CBCS SCHEME

BAE657D

USN

Question Paper Version : A

Sixth Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026

Multi-disciplinary Research in Aeronautical Engineering

Time: 1 hr. Max. Marks: 50

INSTRUCTIONS TO THE CANDIDATES

1. Answer all the **fifty** questions, each question carries one mark.
2. Use only **Black ball point pen** for writing / darkening the circles.
3. **For each question, after selecting your answer, darken the appropriate circle corresponding to the same question number on the OMR sheet.**
4. Darkening two circles for the same question makes the answer invalid.
5. **Damaging/overwriting, using whiteners** on the **OMR** sheets are strictly prohibited.

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1. What is the primary goal of multi-disciplinary research?
   a) To focus on a single discipline in depth analysis
   b) To integrate knowledge, method and tool from multiple disciplines to solve complex problems.
   c) To avoid collaboration with other disciplines
   d) To simplify research by limiting the scope

2. Which of the following is an example of multi disciplinary research in aeronautical engineering?
   a) Studying aerodynamics in aircraft design
   b) Combining aerospace engineering, material science and computer science to design lightweight aircraft.
   c) Focusing solely on mechanical engineering for aircraft propulsion
   d) Ignoring environmental science in aviation research.

3. Which disciplines are involved in the development of Sustainable Aviation Fuel (SAF)?
   a) Aerospace Engineering, Agriculture and Music
   b) Chemical Engineering, Environmental science and Aerospace Engineering.
   c) Literature, History and Philosophy
   d) Mechanical engineering, psychology and fine arts

4. What is a key characteristic of research objective?
   a) It should be specific, measurable, achievable relevant and time bound.
   b) It should be vague and broad
   c) It should avoid alignment with multi-disciplinary goals
   d) It should focus on theoretical concepts only

5. Which of these is an example of well formulated research objective?
a) To study climate change
b) To examine the effect of climate change on crop yield in South India from 2000-2020.
c) To understand environmental issues
d) To discuss global warming

6. What is the difference between a research objective and research question?
a) Research objectives states what research intends to achieve, while research questions define the specific queries the research will address
b) Research objectives are questions, while research questions are statements
c) Research objectives are always qualitative while research questions are always quantitative
d) There is no difference between research objectives and research questions.

7. A good research question should be
a) Broad and general
b) Based only on personal opinion
c) Specific, clear and focused
d) Impossible to answer

8. Why it is important to align research objectives with research questions?
a) To make the research complex and difficult
b) To avoid answering the research question
c) To increase the length of research paper
d) To ensure that the research stays focused and structured.

9. What type of research question is used for exploratory research?
a) Descriptive
b) Explanatory
c) Open ended and broad
d) Statistical

10. What is the first step in formulating a research objective?
a) Receiving the literature
b) Collecting data
c) Identifying the research problem
d) Writing the conclusion

11. Which of the following is the correct order of the scientific research process?
a) Data Collection → Hypothesis Formulation → Analysis → Conclusion
b) Data Collection → Analysis → Hypothesis Formulation → Conclusion
c) Analysis → Data Collection → Conclusion → Hypothesis Formulation
d) Hypothesis Formulation → Data Collection → Analysis → Conclusion

12. Which research method focuses on exploring cause and effect relationship through manipulation of variables?
a) Descriptive research
b) Exploratory research
c) Observational research
d) Experimental research

13. Which principle of experimental design involves assigning treatments randomly to experimental units?
a) Principle of replication
b) Principle of local control
c) Principle of stratification
d) Principle of randomization

14. Which type of sampling ensures every member of population has an equal chance of being selected?
a) Convenience sampling
b) Purposive sampling
c) Systematic sampling
d) Simple random sampling

15. Which data collection method is best suited for gathering in depth, qualitative insights?
a) Survey
b) Observational checklists
c) Experimental trial
d) Interviews

16. What is the primary purpose of research ethics?
a) To increase research speed
b) To ensure the integrity and safety of research practices
c) To promote biased results
d) To reduce research costs

17. Which method would you use to confirm that a stress monitoring algorithm on aircraft structure is producing accurate results?
a) Validation
b) Verification
c) Evaluation
d) Peer review

18. Which ethical principle ensures that participants can leave a study at any time?
a) Right to withdraw
b) Right to Deceive
c) Right to compensation
d) Right to publish

19. What is the main purpose of evaluation in research?
a) To measure the value and impact of research outcomes
b) To ensure the research follows regulations
c) To confirm the research accuracy of instruments
d) To repeat the research process

20. How does validation differ from verification in research?
a) Validation checks if the method works correctly, verification ensures the correct implementation
b) Validation is similar as verification
c) Verification assures correct sample size
d) Both (b) and (c)

21. Which of the following best describes primary goal of a qualitative measures?
a) To test hypothesis using numerical data
b) To explore participants experiences and meanings
c) To quantify variables and establish casual relationships
d) To predict outcome based on statistical models

22. Which of the following is a key characteristics of quantitative research?
a) Open ended questioning
b) Thematic analysis
c) Use of statistical analysis
d) Narrative data collection

23. In mixed methods research sequential explanatory design refers to
a) Collecting qualitative and quantitative data simultaneously
b) Analysing qualitative data before designing a quantitative study
c) Conducting quantitative data collection first and then qualitative to explain findings
d) Merging qualitative and quantitative data in to single data set.

24. Which of the following methods is most suitable for studying how and why a phenomenon occurs?
a) Quantitative survey
b) Qualitative case study
c) Experimental research
d) Correlational study

25. Which of the following best exemplifies a quantitative study?
a) Interview, exploring coping mechanisms of cancer patients
b) Ethnographic study on classroom behavior
c) Statistical analysis of the effect of a new drug on blood pressure
d) Content analysis of political speeches

26. A researcher wants to develop a theory based on interviews with participants. Which method should they choose?
a) Quantitative experiment
b) Grounded theory (qualitative)
c) Quasi-experimental design
d) Mixed methods explanatory design

27. In quantitative studies validity refers to
a) The ability to generate rich, detailed descriptions
b) The extent to which a tool measures what it claims to measure
c) The consistency of measurement over time
d) The interpretative depth of the data collected

28. Which of the following research designs would most likely to use both a survey and focus group discussions?
a) Purely qualitative study
b) Purely quantitative study
c) Mixed methods study
d) Experimental study

29. A hallmark of qualitative sampling is
a) Random sampling to generalize results
b) Large sample sizes for statistical significance
c) Purposeful sampling to gain in depth understanding
d) Stratified sampling to ensure group representation

30. When choosing between qualitative and quantitative methods, a researcher should primarily consider
a) Available funding for the project
b) The researcher's preference for certain methods
c) The nature of the research question
d) The ease of statistical analysis

31. Which of the following is not a common method of primary data collection?
a) Surveys
b) Interviews
c) Literature review
d) Observations

32. In data management, which step ensures that data is organized, stored and preserved properly for future use?
a) Data visualization
b) Data validation
c) Data archiving
d) Data cleaning

33. Which of the following best describes quantitative data analysis?
a) Analysing patterns in interview response
b) Interpreting trends from numerical data sets
c) Generating themes from open-ended questionnaires
d) Understanding cultural behaviours through observation

34. Which statistical test is typically used to determine the relationship between two variables?
a) Thematic analysis
b) Chi-square test
c) Content analysis
d) SWOT

35. In qualitative data analysis, what is the main purpose of coding
a) To encrypt sensitive data
b) To categorize and interpret themes
c) To perform mathematical operations
d) To create random collection

36. Which of the following methods helps to ensure data validity during data collection?
a) Using ambiguous questions
b) Avoiding pilot testing
c) Standardizing measuring tools
d) Ignoring non-responses

37. Which term refers to correctness and accuracy of data in context of data verification?
a) Reliability
b) Validity
c) Consistency
d) Authenticity

38. Which of these is an example of triangulation in data interpretation?
a) Collecting more data than needed
b) Using multiple data sources to confirm findings
c) Repeating the same experiment multiple times
d) Relying on a single method of data collection

39. Which activity is typically part of data cleaning?
a) Hypothesis testing
b) Removing duplicate entries
c) Conducting interviews
d) Publishing findings

40. What is the primary goal of interpreting data?
a) To find grammatical errors in data
b) To extract meaningful insights from analyzed data
c) To alter data to fit a hypothesis
d) To summarize data without conclusions

41. In research project management the scope of a project primarily defines:
a) The resources required to complete the project
b) The expected outcomes and deliverables
c) The timeline for publishing research
d) The budget constraints

42. Which of the following is not a component of effective research documentation?
a) Keeping informal personal notebook
b) Maintaining a detailed lab notebook
c) Citing all sources of data properly
d) Clearly recording methodology and results

43. In a typical research plan the literature review is intended to
a) List the financial costs of the project
b) Propose new hypothesis without background evidence
c) Summerize and critically analyze existing work in the field
d) Outline the final conclusions of the research

44. Which document is often required when submitting a research article to a peer reviewed journal?
a) A conference certificate
b) A copy right transfer agreement
c) A research plan draft
d) A course completion certificate

45. Which of the following is an essential feature of a good research plan?
a) Detailed review of competitors projects
b) Clear objectives and defined methodology
c) Focus on as many topics as possible
d) No provision for budgeting or resource management

46. In the context of research publishing plagiarism refer to
a) Making honest mistakes in data analysis
b) Publishing in a low impact journal
c) Submitting to multiple journals at once
d) Using another's work or idea without proper citation

47. The role of a Gantt chart in research management is to :
a) Illustrate financial projections
b) Visualize the timeline and schedule of project tasks
c) Represent statistical data outcomes
d) Record personal, opinions about research progress

48. In research writing methodology section should
a) Detailed personal motivation behind the research
b) Explain how data was collected and analyzed
c) Predict the future applications of the research
d) List all the references consulted

49. When selecting a journal for publishing an important factor to consider is :
a) The journals impact factor and relevance to your field
b) The number of advertisements in the journal
c) Whether the journal often free gifts for authors
d) The country of origin of the journal

50. A common reason for research paper rejection in academic journal is :
a) Lack of novelty and unclear research question
b) Providing too many charts and figures
c) Submitting research is multiple languages
d) Having a very long abstract

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