

Entrance Test for Ph.D. Programme-2018

Time: 120 Minutes

Max Marks: 100

Discipline: Civil Engineering

Set: A

Test ID: 05

Name:

Father Name:

Roll Number: Date:/...../.....

Roll Number in words:

Signature of Candidate:

Signature of Invigilator:

INSTRUCTIONS FOR CANDIDATES

1. Do not open seal before start of Exam.
2. Carefully fill all your details in top portion of this question paper. Don't leave any column blank.
3. Use blue/black ball point pen to fill details on question paper. Write only in capital letters.
4. Carefully fill all your details in top portion of OMR answer sheet. Also put your signatures at bottom portion of OMR.
5. **Use only black ball point pen to fill details & darken circles on OMR sheet. Using pencil is strictly prohibited.**
6. **Carefully fill your Roll No, Test ID, Category, Paper Set and other required details on the OMR sheet.**
7. Question paper consists of two sections. Section-I is of Research Methodology and Section-II is Subject specific. Each section contains 50 multiple choice questions. Total 100 questions of one mark each.
8. **Maximum marks are 100.**
9. **Time allowed is 120 minutes.**
10. **Qualifying marks shall be 50% for General Category and 45% for Reserved Categories.**
11. All questions are compulsory. No negative marking for wrong answers.
12. There are four alternative answers for each question out of which only one is correct.
13. You have to darken the circle of right answer on OMR answer sheet.
14. Questions left blank or attempted with two or more options/answers will not be evaluated.
15. Also read carefully the instructions on OMR answer sheet before attempting the questions.
16. Use of calculator is not allowed.
17. Log tables may be provided for calculation work, if required.
18. OMR sheet should not be folded or crushed. Don't put any stray marks on the sheet.
19. Circles on **OMR sheet** should be darkened completely. Incomplete/half filled circles will not be evaluated.
20. Do not use marker or white fluid on the OMR sheet.
21. **The medium of the examination is English only.**
22. No extra sheet will be provided for the rough work. Use the space inside the question paper pages for rough work.
23. Carrying mobile phones, electronic gadgets, notes or extra papers in examination hall is strictly prohibited.
24. Indulging in any form of unfair means, canvassing, impersonation or misbehaviour with examination staff will result in disqualification of your candidature.

Section-I
Research Methodology

1. Who authored the book "Methods in Social Research"?
 - A) Wilkinson
 - B) C R Kothari
 - C) Kerlinger
 - D) Goode and Halt

2. Social Science deals with
 - A) Objects
 - B) Human beings
 - C) Living things
 - D) Non-living things

3. "The Romance of Research" is authored by
 - A) Redmen and Mory
 - B) P. V. Young
 - C) Robert C. Meir
 - D) Harold Dazier

4. Which of the following is an example of primary data?
 - A) Book
 - B) Journal
 - C) Newspaper
 - D) Census Report

5. ICSSR stands for
 - A) Indian Council for Survey and Research
 - B) Indian Council for Strategic Research
 - C) Indian Council for Social Science Research
 - D) Inter National Council for Social Science Research

6. JRF stands for
 - A) Junior Research Functions
 - B) Junior Research Fellowship
 - C) Junior Fellowship
 - D) None of the above
7. In the formulation of problem, which of the following we need to give?
 - A) Title
 - B) Index
 - C) Bibliography
 - D) Concepts
8. Analogies are sources of
 - A) Data
 - B) Concept
 - C) Research
 - D) Hypothesis
9. When a hypothesis is stated negatively, it is called
 - A) Relational Hypothesis
 - B) Situational Hypothesis
 - C) Null Hypothesis
 - D) Casual Hypothesis
10. In a survey, there is an enumerator and
 - A) Guide
 - B) Respondent
 - C) Supervisor
 - D) Messenger
11. A short summary of Technical Paper is called
 - A) Article
 - B) Research Abstract

- C) Publication
 - D) Guide
12. Ph.D. stands for
- A) Doctor of Philosophy
 - B) Degree in Philosophy
 - C) Doctor of Psychology
 - D) None of the above
13. Failure to acknowledge the borrowed material; is called (Take and use of others as one's own)
- A) Acknowledgement
 - B) Foot Notes
 - C) Index
 - D) Plagiarism
14. Data related to the Human beings are called
- A) Territorial data
 - B) Organisational data
 - C) Peripheral data
 - D) Demographic data
15. Schedule is filled by which of the following?
- A) Respondent
 - B) Enumerator
 - C) Everybody
 - D) None of the above
16. Questions in which only two alternatives are possible are called
- A) Multiple choice questions
 - B) Dichotomous Questions
 - C) Open ended questions
 - D) Structured questions

17. Assigning numerals or other symbols to the categories or response is called
- A) Editing
 - B) Coding
 - C) Transcription
 - D) Tabulation
18. Tippet table refers to
- A) Table of random digits
 - B) Table used in sampling methods
 - C) Table used in statistical investigations
 - D) All of the above
19. Research and development become the index of development of country. Which of the following reasons are true with regards to the statement?
- A) Because R&D reflect the true economic and social conditions prevailing in a country.
 - B) Because R&D targets the human development.
 - C) Because R&D can improve the standard of living of the people in a country.
 - D) All of the above.
20. The word "Anusandhan" implies
- A) Attaining an aim
 - B) Goal orientation
 - C) Following an aim
 - D) Praying to achieve an aim
21. A Researcher wants to study the relationship of family size to income. He classifies his population into different income slabs and then takes a random sample from each slab in order. Which technique of sampling is he working with?
- A) Cluster sampling
 - B) Random sampling

C) Stratified Random sampling

D) Systematic sampling

For Q. 22-23. The following table gives the sales of batteries manufactured by a company over the years.

Number of different batteries sold (in thousands)

Year	Types of Batteries					
	4AH	7AH	32AH	35AH	55AH	Total
1992	75	144	114	102	108	543
1993	90	126	102	84	126	528
1994	96	114	75	105	135	525
1995	105	90	150	90	75	510
1996	90	75	135	75	90	465
1997	105	60	165	45	120	495
1998	115	85	160	100	145	605

22. What was the approximate percentage increase in the sales of 55AH batteries in 1998 compared to that in 1992?

A) 28%

B) 31%

C) 33%

D) 34%

23. The percentage of 4AH batteries sold to the total number of batteries sold was maximum in the year?

A) 1994

B) 1995

C) 1996

- D) 1997
24. Look the series: 22, 21, 23, 22, 24, 23,
- A) 22
 - B) 24
 - C) 25
 - D) 26
25. Which word does not belong to others?
- A) Dodge
 - B) Flee
 - C) Duck
 - D) Avoid
26. Which of the following is not an essential element of report writing?
- A) Research Methodology
 - B) Reference
 - C) Conclusion
 - D) None of the above
27. Which of the following is non-probability sampling?
- A) Snowball
 - B) Random
 - C) Cluster
 - D) Stratified
28. In group interview, there are
- A) One interviewer and one interviewee
 - B) More than one interviewer and one interviewee
 - C) One interviewer and more than one interviewee
 - D) More than one interviewer and more than one interviewee
29. Uniting various qualitative methods with quantitative methods can be called as
- A) Coalesce

- B) Triangulation
 - C) Bipartite
 - D) Impassive
30. Books and records are the primary sources of data in:
- A) clinical research
 - B) historical research
 - C) laboratory research
 - D) participatory research
31. The important pre-requisites of a researcher in sciences, social sciences and humanities are
- A) laboratory skills, records, supervisor, topic
 - B) Supervisor, topic, critical analysis, patience
 - C) archives, supervisor, topic, flexibility in thinking
 - D) topic, supervisor, good temperament, pre-conceived notions
32. A college wants to give training in use of Statistical Package for Social Sciences (SPSS) to researchers. For this the college should organize
- A) Lecture
 - B) Seminar
 - C) Workshop
 - D) Conference
33. Which One of the following is not a quality of researcher?
- A) Keenness in enquiry
 - B) He must be of alert mind
 - C) His assertion to outstrip the evidence
 - D) Unison with that of which he is in search
34. Null means?
- A) One
 - B) Two

- C) Zero
- D) None of the above

35. The depth of any research can be judged by:

- A) title of the research
- B) duration of the research
- C) objectives of the research
- D) total expenditure on the research

36. Fundamental research reflects the ability to:

- A) Expound new principles
- B) Synthesize new ideals
- C) Evaluate the existing material concerning research
- D) Study the existing literature regarding various topics

37. A ratio represents the relation between

- A) Part and Part
- B) Part and Whole
- C) Whole and Whole
- D) All of the above

38. Circle graphs are used to show:

- A) How one part is related to other parts?
- B) How various sections share in the whole?
- C) How one whole is related to other whole?
- D) How various parts are related to the whole?

39. Field-work based research is classified as:

- A) Historical
- B) Empirical
- C) Biographical
- D) Experimental

40. Statistical measure based upon the entire population is called parameter while measure based upon a sample is known as:
- A) Inference
 - B) Statistics
 - C) Sample parameter
 - D) None of these
41. The importance of the correlation co-efficient lies in the fact that:
- A) It is one of the most valid measure of statistics.
 - B) It is a non-parametric method of statistical analysis.
 - C) There is a linear relationship between the correlated variables.
 - D) It allows one to determine the degree or strength of the association between two variables.
42. Which one of the following is the most comprehensive source of population data?
- A) Census
 - B) National Sample Surveys
 - C) Demographic Health Surveys
 - D) National Family Health Surveys
43. Which correlation co-efficient best explains the relationship between creativity and intelligence?
- A) 0.3
 - B) 0.5
 - C) 0.6
 - D) 1.0
44. Normal Probability Curve should be
- A) Zero skewed
 - B) Positively skewed
 - C) Negatively skewed
 - D) Leptokurtic skewed

45. A doctor studies the relative effectiveness of two drugs of dengue fever. His research would be classified as
- A) Case Study
 - B) Ethnography
 - C) Descriptive Survey
 - D) Experimental Research
46. Newton gave three basic laws of motion. This research is categorized as
- A) Sample Survey
 - B) Applied Research
 - C) Descriptive Research
 - D) Fundamental Research
47. When two or more successive footnotes refer to the same work which one of the following expressions is used?
- A) et.al
 - B) op.cit
 - C) loc.cit
 - D) ibid
48. Nine year olds are taller than seven year olds. This is an example of a reference drawn from
- A) Vertical study
 - B) Time series study
 - C) Experimental study
 - D) Cross-sectional study
49. Which one of the following belongs to the category of good 'research ethics'?
- A) Publishing the same paper in two research journals without telling the editors
 - B) Trimming outliers from a data set without discussing your reasons in a research paper

- C) Conducting a review of the literature that acknowledges the contributions of other people in the relevant field or relevant prior work
 - D) Including a colleague as an author on a research paper in return for a favor even though the colleague did not make a serious contribution to the paper
50. Which of the following are the basic rules of APA style of referencing format?
- A) Alphabetically index reference list
 - B) Invert authors' names (last name first)
 - C) Italicize titles of longer works such as books and journals
 - D) All of the above

Section-II
Civil Engineering

51. An under-reinforced section means
- (a) Steel is provided at the under side only
 - (b) Steel provided insufficient
 - (c) Steel is provided on any one of the faces only
 - (d) Steel will yield first
52. A column with both ends fixed buckles when subjected to a force of 30000 N. One end is then allowed to be free. At what force, in newtons, will it buckle?
- (a) 2025
 - (b) 1875
 - (c) 1725
 - (d) 1650
53. In the analysis of statically indeterminate structures, the first stage is to identify the number of redundant forces and remove them. The structure that remains after removal of redundancies is called
- (a) Primary structure
 - (b) Secondary structure
 - (c) Hyperstatic structure
 - (d) Released structure
54. The deflection of a beam may be decreased by
- (a) Decreasing the depth of beam
 - (b) Increasing the span
 - (c) Providing greater end restraint
 - (d) Any of the above methods.
55. Which of the following is the correct definition in relation to an axially loaded bar?
- (a) Flexibility is the force required to produce unit deflection
 - (b) Flexibility is the deflection per unit length
 - (c) Flexibility is the deflection due to unit load
 - (d) Flexibility is the ratio of length to the least lateral dimension.
56. The strain energy that can be stored in a given weight of rubber as compared to that in the same weight of structural steel is approximately
- (a) 10 times

- (b) 170 times
 - (c) One-tenth
 - (d) 1/170 times
57. In a building frame, shear walls are provided to resist
- (a) Vertical loads
 - (b) Horizontal loads
 - (c) Both (a) and (b)
 - (d) Neither (a) nor (b)
58. The elements of a flexibility matrix are
- (a) Generalised displacements
 - (b) Generalised forces
 - (c) Both (a) and (b)
 - (d) Neither (a) nor (b)
59. If the stiffness matrix of a structure is positive definite, it indicates
- (a) Unstable structure
 - (b) Stable structure
 - (c) Determinate structure
 - (d) Indeterminate structure
60. If a beam subjected to a total uniformly distributed load W is propped at the centre to neutralize the deflection, the reaction at the prop is
- (a) W
 - (b) $W/2$
 - (c) $5W/8$
 - (d) $3W/4$
61. If the depth of a simply supported rectangular beam is doubled, for the same load, the deflection at the centre will be
- (a) One-half
 - (b) One-fourth
 - (c) One-eighth
 - (d) One-sixteenth
62. The uniformity coefficient of a soil is
- (a) The ratio of D_{30} and D_{10} size
 - (b) The ratio of D_{60} and D_{10} size
 - (c) The ratio $\frac{D(30)^2}{D_{60} D_{10}}$
 - (d) Unity for a well-graded soil

63. Secondary consolidation is
- Caused by hydrodynamic lag
 - Caused by the creep
 - Large for the pressures below the preconsolidation pressure
 - Very small for highly plastic clays and organic clays.
64. Bishop's method of stability analysis
- Assumes that the horizontal forces on the vertical faces of the slices are zero
 - Assumes that the horizontal forces on the vertical faces of the slices balance each other
 - Gives the value of factor of safety which is over-estimated
 - Does not need any trials for solutions.
65. The local shear failure
- Occurs in very dense sand and stiff clay
 - Occurs in very loose sand and compressible soils
 - Occurs in cohesionless soils usually when ϕ is more than 36°
 - Load can be obtained from the Terzaghi theory by taking $c_m = \frac{2c}{3}$ and $\phi_m = \frac{2}{3}\phi$
66. The group index of a soil depends upon
- The plasticity index
 - The plastic limit
 - The portion passing US sieve.no.8
 - All (a), (b) and (c)
67. A triaxial compression test in which drainage is permitted in the consolidation stage, but no drainage is permitted in the shearing stage and the pore water pressure measurements are also taken, is known as
- U-U test
 - C-D test
 - C-Utest
 - C-U test
68. The compression index (C_α)
- Has the dimension (L^2/F)
 - Is dimensionless

- (c) Is the same as coefficient of volume change
 - (d) Is the same as coefficient of compressibility
69. The theoretical consolidation curve between T_v and the degree of consolidation is a straight line upto
- (a) 30 percent U
 - (b) 40 percent U
 - (c) 50 percent U
 - (d) 60 percent U
70. The Stoke law
- (a) Can be used to analyse particles even smaller than 0.0002 mm equivalent diameter
 - (b) Can be used to analyse particles greater than 0.2 mm equivalent diameter
 - (c) Gives the diameter of a hypothetical sphere which will settle at the same terminal velocity
 - (d) Always gives the same size of the particles as that by the mechanical analysis.
71. Quick sand
- (a) Is a type of sand
 - (b) Is a condition wherein cohesionless soil loses its strength because of upward flow of water
 - (c) Condition does not depend upon the permeability
 - (d) Tends to suck into it the persons standing on it.
72. Standard Proctor test is used for determining
- (a) Optimum water content of soils
 - (b) Void ratio for fine silts
 - (c) Both (a) and (b) above
 - (d) None of the above.
73. If the amount of tensile steel in a beam is very small
- (a) Bond failure will occur
 - (b) Shear failure will occur
 - (c) Gradual failure will occur
 - (d) Sudden failure will occur.
74. The ratio of the moment of inertia of a circular body about x-axis to that about y-axis is
- (a) $\frac{1}{2}$
 - (b) 1
 - (c) 2

- (d) Zero.
75. The bearing capacity of hard rock (granite) is of the order of
- (a) 1 kg/cm²
 - (b) 5 kg/cm²
 - (c) 30 to 35 kg/cm²
 - (d) 70 to 140 kg/cm²
76. Absolute humidity in air
- (a) Remains constant at all altitudes
 - (b) Increases at higher altitude
 - (c) Decreases at higher altitude
 - (d) None of the above
77. The time corresponding to minimum total project cost is
- (a) Crash time
 - (b) Normal time
 - (c) Optimistic time
 - (d) Standard time
78. In a laminar flow through a circular pipe of diameter 200 mm, the maximum velocity is 1 m/sec. The velocity at a radial distance of 50 mm from the axis of the pipe will be
- (a) 1.0 m/s
 - (b) 0.25 m/s
 - (c) 0.75 m/s
 - (d) 0.1 m/s
79. Lining of irrigation channels
- (a) increases the water logging area
 - (b) decreases the water logging area
 - (c) Does not change the water logging area
 - (d) None of the above
80. The effect of decreasing diameter of sewer on self cleansing velocity is
- (a) To decrease the velocity
 - (b) To increase the velocity
 - (c) Sometimes decreases and sometimes increases
 - (d) No effect
81. Growing vegetation in the case of False Colour Composite Image will be seen as characteristics
- (a) Bluish red colour
 - (b) Red colour

- (c) Green colour
(d) Pink colour
82. When two roads with two lane, two way traffic, cross at an uncontrolled intersection, the total number of potential major conflict points will be
- (a) 4
(b) 16
(c) 32
(d) 64
83. The sleepers resting directly on the girder are fastened to the top flange of the girder by
- (a) Hook bolts
(b) Dog spikes
(c) Rail screws
(d) Nuts
84. Minimum value of throw of switch for broad gauge track is
- (a) 89 mm
(b) 95mm
(c) 100 mm
(d) 115 mm
85. A speaks truth in 60% cases and B in 70% cases. In what percentage of cases are they likely to contradict each other in stating the same fact?
- (a) 18%
(b) 28%
(c) 46%
(d) 40%
86. Find the chance that a leap year selected at random will contain 53 days.
- (a) $1/7$
(b) $3/7$
(c) $6/7$
(d) $2/7$
87. Let h be the finite difference, then forward difference operator is defined by
- (a) $f(x)=f(x+h)-f(x)$
(b) $f(x)=f(x-h)-f(x)$
(c) $f(x)=f(x*h)$
(d) $f(x)=f(x)$

88. If the value of derivative is required near the middle of the table, we use

- (a) Newton Forward Interpolation Formula
- (b) Newton Forward difference Formula
- (c) Central Difference Formula
- (d) Lanrange's Interpolation Formula

89. A matrix whose transpose is same as the original matrix is known as

- (a) Symmetric matrix
- (b) Skew symmetric matrix
- (c) Column matrix
- (d) None of the above

90. What type of noise can be abated by providing lining on walls and ceiling with sound absorbing material?

- (a) Source noise
- (b) Reflection Noise
- (c) Structural noise
- (d) Direct air borne noise

91. The detention period adopted for sewage sedimentation tanks is of the order of

- (a) 1-2 hours
- (b) 4-8 hours
- (c) 8-16 hours
- (d) 24-36 hours

92. The method of refuse disposal , involving burial in trenches is called

- (a) Incineration
- (b) Pulverisation
- (c) Compositing
- (d) None of the above

93. The secondary air pollutant among the following is

- (a) Sulphur dioxide
- (b) Methane
- (c) Carbon monoxide
- (d) Peroxy acetyl nitrate(PAN)

94. Ringlemann's scale is used to

- (a) Measure carbon oxide
- (b) Measure carbon monoxide
- (c) Grade density of smoke
- (d) Grade automobile exhaust gas

95. Water having pH less than seven is

- (a) Acidic
- (b) Neutral
- (c) Basic
- (d) None of the above

96. A floating body is said to be in a state of stable equilibrium
- (a) When its metacentric height is zero
 - (b) When the metacentre is above the centre of gravity
 - (c) When the metacentre is below the centre of gravity
 - (d) Only when its centre of gravity is below its centre of buoyancy
97. If the R.L. of a B.M. is 100.00m, the back sight is 1.215 m and the fore sight is 1.870 m, the R.L. of the forward station is
- (a) 99.345
 - (b) 100.345
 - (c) 100.655
 - (d) 101.870
98. If the intercept on a vertical staff is observed as 0.75 m from a tacheometer, the horizontal distance between tacheometer and staff station is
- (a) 7.5 m
 - (b) 25 m
 - (c) 50 m
 - (d) 75 m
99. The age of a tree can be known by examining
- (a) Cambium layer
 - (b) Annular rings
 - (c) Medullary rings
 - (d) Heart wood
100. The value of Vee-Bee time for workability as per Indian standards is prescribed as
- (a) 2 – 5 seconds
 - (b) 5 – 10 seconds
 - (c) 10 – 20 seconds
 - (d) 20 – 30 seconds