



Booklet Series



22/AE/CM/M-2024-06

Question Booklet
CIVIL ENGINEERING – II
Paper – VI

Booklet Serial No.

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Candidate's Roll Number

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Time Allowed : 01 Hour

Maximum Marks : 100

Read the following instructions carefully before you begin to answer the questions.

IMPORTANT INSTRUCTIONS

1. This Question Booklet contains **50** questions in all.
2. All questions carry equal marks.
3. Attempt **all** questions.
4. An Answer Sheet has been supplied inside the question booklet to mark the answers. **You must write your Roll Number and encode it and write other particulars in the space provided in the Answer Sheet, failing which your Answer Sheet will not be evaluated.**
5. **Immediately after commencement of the examination, you should check up your Question Booklet and attached answer sheet and ensure that the Question Booklet Series is printed on the top left-hand corner of the Booklet and the series encoded in answer sheet are same. Also please check that the Booklet contains 12 printed pages including 2 pages (Page Nos. 11 and 12) for Rough Work and no page or question is missing or unprinted or torn or repeated or question booklet and answer sheet have different series. If you find any defect in this Booklet and attached answer sheet, get it replaced immediately by a complete Booklet with OMR sheet of the same series.**
6. You must write your Roll Number in the space provided on the top of this page. Do not write anything else on the Question Booklet.
7. Questions and their responses are printed in English version in this Booklet. Each question comprises of **four** responses — (A), (B), (C) and (D). You are to select **ONLY ONE** correct response and mark it in your Answer Sheet. In case you feel that there are more than one correct response, mark the response which you consider the best. In any case, choose **ONLY ONE** response for each question. Your total marks will depend on the number of correct responses marked by you in the Answer Sheet.
8. In the Answer Sheet, there are **four** circles — (A), (B), (C) and (D) against each question. To answer the questions, you are to mark with **Black/Blue ink ballpoint pen ONLY ONE circle** of your choice for each question. Select only one response for each question and mark it in your Answer Sheet. If you mark more than one circle for one question, the answer will be treated as wrong. **Use Black/Blue ink ballpoint pen only to mark the answer in the Answer Sheet. Any erasure or change is not allowed.**
9. You should not remove or tear off any sheet from the Question Booklet. You are not allowed to take this Question Booklet and the Answer Sheet out of the Examination Hall during the examination. **After the examination has concluded, you must hand over your Answer Sheet to the Invigilator.** Thereafter, you are permitted to take away the Question Booklet with you.
10. Failure to comply with any of the above instructions will render you liable to such action or penalty as the Commission may decide at their discretion.
11. Candidates must assure before leaving the Examination Hall that their Answer Sheets will be kept in Self Adhesive LDPE Bag and completely packed/sealed in their presence.



1. When the hydraulic jump is in a moving form it is called



- (A) Positive surge
- (B) Turbulent surge
- (C) Accelerated surge
- (D) Negative surge

2. The interface treatment provided to plug in the voids of porous surfaces and to bond loose particles in bituminous pavements is called

- (A) Seal coat
- (B) Prime coat
- (C) Surface dressing
- (D) Tack coat

3. Which of the following is *not* a classification of traps based on their shape ?



- (A) Q-trap
- (B) S-trap
- (C) W-trap
- (D) P-trap

4. As per IRC 37, the maximum volume of traffic (in a vehicle per hour) entering from all legs of the rotary intersection can be handled efficiently is



- (A) 2000
- (B) 3000
- (C) 5000
- (D) 1000

5. What is the name of the wingwall if the angle of splay 90° ?

- (A) Return
- (B) Straight
- (C) Tee abutment
- (D) Splayed

6. In designing Imhoff tanks, the usual retention period is



- (A) 8 hours
- (B) 14 hours
- (C) 20 hours
- (D) 2 hours



7. A fall is constructed to



- (A) Destroy the surplus energy
- (B) Overcome surplus energy
- (C) Maintain surplus energy
- (D) Create surplus energy

8. In deriving the equation for the hydraulic jump in a rectangular channel in terms of conjugate depths and initial Froude number

- (A) Only continuity equation is used
- (B) Continuity and momentum equations are used
- (C) Energy, momentum and continuity equations are used
- (D) Energy and continuity equations are used



9. The highest CBR number is required for

- (A) Sub grade
- (B) Sub base
- (C) Base
- (D) Pavement

10. A direct runoff hydrograph due to a storm idealized into a triangular shape has a peak flow rate of $60 \text{ m}^3/\text{s}$ occurring at 25 hours from its start. If the base width of this hydrograph is 72 hours, and the catchment area is 777.6 km^2 , the runoff from the storm is



- (A) 2 cm
- (B) 5 cm
- (C) 10 cm
- (D) 1 cm

11. Which of the following statement is true about hydroelectric power plant ?

- (A) Due to non-uniform flow of water frequency control in such plants is very difficult
- (B) Hydroelectric power plant has high running cost
- (C) Water is used as fuel in hydroelectric power plant
- (D) Hydroelectric power plants are multipurpose





12. A watershed got transformed from rural to urban over a period of time.



The effect of urbanization on storm runoff hydrograph from the watershed is to

- (A) Increase the time to peak discharge
- (B) Decrease the time base
- (C) Decrease the peak discharge
- (D) Decrease the volume of runoff

13. For a given specific energy E , the



critical depth y_c for a rectangular channel is given by

- (A) $y_c = 2/3E$
- (B) $y_c = 4/5E$
- (C) $y_c = 3/4E$
- (D) $y_c = 3/2E$

14. The maximum thickness of expansion joint in rigid pavements is



- (A) 25 mm
- (B) 50 mm
- (C) 100 mm
- (D) Zero

15. Which of the following method is widely used in India for the computation of consumptive use ?

- (A) Tanks and Lysimeter
- (B) Blaney – Criddle equation
- (C) Penman's equation
- (D) None of the above

16. For roughing type trickling filters what would be the BOD removal rate ?



- (A) 60 – 90%
- (B) 80 – 90%
- (C) 40 – 70%
- (D) 50 – 80%



17. In trapezoidal weir, sides are inclined outward with a slope of



- (A) 1 : 5
- (B) 1 : 6
- (C) 1 : 3
- (D) 1 : 4

18. When did spread foundation is adopted for bridges ?

- (A) Depth of water is more
- (B) Good soil is not available at shallow depth
- (C) Tension developed is more
- (D) Good soil is available at shallow depth

19. Which of the following is a method used to estimate potential evapotranspiration ?



- (A) Manning's equation
- (B) Chezy's equation
- (C) Thornthwaite equation
- (D) Hazen-Williams equation

20. Soak pit shall **not** be less than



- (A) 90 cm
- (B) 50 cm
- (C) 100 cm
- (D) 45 cm

21. Which of the following zone in zoned type embankment prevents piping through cracks ?



- (A) Transition zone
- (B) Outer zone
- (C) Core wall
- (D) Central core

22. The relation between Transmissibility (T) and Permeability (K) for an aquifer of depth d is

- (A) $T = K.d$
- (B) $T = K.\log d$
- (C) $T = \ln (Kd)$
- (D) $K = T.d$



23. The basic mechanism behind the phenomenon of sediment transport is



- (A) Drag force in the direction of the flow
- (B) Free motion of the sediment particles
- (C) Force exerted by water vertically
- (D) Drag force opposite to the direction of the flow

24. Which of the following test measures the toughness of road aggregates ?

- (A) Abrasion test
- (B) Crushing test
- (C) Shape test
- (D) Impact test

25. What is the purpose of a Travel Time and Delay Study ?



- (A) For survey data
- (B) To assess the quality of traffic movement
- (C) To assess the time taken to travel by various vehicles
- (D) To evaluate the traffic stream

26. Which of the following method is used to forecast the population of old and very large city ?

- (A) Geometric progression method
- (B) Graphical method
- (C) Logistic curve method
- (D) Arithmetical increase method



27. Most efficient channel section is

- (A) Triangular
- (B) Rectangular
- (C) Semicircular
- (D) Half hexagon in the form of trapezoid

28. Which of the following is false about rapid gravity type filters used for water purification ?



- (A) Operational cost is high
- (B) Depreciation of plant is high
- (C) Coagulation is not essential
- (D) Skilled supervision is essential



29. An irrigation project is classified as a major project when the Culturable Command Area (CCA) involved in the project is more than



- (A) 10000 hectares
- (B) 2000 hectares
- (C) 5000 hectares
- (D) 2500 hectares

30. If the value of rate of change of specific energy is 7.79×10^{-4} m and $S_f = 0.00013$, the value of bed slope is

- (A) 1 in 1100
- (B) 1 in 1200
- (C) 1 in 1300
- (D) 1 in 1000

31. Which type of open well is suitable when the sub-soil is formed of gravel or coarse sand deposits ?



- (A) Wells with pervious lining
- (B) Wells with impervious lining
- (C) Temporary wells
- (D) Unlined wells

32. An existing flexible pavement that develops extensive cracks is called

- (A) Ravelling
- (B) Shear
- (C) Pot hole
- (D) Alligator cracks

33. What is the cross sectional shape of shallow surface drains ?



- (A) Circular
- (B) Rectangular
- (C) Trapezoidal
- (D) Triangular

34. Which has the flexibility to turn 360° with the port axis ?



- (A) Banjo connector
- (B) Elbow connector
- (C) Reducer
- (D) Plug



35. Which of the following conditions is the chief characteristic of critical flow ?



(A) $QT^2/gA^2 = 1$

(B) $Q^2R/gA^3 = 1$

(C) $Q^2T^2/gA^3 = 1$

(D) $Q^2T/gA^3 = 1$

36. Out of 120 cu m of water pumped into a canal, 80 cu m of water could be supplied to a field. 60 cu m of water was stored in the root zone while water required in root zone prior to irrigation was 80 cu m. The storage efficiency of irrigation is

(A) 66.67%

(B) 100%

(C) 50%

(D) 75%

37. The bottom portion of concrete gravity dam is usually stepped in order to



(A) Increase shear strength at base of dam

(B) Increase tension at base of dam

(C) Strengthen the foundation

(D) Increase resistance against overturning

38. Which of the following represents Dicken's formula for peak discharge

(in m^3/s) ? C_D = Dickens constant,

A = catchment area in km^2 .



(A) $Q = C_D \cdot A^{2/3}$

(B) $Q = C_D \cdot A^{1/4}$

(C) $Q = C_D \cdot A^{3/4}$

(D) $Q = C_D \cdot A^{1/3}$

39. The effect of grade on safe overtaking sight distance is

(A) To decrease it on descending grades and to increase it on ascending grades

(B) To increase it on both descending and ascending grades



(C) To decrease it on both descending and ascending grades

(D) To increase it on descending grades and to decrease it on ascending grades



40. Aeration of water is done to remove



- (A) Colour
- (B) Bacteria
- (C) Hardness
- (D) Odour

41. The hydraulic structure which controls the supply to an off-taking channel from the parent channel is

- (A) Canal fall
- (B) Cross regulator
- (C) Canal escape
- (D) Distributary head regulator

42. In distribution pipes, drain valves are provided at



- (A) Higher point
- (B) Junction points
- (C) Any where
- (D) Lower point

43. A detention basin for flood control is the one which is provided with

- (A) Uncontrolled outlet but controlled spillways
- (B) Controlled outlet but uncontrolled spillways
- (C) Controlled outlet and spillways
- (D) Uncontrolled outlet and spillways



44. Which type of bacteria is used in trickling filters ?

- (A) Nitrifying
- (B) Anaerobic
- (C) Blue-green bacteria
- (D) Facultative

45. The erosion between shoulder and pavement leads to



- (A) Break down
- (B) Edge drop
- (C) Flat drop
- (D) Drop



46. The design period for a water supply

project is taken as



- (A) 10 to 15 years
- (B) 15 to 20 years
- (C) 20 to 30 years
- (D) 5 to 10 years

47. A canal is 80 km long and has an average



surface width of 15 m. If the evaporation measured in a class A pan is 0.5 cm/day, the volume of water evaporated in a month of 30 days is (in m^3)

- (A) 18000
- (B) 180000
- (C) 126000
- (D) 12600

48. In a barrage, the crest level is kept at



- (A) High with large gates
- (B) High with no gates
- (C) Low with no gates
- (D) Low with large gates

49. What percentage camber must be provided for a CC road passing through low rainfall area ?

- (A) 2.5%
- (B) 2.0%
- (C) 1.7%
- (D) 3.0%

50. _____ in a hydro power plant is used to discharge surplus water on the downstream side of a dam.



- (A) Economizer
- (B) Penstock
- (C) Spillway
- (D) Surge tank



SPACE FOR ROUGH WORK





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