use of imports.

84. Which of the following is not a type of research design?
    A) Experimental design
    B) Descriptive design
    C) Correlational design
    D) Probability design

85. What is a research hypothesis?
    A) A tentative explanation for a phenomenon
    B) A statement that is proven to be true
    C) A prediction of what the researcher expects to find
    D) A statement of fact

86. What is the purpose of a pilot study?
    A) To test the feasibility of the research design
    B) To test the reliability and validity of the measures
    C) To determine the appropriate sample size
    D) To collect preliminary data

87. In five One-Day Internationals, a batsman has scored 31,97,112, 63, and 12 runs. the quality deviation of the info is-
    A) 21.78
    B) 23.79
    C) 25.79
    D) 26.77

88. Determine the mode of the decision received seven days in a row: 11,13,13,17,19,23,25
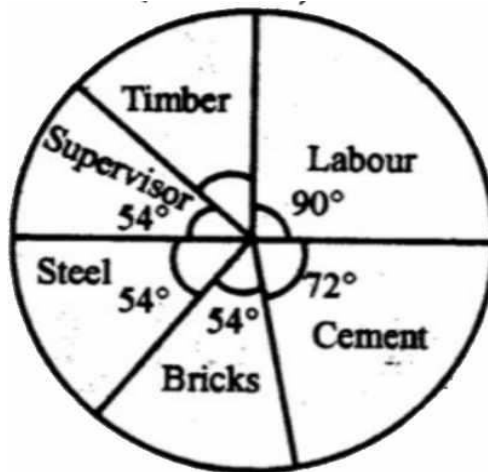   A) 11
    B) 13
    C) 17
    D) 23

89. The following pie chart comprises the cost of constructing one house. The total cost was Rs. 6 lakhs

The amount spent on cement is

    A) Rs.2,00,000
    B) Rs.1,60,000
    C) Rs.1,20,000
    D) Rs.1,00,000

90. Referring to chart below,

the amount spent on cement, steel and supervision is what percent of the total cost of construction?

    A) 40%
    B) 45%
    C) 50%
    D) 55%

91. Table shows the mobile phones sold on different days by different sellers. Read the table carefully and answer the questions.

Mobiles Phones Sellers	Day						
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
P	40	45	48	28	50	24	20
Q	90	92	27	12	16	98	26
R	80	36	30	13	28	62	47
S	60	46	12	64	52	34	76
T	48	18	58	69	70	10	15

Find the difference of mobile phones sold by P and R together on Monday to the mobile phones sold by S and T on Wednesday.

    A) 60
    B) 50
    C) 80
    D) 20

92. Referring to above table, Find the ratio of mobile phones sold by Q on Tuesday and Saturday together to the mobile phones sold by R on Thursday and Sunday together.

    A) 7 : 19
    B) 19 : 5
    C) 19 : 6
    D) 2 : 5

93. The frequency distribution of a numerical data can be graphically represented by a _____
    A) Histogram
    B) Telegram
    C) Monogram
    D) Anagram

94. Which one of the following is not the graphical representation of statistical data:
    A) Bar graph
    B) Histogram
    C) Frequency polygon
    D) Cumulative frequency distribution

95. In a histogram, each class rectangle is constructed with base as
    A) frequency
    B) class-intervals
    C) range
    D) size of the class

96. What does the command \documentclass{article} do in LaTeX?
    A) It sets the document class as an article
    B) It creates a new section in the document
    C) It sets the font style of the document
    D) It creates a new document

97. What does the command \begin{center} do in LaTeX?
    A) It creates a new center-aligned section.
    B) It sets the font size to center aligned.
    C) It creates a new paragraph.
    D) It centers the text or content.

98. Which of the following procedures would not be included in a programme of qualitative research?
    A) Assessment of effect size.
    B) Development of appropriate research questions.
    C) Clarification of the logic linking the data to research propositions.
    D) Explanation of criteria for data interpretation.

99. What is the most common method of data collection in quantitative research?
    A) Interviews
    B) Focus groups
    C) Observation
    D) Surveys/questionnaires

100. Which statistical test is used to determine if there is a significant difference between the means of two or more groups in quantitative research?
    A) t-test
    B) ANOVA (Analysis of Variance)
    C) Chi-square test
    D) Regression analysis