

Total No. of Printed Pages : 21

(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU
ARE ASKED TO DO SO)

A

PHD-EE-November, 2025
Mechanical Engineering

SET-X

10009

Sr. No.

Time : 1¼ Hours

Max. Marks : 100

Total Questions : 100

Roll No. (in figures) _____ (in words) _____

Name _____ Date of Birth _____

Father's Name _____ Mother's Name _____

Date of Examination _____

(Signature of the Candidate)

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PHD-EE-November, 2025/(Mech. Engg.)(SET-X)/(A)

SEAL

1. The word research literally means :
 - (1) Re-writing facts
 - (2) Searching again for knowledge
 - (3) Statistical calculation
 - (4) Data entry
2. In research, replication of study increases :
 - (1) Validity
 - (2) Reliability
 - (3) Sampling error
 - (4) Bias
3. Research process does not include :
 - (1) Data analysis
 - (2) Hypothesis formulation
 - (3) Advertisement design
 - (4) Interpretation
4. Research is considered scientific when it is :
 - (1) Based on opinion
 - (2) Logical and systematic
 - (3) Emotional
 - (4) Random
5. Which of the following is not an ethical issue ?
 - (1) Fabrication of data
 - (2) Plagiarism
 - (3) Misrepresentation
 - (4) Literature review

6. A case-study method is most suitable for :
 - (1) Large-scale-surveys
 - (2) In-depth analysis of a single unit
 - (3) Hypothesis testing only
 - (4) Correlation studies
7. In a structured interview, questions are :
 - (1) Fixed and pre-decided
 - (2) Open and spontaneous
 - (3) Participant-led
 - (4) Unplanned
8. Pilot study is conducted to :
 - (1) Finalize tools and check feasibility
 - (2) Collect final data
 - (3) Analyze hypothesis
 - (4) Publish research
9. Which philosophical approach supports objective, measurable reality ?
 - (1) Positivism
 - (2) Constructivism
 - (3) Pragmatism
 - (4) Relativism
10. A questionnaire differs from a schedule because :
 - (1) Respondents fill it themselves
 - (2) Enumerator fills it
 - (3) It is for illiterate respondents
 - (4) It is only oral

11. Questionnaire filled by respondents themselves is called :
- (1) Interview schedule
 - (2) Observation
 - (3) Mail survey
 - (4) Case study
12. Dichotomous questions are those which ?
- (1) Have only two alternatives
 - (2) Have multiple options
 - (3) Are open-ended
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13. Observation method is most suitable when :
- (1) Data must be verified directly
 - (2) Population is inaccessible
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14. "Schedule" is used as a :
- (1) Research tool
 - (2) Sampling frame
 - (3) Theory
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15. Open-ended questions are useful for :
- (1) Objective responses
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16. Standard structure IMRAD stands for :
- (1) Introduction, Methods, Results and Discussion
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 - (3) Issue, Measurement, Result and Diagram
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17. Bibliography is important because :
- (1) It extends word count
 - (2) It helps others locate sources
 - (3) It is optional
 - (4) It hides references
18. Footnotes are used for :
- (1) Decoration
 - (2) Citing references
 - (3) Writing appendix
 - (4) Formatting text
19. The main purpose of thesis writing is :
- (1) To show understanding of research process
 - (2) To replicate others' work
 - (3) To summarize previous papers only
 - (4) To create publicity
20. A research paper differs from a thesis because :
- (1) It is shorter and focuses on one issue
 - (2) It is written for degree completion
 - (3) It has no abstract
 - (4) It does not cite references

- 21.** APA referencing style requires :
- (1) Author, Year, Title, Publisher
 - (2) Title, Author, DOI, Volume
 - (3) Publisher, Year, Edition
 - (4) None
- 22.** DOI in a journal article ensures :
- (1) Permanent online link to publication
 - (2) Digital security
 - (3) Confidential access
 - (4) Peer review process
- 23.** Mean is affected most by :
- (1) Median
 - (2) Extreme values
 - (3) Mode
 - (4) Range
- 24.** Standard deviation is a measure of :
- (1) Central tendency
 - (2) Variation or dispersio
 - (3) Relationship
 - (4) Frequency
- 25.** When mean = median = mode, the data is :
- (1) Positively skewed
 - (2) Negatively skewed
 - (3) Symmetrical
 - (4) Uniform

26. Correlation coefficient (r) lies between :
- (1) 0 and 1
 - (2) -1 and +1
 - (3) 1 and 100
 - (4) 0 and 100
27. When the p -value < 0.05 , we :
- (1) Accept the null hypothesis
 - (2) Reject the null hypothesis
 - (3) Ignore the result
 - (4) Retest data
28. Chi-square test is used for :
- (1) Relationship between categorical variables
 - (2) Comparing means
 - (3) Predicting regression
 - (4) Time-series analysis
29. In regression, R^2 value indicates :
- (1) Degree of variance explained by the model
 - (2) Correlation strength only
 - (3) Type of variable
 - (4) Sampling adequacy
30. Mean, Median, and Mode are measures of :
- (1) Dispersion
 - (2) Correlation
 - (3) Central Tendency
 - (4) Regression

31. In hypothesis testing, Type I error occurs when :
- (1) True null hypothesis is rejected
 - (2) False null hypothesis accepted
 - (3) Both accepted
 - (4) None
32. The T-test is applicable for :
- (1) Large samples
 - (2) Small samples
 - (3) All samples
 - (4) None
33. The normal distribution curve is :
- (1) Skewed
 - (2) Symmetrical
 - (3) Bimodal
 - (4) Random
34. The mean of sampling distribution equals :
- (1) Population mean
 - (2) Population variance
 - (3) Standard error
 - (4) None
35. SPSS stands for :
- (1) Statistical Package for Social Sciences
 - (2) Software Program for Statistical Systems
 - (3) Standard Process Sampling System
 - (4) None

36. Binary number system uses :

- (1) 10 digits
- (2) 2 digits
- (3) 8 digits
- (4) 16 digits

37. Hypothesis is a :

- (1) Testable statement
- (2) Law
- (3) Principle
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38. Sampling is preferred because it :

- (1) Saves time & cost
- (2) Covers entire population
- (3) Avoids estimation
- (4) Is less accurate

39. Universe in research means :

- (1) Population of interest
- (2) Galaxy
- (3) Sample
- (4) Category

40. Random sampling ensures :

- (1) Equal chance to each unit
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- (3) Manual choice
- (4) Fixed group

- 41.** Coding is part of :
- (1) Data processing
 - (2) Data collection
 - (3) Sampling
 - (4) Interpretation
- 42.** Pre-writing consideration in report writing involves :
- (1) Deciding target audience & objectives
 - (2) Drawing tables
 - (3) Printing graphs
 - (4) Proofreading
- 43.** The term "Research Design" refers to :
- (1) Blueprint of research
 - (2) Type of hypothesis
 - (3) Statistical tool
 - (4) Theoretical model
- 44.** "Research Ethics" ensures :
- (1) Honesty and integrity in research
 - (2) Faster publication
 - (3) Higher citation
 - (4) Greater funding
- 45.** Report format of a journal article generally includes :
- (1) Abstract, Methodology, Results, References
 - (2) Only text
 - (3) Tables only
 - (4) None

46. Quantitative research deals primarily with :
- (1) Numerical data
 - (2) Verbal opinions
 - (3) Emotions
 - (4) Historical records
47. Primary data is :
- (1) Already published information
 - (2) Data collected first-hand by the researcher
 - (3) Secondary data verified again
 - (4) None
48. Which one is a secondary data source ?
- (1) Field survey
 - (2) Census report
 - (3) Observation
 - (4) Personal interview
49. Abstract of a research paper should contain :
- (1) Objectives, method, results and conclusion
 - (2) Only references
 - (3) Detailed data tables
 - (4) Footnotes
50. Empirical research is characterized by :
- (1) Observation and data-based evidence
 - (2) Logical reasoning only
 - (3) Philosophical discussion
 - (4) Pure theory

51. Coulomb friction is :
- (1) friction between electrically charged bodies
 - (2) friction between bodies having relative motion
 - (3) friction between solids and liquids
 - (4) friction between dry surfaces
52. Centre of gravity of a plane lamina will not be at its geometrical centre if it is a :
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- (1) measurement of load
 - (2) measurement of shear stress
 - (3) measurement of resilience .
 - (4) measurement of longitudinal strain
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- (1) 0.27
 - (2) 0.31
 - (3) 0.33
 - (4) 0.36

56. The point of contraflexure occurs in :
- (1) simply supported beams only
 - (2) cantilever beams only
 - (3) continuous beams only
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57. A column that fails primarily due to direct stress is called :
- (1) long column
 - (2) weak column
 - (3) short column
 - (4) medium column
58. The yield point in fatigue loading as compared to the yield point in static loading is :
- (1) half
 - (2) one forth
 - (3) same
 - (4) higher
59. Which of the following is a lower pair ?
- (1) piston and cylinder
 - (2) cam and follower
 - (3) belt drive
 - (4) gear
60. Module is expressed in :
- (1) mm
 - (2) mm/mm
 - (3) mm/number of teeth
 - (4) dimensionless

61. Crowning is done on :
- (1) gears
 - (2) shafts
 - (3) pulleys
 - (4) keys
62. Which of the following is a dead weight type governor ?
- (1) Porter governor
 - (2) Hartnell governor
 - (3) Watt governor
 - (4) All of the above
63. The shear stress – velocity gradient relation of the Newtonian fluids is :
- (1) Linear
 - (2) Parabolic
 - (3) Hyperbolic
 - (4) Involutic
64. A pitot tube is used for the measurement of :
- (1) Pressure
 - (2) Velocity
 - (3) Viscosity
 - (4) Surface tension
65. The quation of continuity of flow is based on the principle of conservation of :
- (1) Momentum
 - (2) Mass
 - (3) Energy
 - (4) All of the above

66. A dimensionless number which is the ratio of kinematic viscosity to thermal diffusivity is known as :
- (1) Prandtl number
 - (2) Reynolds number
 - (3) Nusselt number
 - (4) Péclet number
67. The relation between the emissive and absorptive power of a surface is developed under :
- (1) Planck's law
 - (2) Kirchhoff's law
 - (3) Electrical analogy
 - (4) Stefan-Boltzmann's law
68. A correction of LMTD is necessary in case of :
- (1) Parallel flow heat exchanger
 - (2) Counter current heat exchanger
 - (3) Cross flow heat exchanger
 - (4) All of the above
69. Absolute zero pressure will occur :
- (1) at sea level
 - (2) at the center of the earth
 - (3) when molecular momentum of the system becomes zero
 - (4) under vacuum conditions
70. An ideal gas as compared to a real gas at very high pressure occupies :
- (1) more volume
 - (2) less volume
 - (3) same volume
 - (4) unpredictable behaviour

71. According to Gay-Lussac law for a perfect gas, the absolute pressure of given mass varies directly as :
- (1) temperature
 - (2) absolute
 - (3) absolute temperature, if volume is kept constant
 - (4) volume, if temperature is kept constant
72. Which of the following processes is irreversible process ?
- (1) isothermal
 - (2) adiabatic
 - (3) throttling
 - (4) all of the above
73. Change in enthalpy in a closed system is equal to heat transferred if the reversible process takes place at constant :
- (1) pressure
 - (2) temperature
 - (3) volume
 - (4) internal energy
74. Carnot cycle efficiency depends upon :
- (1) properties of the medium/substance used
 - (2) condition of engine
 - (3) working condition
 - (4) temperature range of operation
75. The ratio of indicated thermal efficiency to the corresponding air standard cycle efficiency is called :
- (1) net efficiency
 - (2) efficiency ratio
 - (3) relative efficiency
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76. For same compression ratio and for same heat added :

- (1) Otto cycle is more efficient than Diesel Cycle
- (2) Diesel cycle is more efficient than Otto cycle
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- (4) Both Otto and Diesel cycles are equally efficient

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78. Gas turbine cycle consists of :

- (1) two isothermals and two isentropics
- (2) two isentropics and two constant volumes
- (3) two isentropics, one constant volume and one constant pressure
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79. Consumable patterns are made of :

- (1) polystyrene
- (2) wax
- (3) plaster of paris
- (4) any of the above

80. Sodium silicate in sand is often used as

- (1) substitute of clay
- (2) binder
- (3) refractory material
- (4) permeability promotion agent

81. The location of riser least depends on :
- (1) metal to be cast
 - (2) size of core
 - (3) design of casting
 - (4) feasibility of directional solidification
82. The main constituent of high speed steel is :
- (1) Tungsten
 - (2) Chromium
 - (3) Vanadium
 - (4) Cobalt
83. Holes are usually enlarge by :
- (1) Drills
 - (2) Reamers
 - (3) Boring bars
 - (4) None of the above
84. In gas welding using oxygen and acetylene cylinders, the pressure of gas is more in :
- (1) Oxygen cylinder
 - (2) Acetylene cylinder
 - (3) Equal in both cylinder
 - (4) None of the above
85. Principal materials used in soldering are
- (1) Tin and lead
 - (2) Copper and tin
 - (3) Zinc and copper
 - (4) Copper and lead

86. In which of the following process the electrode is not consumed ?

- (1) TIG welding
- (2) DC arc welding
- (3) Gas welding
- (4) Plasma welding

87. Collapsible tubes are made by :

- (1) drawing
- (2) spinning
- (3) extrusion
- (4) rolling

88. In a rolling process, the state of stress of the material undergoing deformation is

- (1) pull compression
- (2) pure shear
- (3) compression and shear
- (4) tension and shear

89. Tool signature comprises

- (1) 5 elements
- (2) 6 elements
- (3) 7 elements
- (4) 8 elements

90. In deep drawing of sheets, the values of limiting drawing ratio depend on :

- (1) percentage elongation of sheet
- (2) yield strength of sheet
- (3) type of press used
- (4) thickness of sheet

91. Shear angle varies with :
- (1) cutting speed
 - (2) feed
 - (3) depth of cut
 - (4) work piece materials and tool geometry
92. SIMO charts are used in :
- (1) method study
 - (2) micro motion study
 - (3) process analysis
 - (4) layout analysis
93. ABC analysis is used in :
- (1) CPM
 - (2) PERT
 - (3) Inventory control
 - (4) All of the above
94. CPM is oriented to :
- (1) cost
 - (2) time
 - (3) objective
 - (4) activity
95. In PERT, the distribution of activity times of assumed to be :
- (1) Normal
 - (2) Gamma
 - (3) Beta
 - (4) Exponential

96. In simplex method, the variables which have not been assigned the value zero during the iteration are called :
- (1) Basic variables
 - (2) Actual variables
 - (3) Artificial variables
 - (4) None of the above
97. EOQ is taken at the point where cost of carrying equals the cost of :
- (1) ordering of material
 - (2) material
 - (3) safety stock
 - (4) bosh material and safety stock
98. Material handling is higher in case of :
- (1) Process layout
 - (2) Product layout
 - (3) Group lay out
 - (4) Fixed position layout
99. A critical path has :
- (1) zero slack
 - (2) minimum slack
 - (3) maximum slack
 - (4) infinite slack
100. Which of the following software is used for simulation ?
- (1) GPSS
 - (2) Minsky
 - (3) CATIA
 - (4) CAM

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- (1) To show understanding of research process
 - (2) To replicate others' work
 - (3) To summarize previous papers only
 - (4) To create publicity
- 40.** A research paper differs from a thesis because :
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- (1) Numerical data
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83. Mean is affected most by :

- (1) Median
- (2) Extreme values
- (3) Mode
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84. Standard deviation is a measure of :

- (1) Central tendency
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- (3) Relationship
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86. Correlation coefficient (r) lies between :
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89. In regression, R^2 value indicates :
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- 91.** The word research literally means :
- (1) Re-writing facts
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(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU
ARE ASKED TO DO SO)

C

PHD-EE-November, 2025
Mechanical Engineering

SET-X

10067

Sr. No.

Time : 1¼ Hours

Max. Marks : 100

Total Questions : 100

Roll No. (in figures) _____ (in words) _____

Name _____ Date of Birth _____

Father's Name _____ Mother's Name _____

Date of Examination _____

(Signature of the Candidate)

(Signature of the Invigilator)

**CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE
STARTING THE QUESTION PAPER.**

- All questions are compulsory.**
- The candidates **must return** the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
- Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
- Question Booklet along with answer key of all the A, B, C & D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University Website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case, will be considered.
- The candidate **must not** do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself. Answers **must not** be ticked in the question booklet.
- There will be negative marking and a deduction of 0.25 marks for each wrong answer. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.**
- Use only **Black or Blue Ball Point Pen** of good quality in the OMR Answer-Sheet.
- Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after starting of the examination.**

PHD-EE-November, 2025/(Mech. Engg.)(SET-X)/(C)

SEAL

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- (1) True null hypothesis is rejected
 - (2) False null hypothesis accepted
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 - (4) None
52. The T-test is applicable for :
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 - (2) Small samples
 - (3) All samples
 - (4) None
53. The normal distribution curve is :
- (1) Skewed
 - (2) Symmetrical
 - (3) Bimodal
 - (4) Random
54. The mean of sampling distribution equals :
- (1) Population mean
 - (2) Population variance
 - (3) Standard error
 - (4) None
55. SPSS stands for :
- (1) Statistical Package for Social Sciences
 - (2) Software Program for Statistical Systems
 - (3) Standard Process Sampling System
 - (4) None

56. Binary number system uses :
- (1) 10 digits
 - (2) 2 digits
 - (3) 8 digits
 - (4) 16 digits
57. Hypothesis is a :
- (1) Testable statement
 - (2) Law
 - (3) Principle
 - (4) Observation
58. Sampling is preferred because it :
- (1) Saves time & cost
 - (2) Covers entire population
 - (3) Avoids estimation
 - (4) Is less accurate
59. Universe in research means :
- (1) Population of interest
 - (2) Galaxy
 - (3) Sample
 - (4) Category
60. Random sampling ensures :
- (1) Equal chance to each unit
 - (2) Bias in selection
 - (3) Manual choice
 - (4) Fixed group

61. According to Gay-Lussac law for a perfect gas, the absolute pressure of given mass varies directly as :
- (1) temperature
 - (2) absolute
 - (3) absolute temperature, if volume is kept constant
 - (4) volume, if temperature is kept constant
62. Which of the following processes is irreversible process ?
- (1) isothermal
 - (2) adiabatic
 - (3) throttling
 - (4) all of the above
63. Change in enthalpy in a closed system is equal to heat transferred if the reversible process takes place at constant :
- (1) pressure
 - (2) temperature
 - (3) volume
 - (4) internal energy
64. Carnot cycle efficiency depends upon :
- (1) properties of the medium/substance used
 - (2) condition of engine
 - (3) working condition
 - (4) temperature range of operation
65. The ratio of indicated thermal efficiency to the corresponding air standard cycle efficiency is called :
- (1) net efficiency
 - (2) efficiency ratio
 - (3) relative efficiency
 - (4) overall efficiency

66. For same compression ratio and for same heat added :
- (1) Otto cycle is more efficient than Diesel Cycle
 - (2) Diesel cycle is more efficient than Otto cycle
 - (3) Efficiency depends on other factors
 - (4) Both Otto and Diesel cycles are equally efficient
67. The mean effective pressure obtained from engine indicator indicates the :
- (1) minimum pressure
 - (2) instantaneous pressure at any instant
 - (3) exhaust pressure
 - (4) average pressure
68. Gas turbine cycle consists of :
- (1) two isothermals and two isentropics
 - (2) two isentropics and two constant volumes
 - (3) two isentropics, one constant volume and one constant pressure
 - (4) two isentropics and two constant pressures
69. Consumable patterns are made of :
- (1) polystyrene
 - (2) wax
 - (3) plaster of paris
 - (4) any of the above
70. Sodium silicate in sand is often used as
- (1) substitute of clay
 - (2) binder
 - (3) refractory material
 - (4) permeability promotion agent

71. The location of riser least depends on :
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81. Questionnaire filled by respondents themselves is called :
- (1) Interview schedule
 - (2) Observation
 - (3) Mail survey
 - (4) Case study
82. Dichotomous questions are those which ?
- (1) Have only two alternatives
 - (2) Have multiple options
 - (3) Are open-ended
 - (4) None of these
83. Observation method is most suitable when :
- (1) Data must be verified directly
 - (2) Population is inaccessible
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84. "Schedule" is used as a :
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C

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- (1) piston and cylinder
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 - (3) belt drive
 - (4) gear
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- (1) mm
 - (2) mm/mm
 - (3) mm/number of teeth
 - (4) dimensionless

Total No. of Printed Pages : 21

(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU
ARE ASKED TO DO SO)

D

PHD-EE-November, 2025
Mechanical Engineering

SET-X

10004

Sr. No.

Time : 1¼ Hours

Max. Marks : 100

Total Questions : 100

Roll No. (in figures) _____ (in words) _____

Name _____ Date of Birth _____

Father's Name _____ Mother's Name _____

Date of Examination _____

(Signature of the Candidate)

(Signature of the Invigilator)

**CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE
STARTING THE QUESTION PAPER.**

1. **All questions are compulsory.**
2. The candidates **must return** the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
4. Question Booklet along with answer key of all the A, B, C & D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University Website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case, will be considered.
5. The candidate **must not** do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself. Answers **must not** be ticked in the question booklet.
6. **There will be negative marking and a deduction of 0.25 marks for each wrong answer. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.**
7. Use only **Black or Blue Ball Point Pen** of good quality in the OMR Answer-Sheet.
8. **Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after starting of the examination.**

PHD-EE-November, 2025/(Mech. Engg.)(SET-X)/(D)

SEAL

1. Questionnaire filled by respondents themselves is called :

- (1) Interview schedule
- (2) Observation
- (3) Mail survey
- (4) Case study

2. Dichotomous questions are those which ?

- (1) Have only two alternatives
- (2) Have multiple options
- (3) Are open-ended
- (4) None of these

3. Observation method is most suitable when :

- (1) Data must be verified directly
- (2) Population is inaccessible
- (3) Information is theoretical
- (4) Respondents are literate

4. "Schedule" is used as a :

- (1) Research tool
- (2) Sampling frame
- (3) Theory
- (4) Data type

5. Open-ended questions are useful for :

- (1) Objective responses
- (2) Exploratory research
- (3) Statistical summaries
- (4) Computer analysis

6. Standard structure IMRAD stands for :
 - (1) Introduction, Methods, Results and Discussion
 - (2) Introduction, Model, Review and Data
 - (3) Issue, Measurement, Result and Diagram
 - (4) Index, Method, Result and Data
7. Bibliography is important because :
 - (1) It extends word count
 - (2) It helps others locate sources
 - (3) It is optional
 - (4) It hides references
8. Footnotes are used for :
 - (1) Decoration
 - (2) Citing references
 - (3) Writing appendix
 - (4) Formatting text
9. The main purpose of thesis writing is :
 - (1) To show understanding of research process
 - (2) To replicate others' work
 - (3) To summarize previous papers only
 - (4) To create publicity
10. A research paper differs from a thesis because :
 - (1) It is shorter and focuses on one issue
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11. Shear angle varies with :

- (1) cutting speed
- (2) feed
- (3) depth of cut
- (4) work piece materials and tool geometry

12. SIMO charts are used in :

- (1) method study
- (2) micro motion study
- (3) process analysis
- (4) layout analysis

13. ABC analysis is used in :

- (1) CPM
- (2) PERT
- (3) Inventory control
- (4) All of the above

14. CPM is oriented to :

- (1) cost
- (2) time
- (3) objective
- (4) activity

15. In PERT, the distribution of activity times of assumed to be :

- (1) Normal
- (2) Gamma
- (3) Beta
- (4) Exponential

16. In simplex method, the variables which have not been assigned the value zero during the iteration are called :
- (1) Basic variables
 - (2) Actual variables
 - (3) Artificial variables
 - (4) None of the above
17. EOQ is taken at the point where cost of carrying equals the cost of :
- (1) ordering of material
 - (2) material
 - (3) safety stock
 - (4) bosh material and safety stock
18. Material handling is higher in case of :
- (1) Process layout
 - (2) Product layout
 - (3) Group lay out
 - (4) Fixed position layout
19. A critical path has :
- (1) zero slack
 - (2) minimum slack
 - (3) maximum slack
 - (4) infinite slack
20. Which of the following software is used for simulation ?
- (1) GPSS
 - (2) Minsky
 - (3) CATIA
 - (4) CAM

21. According to Gay-Lussac law for a perfect gas, the absolute pressure of given mass varies directly as :
- (1) temperature
 - (2) absolute
 - (3) absolute temperature, if volume is kept constant
 - (4) volume, if temperature is kept constant
22. Which of the following processes is irreversible process ?
- (1) isothermal
 - (2) adiabatic
 - (3) throttling
 - (4) all of the above
23. Change in enthalpy in a closed system is equal to heat transferred if the reversible process takes place at constant :
- (1) pressure
 - (2) temperature
 - (3) volume
 - (4) internal energy
24. Carnot cycle efficiency depends upon :
- (1) properties of the medium/substance used
 - (2) condition of engine
 - (3) working condition
 - (4) temperature range of operation
25. The ratio of indicated thermal efficiency to the corresponding air standard cycle efficiency is called :
- (1) net efficiency
 - (2) efficiency ratio
 - (3) relative efficiency
 - (4) overall efficiency

26. For same compression ratio and for same heat added :
- (1) Otto cycle is more efficient than Diesel Cycle
 - (2) Diesel cycle is more efficient than Otto cycle
 - (3) Efficiency depends on other factors
 - (4) Both Otto and Diesel cycles are equally efficient
27. The mean effective pressure obtained from engine indicator indicates the :
- (1) minimum pressure
 - (2) instantaneous pressure at any instant
 - (3) exhaust pressure
 - (4) average pressure
28. Gas turbine cycle consists of :
- (1) two isothermals and two isentropics
 - (2) two isentropics and two constant volumes
 - (3) two isentropics, one constant volume and one constant pressure
 - (4) two isentropics and two constant pressures
29. Consumable patterns are made of :
- (1) polystyrene
 - (2) wax
 - (3) plaster of paris
 - (4) any of the above
30. Sodium silicate in sand is often used as
- (1) substitute of clay
 - (2) binder
 - (3) refractory material
 - (4) permeability promotion agent

31. Coulomb friction is :

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 - (4) dimensionless

41. In hypothesis testing, Type I error occurs when :

- (1) True null hypothesis is rejected
- (2) False null hypothesis accepted
- (3) Both accepted
- (4) None

42. The T-test is applicable for :

- (1) Large samples
- (2) Small samples
- (3) All samples
- (4) None

43. The normal distribution curve is :

- (1) Skewed
- (2) Symmetrical
- (3) Bimodal
- (4) Random

44. The mean of sampling distribution equals :

- (1) Population mean
- (2) Population variance
- (3) Standard error
- (4) None

45. SPSS stands for :

- (1) Statistical Package for Social Sciences
- (2) Software Program for Statistical Systems
- (3) Standard Process Sampling System
- (4) None

46. Binary number system uses :

- (1) 10 digits
- (2) 2 digits
- (3) 8 digits
- (4) 16 digits

47. Hypothesis is a :

- (1) Testable statement
- (2) Law
- (3) Principle
- (4) Observation

48. Sampling is preferred because it :

- (1) Saves time & cost
- (2) Covers entire population
- (3) Avoids estimation
- (4) Is less accurate

49. Universe in research means :

- (1) Population of interest
- (2) Galaxy
- (3) Sample
- (4) Category

50. Random sampling ensures :

- (1) Equal chance to each unit
- (2) Bias in selection
- (3) Manual choice
- (4) Fixed group

51. APA referencing style requires :
- (1) Author, Year, Title, Publisher
 - (2) Title, Author, DOI, Volume
 - (3) Publisher, Year, Edition
 - (4) None
52. DOI in a journal article ensures :
- (1) Permanent online link to publication
 - (2) Digital security
 - (3) Confidential access
 - (4) Peer review process
53. Mean is affected most by :
- (1) Median
 - (2) Extreme values
 - (3) Mode
 - (4) Range
54. Standard deviation is a measure of :
- (1) Central tendency
 - (2) Variation or dispersio
 - (3) Relationship
 - (4) Frequency
55. When mean = median = mode, the data is :
- (1) Positively skewed
 - (2) Negatively skewed
 - (3) Symmetrical
 - (4) Uniform

56. Correlation coefficient (r) lies between :
- (1) 0 and 1
 - (2) -1 and +1
 - (3) 1 and 100
 - (4) 0 and 100
57. When the p -value < 0.05 , we :
- (1) Accept the null hypothesis
 - (2) Reject the null hypothesis
 - (3) Ignore the result
 - (4) Retest data
58. Chi-square test is used for :
- (1) Relationship between categorical variables
 - (2) Comparing means
 - (3) Predicting regression
 - (4) Time-series analysis
59. In regression, R^2 value indicates :
- (1) Degree of variance explained by the model
 - (2) Correlation strength only
 - (3) Type of variable
 - (4) Sampling adequacy
60. Mean, Median, and Mode are measures of :
- (1) Dispersion
 - (2) Correlation
 - (3) Central Tendency
 - (4) Regression

61. Coding is part of :
- (1) Data processing
 - (2) Data collection
 - (3) Sampling
 - (4) Interpretation
62. Pre-writing consideration in report writing involves :
- (1) Deciding target audience & objectives
 - (2) Drawing tables
 - (3) Printing graphs
 - (4) Proofreading
63. The term "Research Design" refers to :
- (1) Blueprint of research
 - (2) Type of hypothesis
 - (3) Statistical tool
 - (4) Theoretical model
64. "Research Ethics" ensures :
- (1) Honesty and integrity in research
 - (2) Faster publication
 - (3) Higher citation
 - (4) Greater funding
65. Report format of a journal article generally includes :
- (1) Abstract, Methodology, Results, References
 - (2) Only text
 - (3) Tables only
 - (4) None

66. Quantitative research deals primarily with :
- (1) Numerical data
 - (2) Verbal opinions
 - (3) Emotions
 - (4) Historical records
67. Primary data is :
- (1) Already published information
 - (2) Data collected first-hand by the researcher
 - (3) Secondary data verified again
 - (4) None
68. Which one is a secondary data source ?
- (1) Field survey
 - (2) Census report
 - (3) Observation
 - (4) Personal interview
69. Abstract of a research paper should contain :
- (1) Objectives, method, results and conclusion
 - (2) Only references
 - (3) Detailed data tables
 - (4) Footnotes
70. Empirical research is characterized by :
- (1) Observation and data-based evidence
 - (2) Logical reasoning only
 - (3) Philosophical discussion
 - (4) Pure theory

71. Crowning is done on :
- (1) gears
 - (2) shafts
 - (3) pulleys
 - (4) keys
72. Which of the following is a dead weight type governor ?
- (1) Porter governor
 - (2) Hartnell governor
 - (3) Watt governor
 - (4) All of the above
73. The shear stress – velocity gradient relation of the Newtonian fluids is :
- (1) Linear
 - (2) Parabolic
 - (3) Hyperbolic
 - (4) Involutic
74. A pitot tube is used for the measurement of :
- (1) Pressure
 - (2) Velocity
 - (3) Viscosity
 - (4) Surface tension
75. The quation of continuity of flow is based on the principle of conservation of :
- (1) Momentum
 - (2) Mass
 - (3) Energy
 - (4) All of the above

76. A dimensionless number which is the ratio of kinematic viscosity to thermal diffusivity is known as :
- (1) Prandtl number
 - (2) Reynolds number
 - (3) Nusselt number
 - (4) Péclet number
77. The relation between the emissive and absorptive power of a surface is developed under :
- (1) Planck's law
 - (2) Kirchhoff's law
 - (3) Electrical analogy
 - (4) Stefan-Boltzmann's law
78. A correction of LMTD is necessary in case of :
- (1) Parallel flow heat exchanger
 - (2) Counter current heat exchanger
 - (3) Cross flow heat exchanger
 - (4) All of the above
79. Absolute zero pressure will occur :
- (1) at sea level
 - (2) at the center of the earth
 - (3) when molecular momentum of the system becomes zero
 - (4) under vacuum conditions
80. An ideal gas as compared to a real gas at very high pressure occupies :
- (1) more volume
 - (2) less volume
 - (3) same volume
 - (4) unpredictable behaviour

81. The word research literally means :
- (1) Re-writing facts
 - (2) Searching again for knowledge
 - (3) Statistical calculation
 - (4) Data entry
82. In research, replication of study increases :
- (1) Validity
 - (2) Reliability
 - (3) Sampling error
 - (4) Bias
83. Research process does not include :
- (1) Data analysis
 - (2) Hypothesis formulation
 - (3) Advertisement design
 - (4) Interpretation
84. Research is considered scientific when it is :
- (1) Based on opinion
 - (2) Logical and systematic
 - (3) Emotional
 - (4) Random
85. Which of the following is not an ethical issue ?
- (1) Fabrication of data
 - (2) Plagiarism
 - (3) Misrepresentation
 - (4) Literature review

86. A case-study method is most suitable for :
- (1) Large-scale-surveys
 - (2) In-depth analysis of a single unit
 - (3) Hypothesis testing only
 - (4) Correlation studies
87. In a structured interview, questions are :
- (1) Fixed and pre-decided
 - (2) Open and spontaneous
 - (3) Participant-led
 - (4) Unplanned
88. Pilot study is conducted to :
- (1) Finalize tools and check feasibility
 - (2) Collect final data
 - (3) Analyze hypothesis
 - (4) Publish research
89. Which philosophical approach supports objective, measurable reality ?
- (1) Positivism
 - (2) Constructivism
 - (3) Pragmatism
 - (4) Relativism
90. A questionnaire differs from a schedule because :
- (1) Respondents fill it themselves
 - (2) Enumerator fills it
 - (3) It is for illiterate respondents
 - (4) It is only oral

91. The location of riser least depends on :
- (1) metal to be cast
 - (2) size of core
 - (3) design of casting
 - (4) feasibility of directional solidification
92. The main constituent of high speed steel is :
- (1) Tungsten
 - (2) Chromium
 - (3) Vanadium
 - (4) Cobalt
93. Holes are usually enlarge by :
- (1) Drills
 - (2) Reamers
 - (3) Boring bars
 - (4) None of the above
94. In gas welding using oxygen and acetylene cylinders, the pressure of gas is more in :
- (1) Oxygen cylinder
 - (2) Acetylene cylinder
 - (3) Equal in both cylinder
 - (4) None of the above
95. Principal materials used in soldering are
- (1) Tin and lead
 - (2) Copper and tin
 - (3) Zinc and copper
 - (4) Copper and lead

96. In which of the following process the electrode is not consumed ?
- (1) TIG welding
 - (2) DC arc welding
 - (3) Gas welding
 - (4) Plasma welding
97. Collapsible tubes are made by :
- (1) drawing
 - (2) spinning
 - (3) extrusion
 - (4) rolling
98. In a rolling process, the state of stress of the material undergoing deformation is
- (1) pull compression
 - (2) pure shear
 - (3) compression and shear
 - (4) tension and shear
99. Tool signature comprises
- (1) 5 elements
 - (2) 6 elements
 - (3) 7 elements
 - (4) 8 elements
100. In deep drawing of sheets, the values of limiting drawing ratio depend on :
- (1) percentage elongation of sheet
 - (2) yield strength of sheet
 - (3) type of press used
 - (4) thickness of sheet

ANSWER KEY FOR PH.D. MECHANICAL ENGG.

Q NO	A	B	C	D
1	2	3	1	3
2	2	3	1	1
3	3	1	1	1
4	2	4	1	1
5	4	3	1	2
6	2	1	1	1
7	1	4	2	2
8	1	4	2	2
9	1	1	1	1
10	1	2	1	1
11	3	4	1	4
12	1	3	1	1
13	1	3	2	3
14	1	4	2	4
15	2	1	3	3
16	1	4	2	1
17	2	3	2	1
18	2	4	1	1
19	1	1	1	1
20	1	1	3	2
21	1	1	2	3
22	1	2	2	3
23	2	2	3	1
24	2	1	2	4
25	3	1	4	3
26	2	2	2	1
27	2	1	1	4
28	1	1	1	4
29	1	1	1	1
30	3	1	1	2
31	1	3	4	4
32	2	1	1	3
33	2	1	3	3
34	1	1	4	4
35	1	2	3	1
36	2	1	1	4
37	1	2	1	3
38	1	2	1	4
39	1	1	1	1
40	1	1	2	1
41	1	4	3	1
42	1	1	1	2
43	1	3	1	2
44	1	4	2	1
45	1	3	2	1
46	1	1	1	2
47	2	1	2	1
48	2	1	3	1
49	1	1	3	1
50	1	2	1	1

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51	4	3	1	1
52	3	1	2	1
53	3	1	2	2
54	4	2	1	2
55	1	2	1	3
56	4	1	2	2
57	3	2	1	2
58	4	3	1	1
59	1	3	1	1
60	1	1	1	3
61	3	2	3	1
62	1	1	3	1
63	1	3	1	1
64	2	1	4	1
65	2	1	3	1
66	1	1	1	1
67	2	3	4	2
68	3	1	4	2
69	3	3	1	1
70	1	4	2	1
71	3	1	2	3
72	3	1	1	1
73	1	1	3	1
74	4	1	1	2
75	3	1	1	2
76	1	1	1	1
77	4	2	3	2
78	4	2	1	3
79	1	1	3	3
80	2	1	4	1
81	2	1	3	2
82	1	1	1	2
83	3	2	1	3
84	1	2	1	2
85	1	3	2	4
86	1	2	1	2
87	3	2	2	1
88	1	1	2	1
89	3	1	1	1
90	4	3	1	1
91	4	2	4	2
92	1	2	3	1
93	3	3	3	3
94	4	2	4	1
95	3	4	1	1
96	1	2	4	1
97	1	1	3	3
98	1	1	4	1
99	1	1	1	3
100	2	1	1	4

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