ACFCVE

Register No.

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2018

CIVIL ENGINEERING

Duration : 3 Hours

Max. Marks : 300

General Instructions to the Applicants :

i)   This Question Paper is descriptive type in Degree Standard.

ii) There is no reservation of marks for neatness of execution and correctness of spelling in respect of this paper.

CIVIL ENGINEERING

PART — A

Note : i) Answer **not exceeding 50 words** each.

 ii) Each question carries **three marks**.

 iii) Answer any **thirty** questions only out of **thirty five** Questions.

$$(30 \times 3 = 90)$$

1. Enumerate the points to be observed in the construction of Aslar masonry.

2. Short note on : Power mixers.

3. What are all the methods of piles with the typical capacity with respect to lengths?

4. What are all the basic data are required for design of a concrete mix?

5. List out different methods of volume computations.

6. How area can be measured from chain survey data?

7. State the role of planimeter in surveying.

8. Define Lead and Lift.

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9. Write the relations between the elastic modulii.

10. What are the stresses involved in the analysis of beams?

11. What are the methods used for finding out the slope and deflection at a section in a loaded beam?

12. Define the term modulus of rupture.

13. Compute the external and internal indeterminancies of the structures shown below.
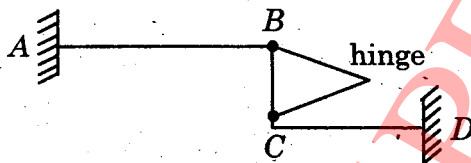
14. Name the classical methods used in Structural Analysis which is based on equilibrium approach.

15. Distinguish between cable and arches.

16. If an angular distortion of 1/3000 is allowed between columns 7.5 m apart, what is the corresponding value of differential settlement?

17. What problem is normally encountered in collecting samples for vane shear test?

18. Define angle of Repose.

19. Give the maximum acceptable limit of the following for the public drinking water :

    (a) pH

    (b) Hardness

    (c) Chlorides.

20. Define MPN index.

21. Why pumps are required in Sanitary works?

22. Why is torsional reinforcement provided in two way slabs?

23. A continuous T beam is supported by RC columns at 5 m centres. The centre to centre distance of adjacent panels of slab is 3200 mm. The thickness of slab and breadth of web 120 mm and 250 mm respectively. Determine the effective width of flange of the T-beam.

24. Under what circumstances doubly reinforced section is normally required? Write any three circumstances.

25. Determine the mean depth of Irrigation in a furrow 75 m long and spaced 60 cm apart with an Initial flow of 1.5 l/s for a period of 40 m the stream was then reduced to 0.5 l/s after it reached the tail end of furrow and the Irrigation was continued for another 45 min.

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26. Define the term unit Hydrograph.

27. Determine the area that can be Irrigated to a depth of 6 cm with a stream of 12 l/s in 8 hours.

28. Calculate the time required to Irrigate a check basis 20 m long and 15 m wide to a depth of 5 cm with a stream of 15 l/s.

29. State the purpose of signalling.

30. State the classification of maintenance of periodic repairs of Roads.

31. What are the general causes of pavement failures (any three)?

32. What are the limitations of Gantt bar chart?

33. What are the significance of floats?

34. What are the types of estimates?

35. What are the advantages of Time-grid diagram?

PART — B

Note : i) Answer **not exceeding 100 words** each.

ii) Each question carries **eight marks**.

iii) Answer any **fifteen** questions only out of **eighteen** Questions.

$(15 \times 8 = 120)$

36. Differentiate / Distinguish between clamp burning and kiln burning.

37. How are concrete blocks manufactured and laid in the wall?

38. How tacheometric constants are being determined?

39. The stadia hairs of tacheometer are separated by a distance of 0.9 mm from the central hair. The focal length of the object glass of the telescope is 18 cm. The distance of the object glass from the trunnion axis is 9 cm. A staff is held vertically at a point the level of which is 30 m above datum. The telescope is inclined at an elevation 8° to the horizontal and the readings at the stadia hairs are 1.68 m, 1.26 m, 0.84 m respectively. If the Height of instrument is 1.5 m. Calculate the distance of the point from the instrument station and the level of the instrument station.

40. Draw the B.M. and S.F. diagrams for the cantilever loaded as shown in fig. below.

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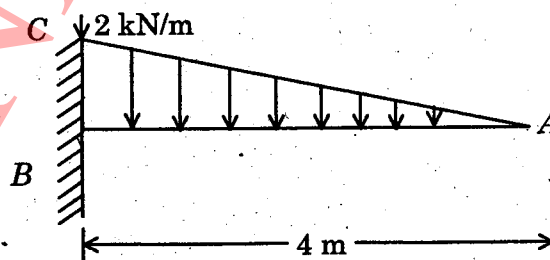
41. A 250 mm long cantilever of rectangular section 40 mm wide and 30 mm deep carries a uniformly distributed load. Calculate the value of 'w' if the maximum deflection in the cantilever is not to exceed 0.5 mm. $E = 70\,GN/m^2$.

42. A propped cantilever AB fixed at A and propped at B has a span of 9 m. It carries point loads of 60 kN and 120 kN at distances of 3 m and 6 m from the fixed end. Design the beam section allowing a load factor of 1.75. Take $F_y = 250\,N/mm^2$.

43. Find the value of W at collapse load for the fixed beam of uniform section.
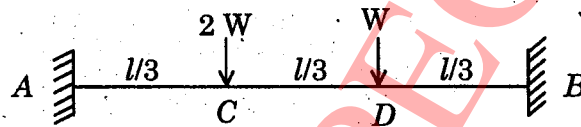
44. The representative liquid limit and plastic limit values of a saturated, normally consolidated clay deposit are 60% and 30% respectively. The saturated unit weight of the soil is $19\,kN/m^3$. Estimate the undrained shear strength of the soil at a depth of 10 m from ground surface. Water Table is at 8 m below ground level.

45. 50 gm of $-75\,\mu$, oven dried soil was used in a hydrometer analysis. The corrected hydrometer reading after 2 min in a 1000 CC soil suspension was 25.0. The effective depth, He for R_H of 25 is 12.13 cm. Taking specific gravity of solids as 2.75 and viscosity of water as 0.01 poise. Calculate the co-ordinates of the point on the grain size curve.

46. Short note on

    (a) P-trap

    (b) Q Trap

    (c) S Trap

    (d) Floor Trap

    (e) Gully Trap

    (f) Cowl

    (g) Siphonage

47. Define BOD with the limitations of BOD test.

48. Discuss in detail the steps involved in proportioning combined trapezoidal footing.

49. A 150 mm × 12 mm tie requires a splice within its length. Design a fillet welded connection with a single cover plate corresponding to the full design strength of the tie. Assume shop welding.

50. What are the advantages and disadvantages of lining of Irrigation channels?

51. What are the measures to prevent water logging?

52. State the failure in cement concrete pavements.

53. Briefly explain the joints in Cement Concrete Pavements.

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PART — C

Note :   i)   Answer **not exceeding 200 words** each.

         ii)   Each question carries **fifteen marks**.

        iii)   Answer any **six** questions only out of **nine** questions.

$(6 \times 15 = 90)$

54. Explain with detail sketch of different types of Bonds used in brick masonry.

55. ABCDEA is a clockwise traverse. The latitude and corresponding departures of the traverse legs are as given below.

Legs :	AB	BC	CD	DE	EA
Departure :	−13.80	+2.70	+7.50	+5.40	−1.80
Latitude :	+2.28	+7.55	−2.37	+1.23	−8.69

Calculate the area of Traverse.

56. A steel tape was exactly 30 m long at 20°C when supported throughout its length under a pull of 15 kg. A line was measured with a pull of 10 kg applied to the tape at a mean temperature of 13°C and found to be 810 m long. The cross-sectional area of tape is 0.03 cm², total weight of the tape is 0.65 kg. α for steel is 11×10^{-6} per °C and $E_S = 2.1 \times 10^6$ kg/cm². Compute the true length of the line if the tape was supported. (a) At every 30 m   (b) At every 15 m.

57. Compute the ordinates at intervals of L/4 of the influence line for R_A for the two span continuous beam for which EI is constant.
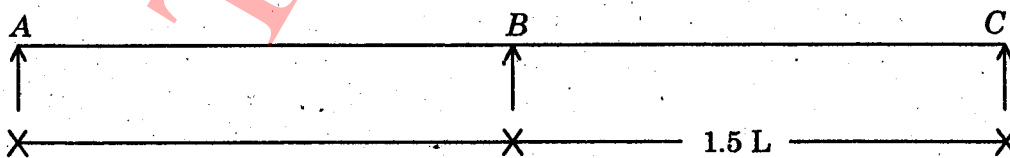
58. The results obtained from a series of $\overline{CU}$ tests on a soil gave the following results.

$C_{CU} = C'_{CU} = 0$

$\phi_{CU} = 15°, \phi'_{CU} = 30°$

A sample of this soil was tested in a $\overline{CU}$ test under a cell pressure of $150\,kN/m^2$.

Determine

(a) deviator stress at failure

(b) pore water pressure at failure

(c) minor principal effective stress at failure

(d) major principal effective stress at failure

(e) the magnitude of A_f.

59. Explain in detail about the hydraulic formulae which are commonly adopted in the design of sewers.

60. A rectangular beam of prestressed concrete is required to support a dead load moment of 15×10^6 Nmm (inclusive of its own weight and a line load moment of 40×10^6 Nmm at its mid section. Determine the initial prestressing force and its electricity at the mid-span section. Take the following values :

Allowable initial compressive stress = $17\,N/mm^2$

Allowable final compressive stress = $14\,N/mm^2$

Allowable initial or final tensile stress = $1\,N/mm^2$

Ultimate stress in steel = $1500\,N/mm^2$. Assume losses = 15%.

61. List out the various physiographic factors that affect run off. Discuss their influence on the volume of run off and the time distribution of run off.

62. Classify the sleepers and discuss about the advantages and disadvantages.

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