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M.Phil./Ph.D. Entrance Examination, September - 2022**CIVIL ENGINEERING****Sub. Code: 58746****Day and Date : Thursday, 22- 09 - 2022****Total Marks : 100****Time : 10.00 a.m. to 12.00 noon.**

- Instructions :**
- 1) All questions are compulsory.
 - 2) Each question carries 2 mark.
 - 3) Answers should be marked in the given OMR answer sheet by darkening the appropriate option.
 - 4) Use black ball point pen only for marking the circle. Do not make any stray mark on the OMR Answer Sheet.
 - 5) Follow the instructions given on OMR Sheet.
 - 6) Rough work shall be done on the sheet provided at the end of question paper.
 - 7) Only non-programmable calculators are allowed.

SECTION I : RESEARCH METHODOLOGY

- 1) With reference to sampling, population refers to
 - A) total number of residents in the study area
 - B) total population of the town
 - C) total number of elements available for a study
 - D) none of the given options

- 2) A methodological plan to obtain sample from the complete population is called
 - A) Research design
 - B) Sampling design
 - C) Sampling Frame
 - D) Sampling procedure

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- 3) the type of sampling in which the entire universe is divided into groups and some groups are randomly selected in the sample is called
 - A) Quota Sampling
 - B) Group Sampling
 - C) Cluster Sampling
 - D) Systematic Sampling
- 4) The data collected from the internet is called
 - A) Primary data
 - B) Ordinal data
 - C) Ratio data
 - D) Secondary data
- 5) Collecting data from consumer panels is an example of
 - A) Observation method
 - B) Interview method
 - C) Socio-metric method
 - D) Schedule method
- 6) Studying the work group is the example of which method?
 - A) Observation Method
 - B) Interview Method
 - C) Questionnaire Method
 - D) Sociometric Method
- 7) The type of data that does not share any property of ordinary arithmetic is
 - A) Nominal Data
 - B) Ordinal Data
 - C) Interval Data
 - D) Ratio Data
- 8) Which of the following is not a type of measurement scales?
 - A) Nominal Scale
 - B) Ordinal Scale
 - C) Ratio Scale
 - D) Differential Scale

- 9) The type of validity that takes care of adequate coverage of measurement and scaling techniques is
 - A) Content Validity
 - B) Criterion-related validity
 - C) Construct validity
 - D) Test-Retest validity
- 10) The type of rating scale in which different items are shown on a number line is
 - A) Itemized rating scale
 - B) Graphic rating scale
 - C) Number rating scale
 - D) Panel scale
- 11) The part of design that deals with conditions of observation is called
 - A) Sampling design
 - B) Observational design
 - C) Statistical design
 - D) Operational design
- 12) The part of design that deals with the way of obtaining and analyzing observation is called
 - A) Sampling design
 - B) Observational design
 - C) Statistical design
 - D) Operational design
- 13) Research design for exploratory study should be
 - A) Rigid
 - B) Flexible
 - C) Neutral
 - D) Indifferent
- 14) Research design for diagnostic study should be
 - A) Rigid
 - B) Flexible
 - C) Neutral
 - D) Indifferent

- 15) The principle according to which an experiment should be repeated more than one for accuracy is
- A) principle of local control
 - B) principle of randomization
 - C) principle of replication
 - D) principle of multiplication
- 16) The principle according to which all variations caused by extraneous variables considered is
- A) principle of local control
 - B) principle of randomization
 - C) principle of replication
 - D) principle of multiplication
- 17) _____ detects a cause or an effect by checking the occurrence or absence of variables in events.
- A) method of agreement
 - B) method of difference
 - C) method of residues
 - D) none of the given options
- 18) _____ detects a cause or an effect by deducing known part from any phenomenon.
- A) method of agreement
 - B) method of difference
 - C) method of residues
 - D) none of the given options
- 19) _____ detects the causal connection between two variables.
- A) method of agreement
 - B) method of difference
 - C) method of residues
 - D) none of the given options

- 20) _____ refers to those independent variables which are not directly related to research study yet they may affect dependent variables.
 - A) Control variables
 - B) Extraneous variables
 - C) Blocking variables
 - D) none of the given option
- 21) Sample is a _____ of population, related to research study yet they may affect dependent variables.
 - A) Superset
 - B) Subset
 - C) Union
 - D) Intersection
- 22) Convenience sampling is a type of.
 - A) Non-Probability Sampling
 - B) Probability Sampling
 - C) Purposive Sampling
 - D) Judgement Sampling
- 23) Sampling errors can be reduced by
 - A) Proper division of sampling units
 - B) Proper measuring device
 - C) Increasing sample size
 - D) Proper sampling frame
- 24) Quota sampling refers to
 - A) the sampling method in which the population is first divided into mutually non- overlapping subgroups
 - B) a non-probability sampling technique in which elements from the universe are selected because of their easy accessibility to the researcher
 - C) the method in which there is no proportionate allocation of elements in the sample
 - D) the non-probability sampling technique in which the researcher selects the sample on the basis of sound judgement

- 25) Questions having predefined/fixed responses in a questionnaire are called_____.
- A) Open Ended Questions B) Close Ended Questions
C) Dichotomous Questions D) Rank Order Questions

SECTION II: CIVIL ENGINEERING

- 26) For laminar flow in a pipe carrying a given discharge, the height of surface, roughness is doubled In such a case, Darcy-Weisbatch friction factor will
- A) Remains unchanged B) Be halved
C) Be doubled D) Increase fourfold
- 27) If the velocity profile in laminar flow is parabolic, then the shear test profile must be
- A) a hyperbola B) a parabola
C) a straight line D) an ellipse
- 28) The terminal velocity of a small sphere setting in a viscous fluid varies as the
- A) Increase square of the diameter
B) Increase of the diameter
C) First power of diameter
D) Increase of the fluid viscosity
- 29) Two reservoirs at different level are connected by two parallel pipes of diameter '2n' & 'd'. The ratio of the flow in the two pipes is
- A) $\sqrt{2}:1$ B) 2:1
C) 4:1 D) $4\sqrt{2}:1$

- 30) Sonoscope is used for which one of the following?
- A) Checking the accuracy of water meters
 - B) Regulating the fire hydrants
 - C) As a replacement of venturimeter for discharge measurement
 - D) Detection of leakage in underground water mains
- 31) As recommended by Sichardt, the radius of influence is
- A) Inversely proportional to drawdown
 - B) Linearly proportional to drawdown
 - C) Independently of drawdown
 - D) Proportional to square root of drawdown
- 32) Electrical conductivity (EC) of water and total dissolved solids (TDS) are interrelated. The value of EC will
- A) Decrease with increase in TDS
 - B) Increase with increase in TDS
 - C) Decrease initially and then increase with increase in TDS
 - D) Increase initially and then decrease with increase in TDS
- 33) The predominating mineral responsible for shrinkage and swelling in black cotton soils is
- | | |
|-----------|--------------------|
| A) Illite | B) Kaolinite |
| C) Mica | D) Montmorillonite |

- 34) The installation of sand drains in clayey soils causes the soils adjacent to the sand drains to undergo which one of the following?
- A) Increase in porosity
 - B) Increase in compressibility
 - C) Decrease in horizontal permeability
 - D) Decrease in shear strength
- 35) In a closed traverse, the sum of south latitudes exceeds the sum of north latitudes and the sum of east departures exceeds the sum of west departures. The closing line will be in the
- A) N-W quadrant
 - B) N-E quadrant
 - C) S-E quadrant
 - D) S-W quadrant
- 36) Snowcem is
- A) Coloured cement
 - B) Powered lime
 - C) Chalk powder
 - D) Mixture of chalk powder and lime
- 37) An aggregate is said to be flaky if its dimension is less than
- A) $1/5^{\text{th}}$ of mean dimension
 - B) $2/5^{\text{th}}$ of mean dimension
 - C) $3/5^{\text{th}}$ of mean dimension
 - D) $4/5^{\text{th}}$ of mean dimension

- 38) Poisson's ratio for concrete
- A) Increase with richer mix
 - B) Decrease with richer mix
 - C) Remains constant
 - D) None of these
- 39) Strength based classification of brick is made on the basis of
- A) IS:3101
 - B) IS:3102
 - C) IS:3495
 - D) IS:3496
- 40) The book value of a property in a particular year is the:
- A) Value at the end of utility period
 - B) Market value
 - C) Original cost minus the amount of depreciation till date
 - D) Original cost minus the amount of depreciation up to the previous year
- 41) The specimen in a Charpy impact test is supported as a:
- A) Cantilever beam
 - B) Simply supported beam
 - C) Fixed beam
 - D) Continuous beam
- 42) What will be the relation between E (Young's modulus of elasticity) and K (bulk modulus), when Poisson's ratio is 0.25?
- A) $E=K$
 - B) $E=2K$
 - C) $E=1.5K$
 - D) $E=K=0$

- 43) A cantilever beam of span L is subjected to clockwise moment of M at the free end. The shear force at any point on the beam is
- A) M/L^2 B) Zero
C) M/L D) $2M/L$
- 44) The ratio of flexural rigidity of a beam ($b \times d$) to another one ($b \times 2d$) of similar material will be
- A) $1/2$ B) $1/4$
C) $1/8$ D) $1/18$
- 45) A continuous beam ABC with the span $AB = BC = L$. Support A is fixed type. And supports B and C are roller type. The kinematic indeterminacy of the beam is
- A) 3 B) 4
C) 5 D) 2
- 46) Which of the following statement is true?
- I) If a truss consists of non-triangular element, then it will essentially be unstable
- II) In the above cases, instability is the most probable occurrence, but there are a lot of examples which are stable
- A) Only I B) Only II
C) Both I and II D) None of these

- 47) According to Whitney's theory the maximum depth of concrete stress block in a balanced RCC beam section of depth 'd' is
- A) 0.46 d B) 0.48 d
C) 0.5 d D) 0.537 d
- 48) Torsion resisting capacity of a given reinforced concrete section
- A) Decrease with decrease in stirrup spacing
B) Decreases with increase in longitudinal bars
C) Does not depend upon stirrup and longitudinal steels
D) Increase with increase in stirrups and longitudinal steels
- 49) If "p" and "d" are pitch and gross diameter of rivets respectively, the efficiency (η) of the riveted joint, is given by,
- A) $\eta = p/(p-d)$ B) $\eta = (p-d)/p$
C) $\eta = p/(p+d)$ D) $\eta = (p+d)/p$
- 50) In earthquake resistant design, response reduction factor (R) for steel special moment resisting frame (SM F) design as per IS 800:2007 is;
- A) 1.5 B) 2.5
C) 5.0 D) 1.0



Rough Work