

02/AE/C/M-2019-8

Serial No.

Candidate's Roll Number

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Question Booklet Series

Question Booklet

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Paper—VI

**CIVIL ENGINEERING**

SECTION—I

Time Allowed : 1 Hour

( Objective )

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. **Immediately after commencement of the examination, you should check up your Question Booklet and ensure that the Question Booklet Series is printed on the top right-hand corner of the Booklet. The Booklet contains 7 printed pages and no page or question is missing or unprinted or torn or repeated. If you find any defect in this booklet, get it replaced immediately by a complete booklet of the same series.**
5. 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.
6. An Answer Sheet will be supplied to you separately by the Invigilator to mark the answers. **You must write your Name, Roll No. and other particulars on the first page of the Answer Sheet provided, failing which your Answer Sheet will not be evaluated.**
7. You will encode your **Roll Number** and the **Question Booklet Series A, B, C or D** as it is printed on the top right-hand corner of this Question Booklet with Black/Blue ballpoint pen in the space provided on **Page-2** of your Answer Sheet. **If you do not encode or fail to encode the correct series of your Question Booklet, your Answer Sheet will not be evaluated correctly.**
8. Questions and their responses are printed in English only in this Booklet. Each question comprises **four** responses—(A), (B), (C) and (D). You are to select **ONLY ONE** correct response and mark 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.
9. In the Answer Sheet, there are **four** brackets—(A), (B), (C) and (D) against each question. To answer the questions you are to **mark with Black/Blue ballpoint pen ONLY ONE** bracket of your choice for each question. Select one response for each question in the Question Booklet and mark in the Answer Sheet. If you mark more than one answer for one question, the answer will be treated as wrong. **Any erasure or change is not allowed.**
10. 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.
11. 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.

SEAL

1. Cross regulators are provided
- (A) to rise the water level to its upstream during the periods of low discharge in parent channel
  - (B) to help in closing the supply to downstream of the parent channel
  - (C) to absorb fluctuations in various sections of the channel systems
  - (D) All of the above
2. When the reservoir is full, the maximum compressive forces in a gravity dam is produced
- (A) at the toe
  - (B) at the heel
  - (C) within the middle third of the base
  - (D) at the centre of base
3. Sewage treatment units are normally designed for
- (A) 5-10 years
  - (B) 15-20 years
  - (C) 30-40 years
  - (D) 40-50 years
4. In water supply for public, threshold odour should be
- (A) 1
  - (B) between 1 and 3
  - (C) 3
  - (D) more than 3
5. Septic tank is a
- (A) settling tank
  - (B) digestion tank
  - (C) Both (A) and (B)
  - (D) None of the above
6. The pipe which is used to carry the discharge from sanitary fittings like bathrooms, kitchen etc. is called
- (A) waste pipe
  - (B) soil pipe
  - (C) vent pipe
  - (D) anti-siphonage pipe
7. The pipes for water supply are tested for
- (A) pressure
  - (B) leakage
  - (C) dimensions
  - (D) All of the above
8. In rapid sand filters, the depth of tank varies in between
- (A) 1 m to 2 m
  - (B) 2.5 m to 3.5 m
  - (C) 3 m to 3.5 m
  - (D) 0.6 m to 0.9 m
9. Seepage through embankment in a earth dam is controlled by
- (A) drainage filters
  - (B) drain trench
  - (C) relief wells
  - (D) provision of downstream berms

10. A chamber made of concrete, fibre glass, PVC or plastic, through which domestic waste water, sewage flows for primary treatment is called
- (A) drainage tank  
(B) septic tank  
(C) pit latrine tank †  
(D) water harvesting tank †
11. Septic tank is usually consists of brick wall in cement not less than
- (A) 20 cm  
(B) 100 cm  
 (C) 80 cm  
(D) 200 cm
12. The BOD after the filtration of sewage from the low-rate trickling filter is
- (A) 40-50%  
 (B) 80-90%  
(C) 70-80%  
(D) 90-99%
13. The organic loading in a trickling filter is measured in
- (A)  $m^3/day$   
(B)  $gm/m^2/day$   
 (C) kg/hectare-meter/day  
 (D) kg/hectare/day
14. The recirculation factor in a low-rate trickling filter is
- (A) 0 †  
 (B) 1  
(C) 10  
(D) 100
15. The diameter of a domestic sewer pipe laid at a gradient 1 in 100 is recommended as
- (A) 100 mm  
 (B) 150 mm  
(C) 210 mm  
(D) 400 mm
16. Which of the following is not a requirement for site selection of hydroelectric power plant?
- (A) Availability of water  
(B) Large catchment area  
 (C) Rocky land  
 (D) Sedimentation
17. The amount of electrical energy that can be generated by a hydroelectric power plant depends upon
- (A) head of water  
(B) quantity of water  
(C) specific weight of water  
(D) efficiency of alternator

18. Hydroelectric power plant is  
(A) non-renewable source of energy  
 (B) conventional source of energy  
(C) non-conventional source of energy  
(D) continuous source of energy
19. What type of flow can be taken for granted in a pipe of uniform cross-section?  
(A) Steady  
(B) Unsteady  
 (C) Uniform  
(D) Non-uniform
20. What is the most common medium for sediment transport?  
(A) Ice  
(B) Human  
(C) Wind  
 (D) Water
21. How many types of weirs are there based on the shape of the crest?  
(A) 6  
 (B) 4  
(C) 5  
(D) 3
22. Triangular weir is also called  
(A) trigonometric  
(B) ogee  
 (C) v-notch  
(D) isolated
23. Weirs are normally used to calculate  
(A) volume  
(B) headloss  
 (C) discharge  
(D) velocity
24. Bearings are provided in the bridges to  
(A) allow translation and rotation in bridges  
(B) transfer forces from superstructure to substructure  
(C) isolate superstructure from substructure  
 (D) All of the above
25. Which of the following loads contributes to longitudinal forces in bridges?  
(A) Dead load  
(B) Wind load  
(C) Temperature load  
 (D) Both (B) and (C)
26. Development of surges in open channel is  
(A) gradually varied flow  
 (B) rapidly varied flow  
(C) steady flow  
(D) normal flow

27. Irrigation canals are generally aligned along
- (A) contour line
  - (B) watershed
  - (C) straight line
  - (D) valley line
28. Which of the following is suitable for small discharge and high heads?
- (A) Centrifugal pump ✖
  - (B) Axial-flow pump
  - (C) Mixed-flow pump
  - (D) Reciprocating pump
29. A hyetograph is a graphical representation of
- (A) rainfall intensity and time
  - (B) rainfall depth and time
  - (C) discharge and time
  - (D) cumulative rainfall and time
30. Kirpich equation is used to determine which one of the following?
- (A) Runoff from a given rainfall
  - (B) Base time for unit hydrograph
  - (C) Time of concentration in runoff hydrograph
  - (D) None of the above
31. The top of the ground on which foundation of road rests is called
- (A) soling
  - (B) base
  - (C) Either (A) or (B)
  - (D) None of the above
32. According to IRC recommendations, absolute minimum radius of curve for safe operation for a design speed of 100 kmph is
- (A) 100 m
  - (B) 200 m
  - (C) 300 m
  - (D) 400 m
33. Critical load position in a rigid pavement design is taken as
- (A) interior loading
  - (B) edge loading
  - (C) corner loading
  - (D) interior, edge and corner loading
34. The most suitable material for highway embankments is
- (A) granular soil
  - (B) organic soil ✖
  - (C) silt
  - (D) clay

35. According to Indian standards, the number of rain gauge stations for an area of  $5200 \text{ km}^2$  in planes should be
- (A) 10  
 (B) 15  
 (C) 20  
 (D) 40
36. The maximum superelevation on hill roads should not exceed
- (A) 7%  
 (B) 8%  
 (C) 9%  
 (D) 10%
37. End of speed limit is
- (A) regulatory sign  
 (B) warning sign  
 (C) inforamatory sign  
 (D) None of the above
38. The stopping sight distance (S) of a vehicle for Indian highways is given by
- (A)  $S = 0.28V \cdot t + \frac{0.01V^2}{\eta}$   
 (B)  $S = 0.28V \cdot t + \frac{0.01\eta}{V^2}$   
 (C)  $S = 0.01V \cdot t + \frac{0.28V^2}{\eta}$   
 (D)  $S = 0.01V \cdot t + \frac{0.28\eta}{V^2}$
- Here  $V$  is the speed of vehicle,  $t$  is the brake reaction time and  $\eta$  is the efficiency of brakes.
39. The perimeter discharge ( $P-Q$ ) relation is given by the equation
- (A)  $P = 2.25Q^{1/2}$   
 (B)  $P = 2.25Q^{3/2}$   
 (C)  $P = 4.75Q^{1/2}$   
 (D)  $P = 4.75Q^{3/2}$
40.  $\Delta\psi$  between two streamlines represents
- (A) velocity  
 (B) discharge  
 (C) head  
 (D) pressure
41. A block of wood 2 m long, 2 m wide and 1 m deep is floating horizontally in water. If density of wood is  $800 \text{ kg/m}^3$ , then the volume of water displaced will be
- (A)  $3.2 \text{ m}^3$   
 (B)  $2.6 \text{ m}^3$   
 (C)  $2 \text{ m}^3$   
 (D)  $6 \text{ m}^3$
42. The rate of filtration of a slow sand filter ranges from
- (A) 10 to  $100 \text{ L/h/m}^2$   
 (B) 10 to  $200 \text{ L/h/m}^2$   
 (C) 200 to  $400 \text{ L/h/m}^2$   
 (D) 400 to  $1000 \text{ L/h/m}^2$

43. In designing Imhoff tanks, the usual retention period is  
 (A) 2 hours  
 ✓(B) 8 hours  
 (C) 14 hours  
 (D) 20 hours
44. The maximum spacing of laterals in a rapid sand filter can be  
 (A) 10 cm  
 (B) 30 cm  
 (C) 50 cm  
 (D) 100 cm
45. If  $W$  is total BOD,  $V$  is filter volume and  $F$  is recirculation factor in a trickling filter, then unit organic loading is obtained by  
 (A)  $u = \frac{WF}{V}$   
 (B)  $u = \frac{VF}{W}$   
 ✓(C)  $u = \frac{WV}{F}$   
 (D)  $u = \frac{W}{VF}$
46. In water supply pipes, wrought iron and cast iron pipes have relationship as  
 (A) life of wrought iron pipes > life of cast iron pipes  
 ✓(B) life of cast iron pipes > life of wrought iron pipes  
 (C) both life spans are equal  
 (D) life of wrought iron pipes = 2 (life of cast iron pipes)
47. When the bed level of canal is higher than the highest flood level (HFL) of discharge, then the cross discharge work is said to be  
 ✓(A) aqueduct  
 (B) super-passage  
 (C) canal syphon  
 (D) under tunnel
48. The bed of canal is lowered in case of  
 (A) syphon aqueduct  
 (B) canal syphon  
 (C) level crossing  
 ✓(D) All of the above
49. Which of the following hydraulic units is used for transmitting increased or decreased torque to the driven shaft?  
 (A) Hydraulic ram  
 (B) Hydraulic intensifier  
 ✓(C) Hydraulic torque converter  
 (D) Hydraulic accumulator
50. When the length of bodywall of a fall is less than the normal width of a canal, it is called  
 (A) notch fall  
 (B) sarda fall  
 (C) flumed fall  
 ✓(D) ogee fall

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