CET (PG)-2015

Sr. No. : **210063**

Question Booklet Series : A

Roll No.   *In Figures*   *In Words*

O.M.R. Answer Sheet Serial No.

Paper : I   Signature of the Candidate : _____

Subject : M.E. Civil Engineering (Construction Technology and Management) Programme

Time : 90 minutes   Number of Questions : 75   Maximum Marks : 75

DO NOT OPEN THE SEAL ON THE BOOKLET UNTIL ASKED TO DO SO

INSTRUCTIONS

1. Write your Roll No. on the Question Booklet and also on the OMR Answer Sheet in the space provided and nowhere else.
2. Enter the Subject and Series Code of Question Booklet on the OMR Answer Sheet. Darken the corresponding bubbles with **Black Ball Point / Black Gel pen.**
3. Do not make any identification mark on the Answer Sheet or Question Booklet.
4. To open the Question Booklet remove the paper seal gently when asked to do so.
5. Please check that this Question Booklet contains 75 questions. In case of any discrepancy, inform the Assistant Superintendent within 10 minutes of the start of test.
6. Each question has four alternative answers (A, B, C, D) of which only one is correct. For each question, darken only one bubble (A or B or C or D), whichever you think is the correct answer, on the Answer Sheet with **Black Ball Point / Black Gel pen.**
7. If you do not want to answer a question, leave all the bubbles corresponding to that question blank in the Answer Sheet. No marks will be deducted in such cases.
8. Darken the bubbles in the OMR Answer Sheet according to the Serial No. of the questions given in the Question Booklet.
9. Negative marking will be adopted for evaluation i.e., 1/4th of the marks of the question will be deducted for each wrong answer. A wrong answer means incorrect answer or wrong filling of bubble.
10. For calculations, use of simple log tables is permitted. Borrowing of log tables and any other material is not allowed.
11. For rough work only the sheets marked "Rough Work" at the end of the Question Booklet be used.
12. The Answer Sheet is designed for **computer evaluation.** Therefore, if you do not follow the instructions given on the Answer Sheet, it may make evaluation by the computer difficult. **Any resultant loss to the candidate on the above account, i.e., not following the instructions completely, shall be of the candidate only.**
13. After the test, hand over the Question Booklet and the Answer Sheet to the Assistant Superintendent on duty.
14. In no case the Answer Sheet, the Question Booklet, or its part or any material copied/noted from this Booklet is to be taken out of the examination hall. Any candidate found doing so, would be expelled from the examination.
15. A candidate who creates disturbance of any kind or changes his/her seat or is found in possession of any paper possibly of any assistance or found giving or receiving assistance or found using any other unfair means during the examination will be expelled from the examination by the Centre Superintendent/Observer whose decision shall be final.
16. **Telecommunication equipment such as pager, cellular phone, wireless, scanner, etc., is not permitted inside the examination hall. Use of calculator is not allowed.**

1. The relationship between the radius of curvature R, bending moment M and flexural rigidity EI is given by :
    (A) $R = M/EI$
    (B) $EI = R/M$
    (C) $M = EI/R$
    (D) $E = MI/R$

2. The equivalent length of a column fixed at one end and free at the other end, is :
    (A) 0.7L
    (B) 0.5L
    (C) 2L
    (D) L

3. If a simply supported rectangular beam of span 'L' and depth 'd' carries a central Load 'W'. The ratio of maximum deflection to maximum bending stress is :
    (A) $L^2/8Ed$
    (B) $L^2/6Ed$
    (C) $L^3/12Ed$
    (D) $L^2/48Ed$

4. The three hinged arch is a statically :
    (A) Determinate
    (B) Indeterminate
    (C) Redundant
    (D) None of the above

5. The centre of gravity of a right circular cone lies on its axis of symmetry at a height of :
    (A) h/2
    (B) h/4
    (C) h/5
    (D) h/3

6. The moment of inertia of a triangular section (base b, height h) about an axis through its C.G. and parallel to the base, is :
    (A) $bh^3/2$
    (B) $bh^3/36$
    (C) $bh^3/3$
    (D) $bh^3/12$

7. If the young's modulus of elasticity of a material is twice its modulus of rigidity, then the Poisson's ratio of the material is :
    (A) Zero
    (B) −1
    (C) 0.5
    (D) −0.5

8. A long column has maximum crippling load when its :
    (A) one end is fixed and other is hinged
    (B) one end is fixed and other end is free
    (C) both ends are hinged
    (D) both ends are fixed

9. A simply supported beam carries a varying load from zero on one end and W at the other end. If the length of the beam is 'a' the shear force will be zero at a distance x from the least loaded point where x is :

(A) $a/2$

(B) $a/3$

(C) $a/\sqrt{3}$

(D) $a\sqrt{3}/2$

10. A two span continuous beam ABC is simply supported at A and C and is continuous over support B. Span AB=6m, BC=6m. The beam carries a udl of 2 t/m over both the spans. EI is constant for the entire beam. The fixed end moment at B in span BA or BC would be :

(A) 9 t.m

(B) 12 t.m

(C) 8 t.m

(D) 6 t.m

11. If the coefficient of active earth pressure K_a is 1/3, then the coefficient of passive earth pressure K_p is :

(A) 1/3

(B) 3

(C) 3/2

(D) 2/3

12. Under-reamed piles are generally :

(A) Driven piles

(B) Bored piles

(C) Pre stressed piles

(D) Precast piles

13. Plasticity index is defined as the range of water content between :

(A) Semi solid limit and liquid limit

(B) Liquid and plastic limit

(C) Plastic limit and semi solid limit

(D) Liquid limit and solid limit

14. In the design of highway, expansion and contraction joints should respectively provided at :

(A) 25 m and 10 m

(B) 50 m and 10 m

(C) 50 m and 32 m

(D) 25 m and 32 m

15. The critical combination of stresses for corner region in cement concrete road is :

(A) load stress + warping stress - frictional stress

(B) load stress + warping stress + frictional stress

(C) load stress + warping stress

(D) load stress + frictional stress

16. As per IRC recommendation, the maximum limit of super elevation for mixed traffic in terrain is :

(A) 1 in 15

(B) equal to camber

(C) 1 in 12.5

(D) 1 in 10

17. In CBR test the value of CBR is calculated at :
    (A) both 2.5 mm and 5.0 mm penetrations
    (B) 2.5 mm penetration only
    (C) 5.0 mm penetration only
    (D) 7.0 mm penetration only

18. The maximum spacing of contraction joints in rigid pavements is :
    (A) 2.5 m
    (B) 4.5 m
    (C) 5.5 m
    (D) 3.5 m

19. The % age of reinforcement in case of slabs, when high strength deformed bars are used is not less than :
    (A) 1.00
    (B) 0.15
    (C) 0.12
    (D) 0.30

20. According to I.S: 456-2000, the maximum strain in concrete at the outermost compression fiber in the limit state design of flexural member is :
    (A) 0.0020
    (B) 0.0050
    (C) 0.0035
    (D) 0.0065

21. In the limit state design of concrete structures the strain distribution is assumed to be :
    (A) Parabolic
    (B) Non linear
    (C) Linear
    (D) Parabolic and Rectangular

22. 1% of voids in a concrete mix would reduce its-strength by about :
    (A) 10 %
    (B) 15 %
    (C) 5 %
    (D) 20 %

23. The ratio of the diameter of reinforcing bars and the slab thickness is :
    (A) 1/5
    (B) 1/6
    (C) 1/4
    (D) 1/8

24. In an RCC beam, side face reinforcement is provided if its depth exceeds :
    (A) 300 mm
    (B) 700 mm
    (C) 750 mm
    (D) 500 mm

25. A riveted joint may experience :
    (A) Bearing failure of plates
    (B) Shear failure of rivets
    (C) Bearing failure of rivets
    (D) All of these

26. If the diameter of a reinforcement bar is d, the anchorage value of the hook is :
    (A) 4d   (B) 8d
    (C) 12d   (D) 16d

27. Which of the following is not a water borne disease ?
    (A) Typhoid   (B) Cholera
    (C) Dysentery   (D) Malaria

28. The ratio of 5 day BOD to ultimate BOD is about :
    (A) 3/4   (B) 2/3
    (C) 1/3   (D) 1.0

29. The waste stabilization ponds can be :
    (A) Facultative   (B) Anaerobic
    (C) Aerobic   (D) Any of the above

30. Lacey's regime condition is obtained if :
    (A) Silt charge in the channel is variable
    (B) Discharge in the channel is variable
    (C) Silt grade in the channel is variable
    (D) Channel flows in unlimited, incoherent alluvium of the same character as that transported
        material

31. The scour depth (D) of a river during flood, may be calculated from the Lacey's equation :
    (A) $D = 0.47(Q/f)^{1/2}$ (B) $D = 0.47(Q/f)^{2/3}$
    (C) $D = 0.47(Q/f)$ (D) $D = 0.47(Q/f)^{1/3}$

32. F.S.L. of a canal at its head should be kept :
    (A) 15 cm higher than the water level of the parent channel
    (B) 15 cm lower than the water level of the parent channel
    (C) At the same level as the water level of the parent channel
    (D) None of the above

33. The structure constructed to allow drainage water to flow under pressure through an
    inverted siphon below a canal, is called :
    (A) Aqueduct   (B) Super passage
    (C) Syphon   (D) Syphon aqueduct

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    (C) At the same level as the water level of the parent channel
    (D) None of the above

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    (A) Aqueduct
    (B) Super passage
    (C) Syphon
    (D) Syphon aqueduct

34. The sensitivity of a rigid module is :
    (A) 1.00
    (B) 1.50
    (C) 2.00
    (D) zero

35. On a flow net diagram, the distance between two consecutive stream lines at two successive sections are 1 cm and 0.5 cm respectively. If the velocity of the first section is 1 m/sec, the velocity at the second will be :
    (A) 0.5 m/sec
    (B) 2.0 m/sec
    (C) 2.5 m/sec
    (D) 1.0 m/sec

36. Reynold's number is the ratio of inertial force and :
    (A) Gravitational force
    (B) Elasticity
    (C) Viscous force
    (D) Surface tension force

37. In the phenomenon of cavitations, the characteristic fluid property involved is :
    (A) Viscosity
    (B) Bulk modulus of elasticity
    (C) Surface tension
    (D) Vapour pressure

38. The kinetic energy correction factor α for laminar flow through a circular pipe is :
    (A) 1.67
    (B) 2.00
    (C) 1.54
    (D) 2.33

39. In an open channel flow the characteristic length commonly used in defining the Reynold's number is the :
    (A) Wetted perimeter
    (B) Area/top width
    (C) Depth of flow
    (D) Hydraulic radius

40. The following is not a direct stream flow determination technique :
    (A) Area velocity method
    (B) Ultrasonic method
    (C) Dilution method
    (D) Slope area method

41. For the irrigation of a crop, the base period B and delta (Δ) in meters are related to the duty D in ha/cumec at the field as :
    (A) $D = 0.864\ B/\Delta$
    (B) $8.64\ \Delta/B$
    (C) $0.864\ \Delta/B$
    (D) $8.64\ B/\Delta$

42. The following structure serves the purpose of a 'safety valve' for canal :
    (A) Cross regulator
    (B) Head regulator
    (C) Canal escape
    (D) Canal fall

43. PERT analysis is based on :
   (A) Most likely time
   (B) Pessimistic time
   (C) Optimistic time
   (D) All of these

44. The critical activity has :
   (A) Zero float
   (B) Maximum float
   (C) Minimum float
   (D) None of these

45. The performance of a specific task in CPM, is known as :
   (A) Activity
   (B) Event
   (C) Dummy
   (D) Contract

46. For excavating utility trenches with precise control of depth, the excavation equipment used is :
   (A) Shovel
   (B) Hoe
   (C) Dragline
   (D) None of the above

47. If a composite bar of steel and copper is heated, then the copper bar will be under :
   (A) Tension
   (B) Torsion
   (C) Shear
   (D) Compression

48. For completion of a project, the critical path of the network represents :
   (A) Maximum time required
   (B) Minimum time required
   (C) Minimum cost required
   (D) Maximum cost required

49. The shear stress distribution over a rectangular cross section of a beam follows :
   (A) A circular path
   (B) A parabolic path
   (C) An elliptical path
   (D) A straight line path

50. Number of links in a 30 m metric chain :
   (A) 100
   (B) 150
   (C) 180
   (D) 200

51. A metallic tape is made of :
   (A) Steel
   (B) Invar
   (C) Linen
   (D) Cloth and wires

52. The correction for sag is :

(A) Always additive

(B) Always subtractive

(C) Always zero

(D) Sometimes additive and sometimes subtractive

53. The horizontal angle between the true meridian and magnetic meridian at a place is called :

(A) Azimuth

(B) Declination

(C) Local attraction

(D) Magnetic bearing

54. A block in the shape of a parallelepiped of side 1 m × 2 m × 3 m lies on the surface. Which of the faces gives maximum stable block ?

(A) 2 m × 3 m

(B) 1 m × 3 m

(C) 1 m × 2 m

(D) equally stable on all faces

55. When a 1ˢᵗ class brick is immersed in cold water for 24 hours, it should not absorb water by weight more than :

(A) 10 %

(B) 15 %

(C) 20 %

(D) 25 %

56. The maximum shear stress introduced in a member which is subjected to an axial load is equal to :

(A) Twice the maximum normal stress

(B) Half of maximum normal stress

(C) Maximum normal stress

(D) Thrice the maximum normal stress

57. The number of independent equations to be satisfied for static equilibrium in a space structure is :

(A) 4

(B) 2

(C) 3

(D) 6

58. For the construction of R.C.C. slabs, columns, beams, walls the grade of concrete mix used is :

(A) 1 : 3 : 6

(B) 1 : 1.5 : 3

(C) 1 : 2 : 4

(D) 1 : 1 : 2

59. A coarse grained soil has a void ratio 0.75, and specific gravity as 2.75. The critical gradient at which quick sand condition occurs is :

(A) 0.5

(B) 0.75

(C) 0.25

(D) 1.00

60. The determination of ultimate bearing capacity on an eccentrically loaded square footing depends upon the concept of useful :
   (A) Triangle
   (B) Width
   (C) Square
   (D) Circle

61. The value of bearing capacity factor for cohesion Nc, for piles as per Meyerhof is taken as :
   (A) 5.14
   (B) 5.17
   (C) 6.2
   (D) 9.0

62. The maximum design gradient for vertical profile of a road is :
   (A) Exceptional Gradient
   (B) Limiting Gradient
   (C) Ruling gradient
   (D) Minimum gradient

63. The method of design of flexible pavement as recommended by IRC is :
   (A) CBR method
   (B) Westergaard method
   (C) Group index method
   (D) Benkelman beam method

64. For concreting heavy reinforced sections without vibration, the workability of concrete expressed as compacting factor should be :
   (A) 0.85 - 0.92
   (B) 0.80 - 0.85
   (C) 0.75 - 0.80
   (D) above 0.92

65. Critical section for a two way shear in case of flat slabs is at a distance of :
   (A) d/2 from periphery of column/capital/drop panel
   (B) at the drop panel of slab
   (C) effective depth of slab from periphery of column/drop panel
   (D) at the periphery of panel

66. The shear reinforcement in RCC is provided to resist :
   (A) Diagonal compression
   (B) Direct compression
   (C) Direct tension
   (D) Diagonal tension

67. Lacing bars in a steel column should be designed to resist :
   (A) 5 % of the column load
   (B) shear force due to 2.5 % of the column load
   (C) bending moment due to 2.5 % of the column load
   (D) both (A) and (B)

68. Settling velocity increases with :
   (A) Size of particles
   (B) Depth of tank
   (C) Specific gravity of solid particles
   (D) Temperature of the liquid

69. Alum is a :
   (A) Catalyst
   (B) Coagulant
   (C) Flocculant
   (D) Disinfectant

70. The standard B.O.D. at 20°C, is taken for the consumption in :
   (A) 1 day
   (B) 3 days
   (C) 5 days
   (D) 2 days

71. Which of the following materials is more elastic ?
   (A) Steel
   (B) Plastic
   (C) Wood
   (D) Rubber

72. In venturimeter, the ratio between throat diameter and pipe diameter is generally adopted as :
   (A) 1:2
   (B) 1:4
   (C) 1:8
   (D) 1:10

73. Dowel on the canal bank serves the purpose of :
   (A) A drainage
   (B) A footpath
   (C) A road curb
   (D) A carriageway

74. While adjusting a leveling instrument, if telescope cannot be moved independently, then that instrument is called :
   (A) I.O.P. level
   (B) Wye level
   (C) Hand level
   (D) Dumpy level

75. When a brick is cut off length wise the cut out bricks are called :
   (A) Corbal
   (B) King closure
   (C) Queen closure
   (D) Bat