

Seat No.	
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M.Phil/Ph.D. Entrance Examination, August - 2018
CIVIL ENGINEERING

Day and Date : Friday, 10 - 08 - 2018

Total Marks : 100

Time : 10.00 a.m. to 12.00 noon

- Instructions :**
- 1) All questions are compulsory.
 - 2) Each question carries 2 marks.
 - 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.

1. Second step in problem formulation is

- A) Statement of the problem
- B) Understanding the nature of the problem
- C) Survey
- D) Discussions

2. Last step in problem formulation is

- A) Survey
- B) Discussion
- C) Literature survey
- D) Re Phrasing the Research problem

3. Which of the following is true of resistant statistics?
- A) Inappropriate for statistical analysis
 - B) Corrupted with measurement bias
 - C) Based on nominal scales
 - D) Able to resist influence of extreme values
4. Which quartile value(s) are likely to be most different between bell-shaped and highly skewed distributions?
- A) The first or third quartile, depending on the skewing
 - B) The second quartile or mean
 - C) All quartiles
 - D) The fourth quartile
5. Which ONE of these is the best description of secondary data?
- A) Ordinary data
 - B) Existing data
 - C) Omnibus data
 - D) Ordinal data
6. Which research refers to scientific study and research that seeks to solve practical problems
- A) Basic research
 - B) Applied research
 - C) Exploratory research
 - D) None of these
7. Method in which researcher uses more than one quantitative data collection technique
- A) Multi method qualitative design
 - B) Mono method quantitative design
 - C) Multi method quantitative design
 - D) Mono method qualitative design

8. Method in which researcher uses more than one qualitative data collection technique
- A) Multi method qualitative designs
 - B) Mixed methods design
 - C) Multi method quantitative designs
 - D) None of these
9. _____ is the classical form of research?
- A) Experiment
 - B) Case study
 - C) Grounded theory
 - D) Narrative inquiry
10. Hypothesis refers to :
- A) The outcome of an experiment
 - B) A conclusion drawn from an experiment
 - C) A form of bias in which the subject tries to outguess the experimenter
 - D) A tentative statement about the relationship
11. _____ presents a problem, discusses related research efforts, outlines the data needed for solving the data and shows the design used to gather and analyze the data.
- A) Research Question
 - B) Research Proposal
 - C) Research Design
 - D) Research Methodology
12. Data that is created, recorded or generated by an entity other than the researcher's organisation is collectively called
- A) Primary data
 - B) Secondary data
 - C) Internal data
 - D) External data

- 13.** The quality of a research to produce almost identical results in successive repeated trials reflects it's
- A) Reliability
 - B) Validity
 - C) Accuracy
 - D) Originality
- 14.** When planning your literature search you need to :
- A) Have clearly defined research questions and objectives
 - B) Define the parameters of your search
 - C) Generate key words and search terms
 - D) All the above
- 15.** The first step in the research process is the :
- A) Development of the research plan
 - B) Survey of stakeholders to determine if problems exist
 - C) Collection of the available sources for needed information
 - D) Definition of the problem and research objectives
- 16.** Mean, Median and Mode are :
- A) Measures of deviation
 - B) Ways of sampling
 - C) Measures of control tendency
 - D) None of the above
- 17.** Research is
- A) Searching 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

- 18.** Which of the following variables cannot be expressed in quantitative terms?
- A) Socio-economic Status B) Marital Status
C) Numerical Aptitude D) Professional Attitude
- 19.** A research paper is a brief report of research work based on
- A) Primary Data only
B) Secondary Data only
C) Both Primary and Secondary Data
D) None of the above
- 20.** How many variables are tested at one time in a controlled experiment?
- A) Three B) Two
C) Four D) One
- 21.** The proposal's literature review is important because :
- A) The tutor insists upon it
B) It shows that you are knowledgeable about the literature that relates to research topic
C) It looks authoritative
D) It is expected by the University
- 22.** Good research proposals will always :
- A) Consider all possible research that had previously been done on the topic
B) Focus on addressing the research objectives
C) Provide respondent names and addresses
D) Focus on the Harvard style

23. Which word fills all the blanks in this extract :

We talk about generating _____, testing _____, rejecting _____.

- A) Aims
- B) Questions
- C) Objectives
- D) Hypothese

24. What is the main advantage of producing a written research proposal?

- A) Helps the institution
- B) Informs all interested parties
- C) Helps keep people employed
- D) Helps with credibility

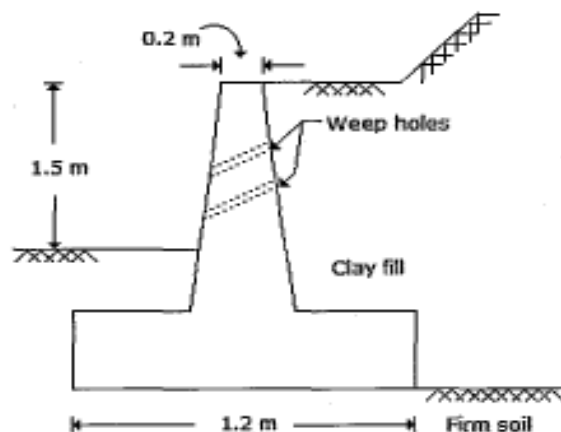
25. “Empirically verifiable observation” is

- A) Theory
- B) Value
- C) Fact
- D) Statement

26. The number of simultaneous equations to be solved in the slope deflection method, is equal to :

- A) the degree of statical indeterminacy
- B) the degree of kinematic indeterminacy
- C) the number of joints in the structure
- D) none of the above

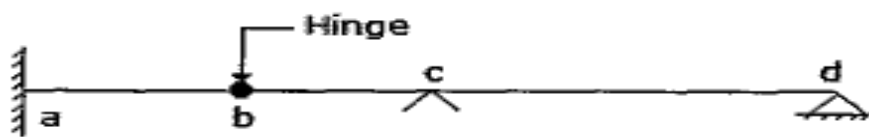
27. The wall shown in the below figure has failed. The cause of failure or the error made in the design of the failed wall is :



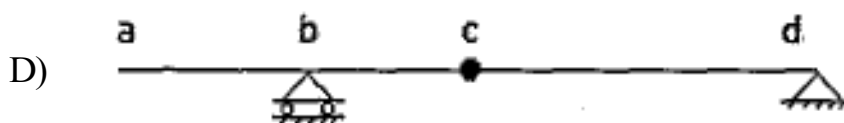
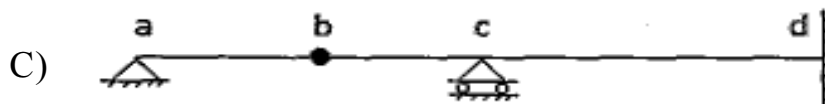
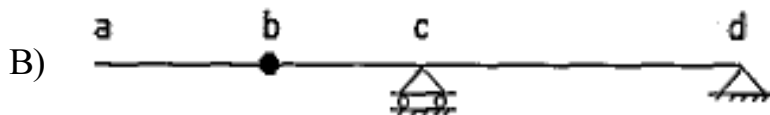
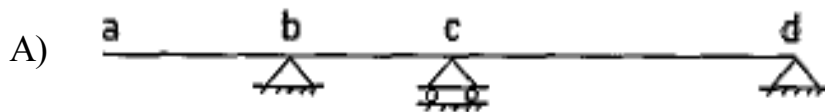
28. The span to depth ratio limit is specified in IS: 456-1978 for the reinforced concrete beams, in order to ensure that the

- A) tensile crack width is below a limit
- B) shear failure is avoided
- C) stress in the tension reinforcement is less than the allowable value
- D) deflection of the beam is below a limiting value

29. A two span beam with an internal hinge is shown below.



The conjugate beam corresponding to this beam is

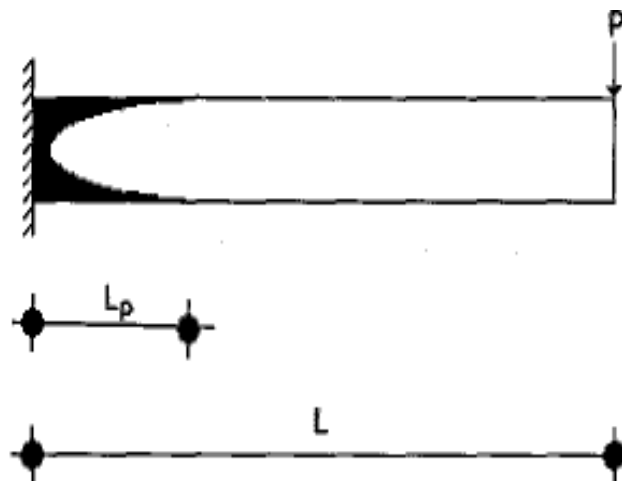


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30. IS 459-1978 recommends to provide certain minimum steel in a RCC beam
- A) to ensure compression failure
 - B) to avoid rupture of steel in case a flexural failure occurs
 - C) to hold the stirrup steel in position
 - D) to provide enough ductility to the beam
31. A hydraulic turbine has a discharge of $5 \text{ m}^3/\text{s}$, when operating under a head of 20 m with a speed of 500 rpm. If it is to operate under a head of 15 m, for the same discharge, the rotational speed in rpm will approximately be
- A) 433
 - B) 403
 - C) 627
 - D) 388
32. The ruling minimum radius of horizontal curve of a national highway in plain terrain for ruling design speed of 100 km/hour with $e = 0.07$ and $f = 0.15$ is close to
- A) 250 m
 - B) 360 m
 - C) 36 m
 - D) 300 m
33. Principle involved in the relationship between submerged unit weight and saturated weight of a soil is based on
- A) Equilibrium of floating bodies
 - B) Archimede's principle
 - C) Stoke's law
 - D) Darcy's law

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34. X -component of velocity in a 2- D incompressible flow is given by $u = y^2 + 4xy$. If Y -component of velocity ' v ' equals zero at $y = 0$, the expression for ' v ' is given by
- A) $4y$
 - B) $2y^2$
 - C) $-2y^2$
 - D) $2xy$
35. Consolidation in soils
- A) is a function of the effective stress
 - B) does not depend on the present stress
 - C) is a function of the pore water pressure
 - D) is a function of the total stress
36. A cantilever beam of length L and a cross section with shape factor f supports a concentrated load P as shown below



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The length L_p of the plastic zone, when the maximum bending moment equals the plastic moment M_p , given by

- A) $\frac{L_p}{L} = \frac{1}{f}$
- B) $\frac{L_p}{L} = L(1 - f)$
- C) $\frac{L_p}{L} = 1 - \frac{1}{\sqrt{f}}$
- D) $\frac{L_p}{L} = 1 - \frac{1}{f}$

37. The minimum area of tension reinforcement in a beam shall be greater than

- A) $0.85 bd/f_y$
- B) $0.87 f_y /bd$
- C) $0.04 bd$
- D) $0.4 bd/y$

38. In an iceberg, 15% of the volume projects above the sea surface. If the specific weight of sea water is 10.5 kN/m^3 , the specific weight of iceberg in kN/m^3 is

- A) 12.52
- B) 9.81
- C) 8.93
- D) 7.83

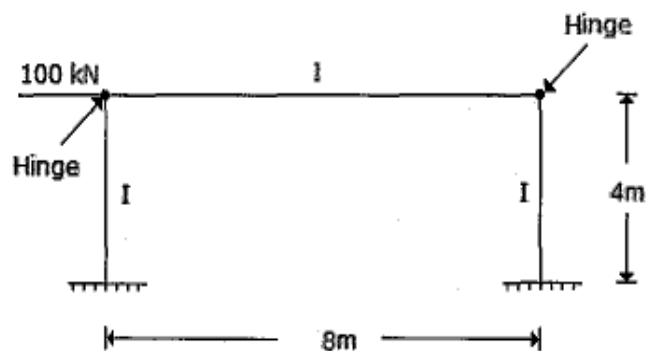
- 39.** A steady discharge of 1 cumec flows uniformly in a rectangular channel 1 m wide at a depth of 250 mm. The slope of the channel bed is :
- A) Adverse
 - B) Steep
 - C) Critical
 - D) Mild
- 40.** Flexible pavements derive stability primarily from :
- A) aggregate interlock, particle friction and cohesion
 - B) cohesion alone
 - C) the binding power of bituminous materials
 - D) the flexural strength of the surface course
- 41.** The permissible bending tensile stress in concrete for the vertical wall of an R.C. water tank made of M 25 concrete is :
- A) 8.5 N/mm^2
 - B) 6.0 N/mm^3
 - C) 2.5 N/mm^2
 - D). 1.8 N/mm^2
- 42.** The cylinder strength of the concrete is less than the cube strength because of
- A) the difference in the shape of the cross section of the specimens
 - B) the difference in the slenderness ratio of the specimens
 - C) the friction between the concrete specimens and the steel plate of the testing machine
 - D) the cubes are tested without capping but the cylinders are tested with capping

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43. A water treatment plant is required to process $28800 \text{ m}^3/\text{d}$ of raw water (density = 1000 kg/m^3 , kinematic viscosity = $10^{-6} \text{ m}^2/\text{s}$). The rapid mixing tank imparts tank a velocity gradient of 900 s^{-1} to blend 35 mg/l of alum with the flow for a detention time of 2 minutes.

The power input (W) required for rapid mixing is

- A) 32.4
 - B) 36
 - C) 324
 - D) 32400
44. A single rapid test to determine the pollution status of river water is :
- A) biochemical oxygen demand
 - B) chemical oxygen demand
 - C) total organic solids
 - D) dissolved oxygen
45. For the frame shown in the below figure, the maximum bending moment in the column is,



- A) zero
 - B) 400 kNm
 - C) 100 kNm
 - D) 200 kNm
- 46.** The drop manholes are provided in a sewerage system when there is
- A) change in alignment of sewer line
 - B) change in size of sewers
 - C) change in the elevation of ground level
 - D) change from gravity system to pressure system
- 47.** The reaction time for calculation of stopping distance may be assumed as
- A) 5 secs
 - B) 2.5 secs
 - C) 0.5 secs
 - D) 10.0 secs
- 48.** The microbial quality of treated piped water supplies is monitored by
- A) Microscopic examination
 - B) Plate count of heterotrophic bacteria
 - C) Coliform MPN test
 - D) Identification of all pathogens

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49. The 5-day BOD of a wastewater sample is obtained as 190 mg/l (with $k = 0.01 \text{ h}^{-1}$). The ultimate oxygen demand (mg/l) of the sample will be
- A) 3800
 - B) 475
 - C) 271
 - D) 190
50. A tube well having a capacity of $4\text{m}^3/\text{hour}$ operates for 20 hours each day during the irrigation season. How much area can be commanded if the irrigation interval is 20 days and depth of irrigation is 7 cm?
- A) $1.71 \times 10^4 \text{ m}^2$
 - B) $1.14 \times 10^4 \text{ m}^2$
 - C) $22.9 \times 10^4 \text{ m}^2$
 - D) $2.29 \times 10^4 \text{ m}^2$



Rough Work

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