**A**

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प्रश्नपुस्तिका क्रमांक
BOOKLET NO.

प्रश्नपुस्तिका

स्थापत्य अभियांत्रिकी

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पेपर-II

एकूण गुण : 200

## सूचना

(1) सदर प्रश्नपुस्तिकेत 100 अनिवार्य प्रश्न आहेत. उमेदवारांनी प्रश्नांची उत्तरे लिहिण्यास सुरुवात करण्यापूर्वी या प्रश्नपुस्तिकेत सर्व प्रश्न आहेत किंवा नाहीत याची खात्री करून घ्यावी. असा तसेच अन्य काही दोष आढळल्यास ही प्रश्नपुस्तिका समवेक्षकांकडून लगेच बदलून घ्यावी.

| परीक्षा-क्रमांक | | | | | | | | |
|---|---|---|---|---|---|---|---|---|

केंद्राची संकेताक्षरे          शेवटचा अंक

(2) आपला परीक्षा- क्रमांक ह्या चौकोनांत
**न विसरता बॉलपेनने लिहावा**.

(3) वर छापलेला प्रश्नपुस्तिका क्रमांक तुमच्या उत्तरपत्रिकेवर विशिष्ट जागी उत्तरपत्रिकेवरील सूचनेप्रमाणे **न विसरता** नमूद करावा.

(4) या प्रश्नपुस्तिकेतील प्रत्येक प्रश्नाला 4 पर्यायी उत्तरे सुचविली असून त्यांना 1, 2, 3 आणि 4 असे क्रमांक दिलेले आहेत. त्या चार उत्तरांपैकी सर्वात योग्य उत्तराचा क्रमांक उत्तरपत्रिकेवरील सूचनेप्रमाणे तुमच्या उत्तरपत्रिकेवर नमूद करावा. अशा प्रकारे उत्तरपत्रिकेवर उत्तरक्रमांक नमूद करताना तो संबंधित प्रश्नक्रमांकासमोर छायांकित करून दर्शविला जाईल याची काळजी घ्यावी. **ह्याकरिता फक्त काळ्या शाईचे बॉलपेन वापरावे, पेन्सिल वा शाईचे पेन वापरू नये.**

(5) सर्व प्रश्नांना समान गुण आहेत. यास्तव सर्व प्रश्नांची उत्तरे द्यावीत. घाईमुळे चुका होणार नाहीत याची दक्षता घेऊनच शक्य तितक्या वेगाने प्रश्न सोडवावेत. क्रमाने प्रश्न सोडविणे श्रेयस्कर आहे पण **एखादा प्रश्न कठीण वाटल्यास त्यावर वेळ न घालविता पुढील प्रश्नाकडे वळावे.** अशा प्रकारे शेवटच्या प्रश्नापर्यंत पोहोचल्यानंतर वेळ शिल्लक राहिल्यास कठीण म्हणून वगळलेल्या प्रश्नांकडे परतणे सोईस्कर ठरेल.

(6) उत्तरपत्रिकेत एकदा नमूद केलेले उत्तर खोडता येणार नाही. नमूद केलेले उत्तर खोडून नव्याने उत्तर दिल्यास ते तपासले जाणार नाही.

(7) प्रस्तुत परीक्षेच्या उत्तरपत्रिकांचे मूल्यांकन करताना उमेदवाराच्या उत्तरपत्रिकेतील योग्य उत्तरांनाच गुण दिले जातील. तसेच ''उमेदवाराने वस्तुनिष्ठ बहुपर्यायी स्वरूपाच्या प्रश्नांची दिलेल्या चार पर्यायांपैकी सर्वात योग्य उत्तरेच उत्तरपत्रिकेत नमूद करावीत. अन्यथा त्यांच्या उत्तरपत्रिकेत सोडविलेल्या प्रत्येक चार चुकीच्या उत्तरांसाठी एका प्रश्नाचे गुण वजा करण्यात येतील''.
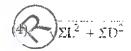
## ताकीद

ह्या प्रश्नपत्रिकेसाठी आयोगाने विहित केलेली वेळ संपेपर्यंत ही प्रश्नपुस्तिका आयोगाची मालमत्ता असून ती परीक्षाकक्षात उमेदवाराला परीक्षेसाठी वापरण्यास देण्यात येत आहे. ही वेळ संपेपर्यंत सदर प्रश्नपुस्तिकेची प्रत/प्रती, किंवा सदर प्रश्नपुस्तिकेतील काही आशय कोणत्याही स्वरूपात प्रत्यक्ष वा अप्रत्यक्षपणे कोणत्याही व्यक्तीस पुरविणे, तसेच प्रसिद्ध करणे हा गुन्हा असून अशी कृती करणाऱ्या व्यक्तीवर शासनाने जारी केलेल्या ''परीक्षांमध्ये होणाऱ्या गैरप्रकारांना प्रतिबंध करण्याबाबतचा अधिनियम-82'' यातील तरतुदीनुसार तसेच प्रचलित कायद्याच्या तरतुदीनुसार कारवाई करण्यात येईल व दोषी व्यक्ती कमाल एक वर्षाच्या कारावासाच्या आणि/किंवा रुपये एक हजार रकमेच्या दंडाच्या शिक्षेस पात्र होईल.
तसेच ह्या प्रश्नपत्रिकेसाठी विहित केलेली वेळ संपण्याआधी ही प्रश्नपुस्तिका अनधिकृतपणे बाळगणे हा सुद्धा गुन्हा असून तसे करणारी व्यक्ती आयोगाच्या कर्मचारीवृंदापैकी, तसेच परीक्षेच्या पर्यवेक्षकीयवृंदापैकी असली तरीही अशा व्यक्तीविरूद्ध उक्त अधिनियमानुसार कारवाई करण्यात येईल व दोषी व्यक्ती शिक्षेस पात्र होईल.

**पुढील सूचना प्रश्नपुस्तिकेच्या अंतिम पृष्ठावर पहा**

1. In the case of which natural feature do the two contour lines intersect ?

   (1) hill      (2) valley      (3) saddle      (4) vertical cliff

2. When L denotes the Latitudes and D denotes the departures, then the closing error is given by .

   (1) $\dfrac{\Sigma L + \Sigma D}{2N}$      (2) $\dfrac{\Sigma L}{N} + \dfrac{\Sigma D}{N}$      (3) $\sqrt{\Sigma L + \Sigma D}$      (4) $\sqrt{\Sigma L^2 + \Sigma D^2}$

3. The line through a point in which plane passing through that point and the north and south poles, intersects with the surface of the earth is known as :

   (1) True Bearing           (2) True Meridian

   (3) Arbitrary meridian      (4) None of the above

4. The chainages of point of curvature and point of tangency of a simple circular curve are 1050.50 m and 1314.90 m respectively. The number of full chords for a peg interval of 30 m will be :

   (1) 7      (2)      (3) 6      (4) 9

5. In plane table survey the method used for locating points is :

   (1) Resection         (2) Radiation

   (3) Intersection      (4) Either Radiation or Intersection

6. Which of the following statements are correct ?

   (a) An echo - sounder is also called as a fathometer.

   (b) A self -registering gauge should be installed in open.

   (c) An echo - sounder can be used in strong currents.

   Answer options :

   (1) (a), (b) and (c)      (2) (a) and (c)

   (3) (a) and (b)         (4) (b) and (c)

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7. Overturning of a vehicle on a curve can be avoided by using :

(1) Transition curve      (2) Vertical curve

(3) Reverse curve      (4) Compound curve

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8. Least count of a theodolite is :

(1) 1 minute    (2) 30 minutes    (3) 1 degree    (4) 20 seconds

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9. If the magnetic bearing of a line is 54°30' and magnetic declination is 5°30' E, the true bearing of line will be .

(1) 61°      (2) 59°      (3) 49°      (4) 60°

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10. The process of determining the difference of elevations of stations from vertical angles and known distances , is known as .

(1) Trigonometrical levelling      (2) Geodetic surveying

(3) Field astronomy      (4) Topographic surveying

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11. The method of tacheometric surveying in which stadia hairs are not used and the readings are taken against the horizontal cross hair with measurement of vertical angle twice for one single observation is known as .

(1) Substance method      (2) Tangential system

(3) Fixed hair method      (4) None of the above

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12. Arithmatic check in levelling indicates :

(1) Accuracy of field work      (2) Correctness of computations

(3) Instrumental error      (4) Error in staff readings

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13. In Global Positioning System (G.P.S.) there are more than 24 Nos. of G.P.S. Satellites moving in circular orbits around the earth with the inclination of :

   (1)  65°            (2)  35°            (3)  45°            (4)  55°

14. For building project estimates which method is generally used in PWD ?

   (1)  Long wall and Short wall method      (2)  Centre line method

   (3)  Crossing method                       (4)  None of the above

15. A building was constructed 20 years ago at ₹ 50,000. The estimated life of the building is 90 years. What is the present value of the building using straight - line method ? Use 10% scrap value

   (1)  ₹ 40,000        (2)  ₹ 38,888        (3)  ₹ 45,000        (4)  ₹ 35,000

16. The quantity of arch masonry work is calculated by the relation :

   (1)  Span of arch × breadth of wall × thickness of arch

   (2)  (Span of arch + 2 × thickness of arch) × breadth of wall

   (3)  (Span of arch + 2 × breadth of wall) × thickness of arch

   (4)  Mean length of arch × breadth of wall × thickness of arch

17. The work output of a mason for brick work in cement mortar for foundation work is roughly expected to be

   (1)  0.5 cu.m. per day        (2)  1.25 cu.m per day

   (3)  2.00 cu.m. per day       (4)  5.00 cu.m. per day

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18. Security deposit deducted at 5% from contractors bills is :

    (1) refunded when the contractor completes the work.

    (2) refunded even before the completion of the work provided good progress has been established

    (3) retained till the expected life of structure and spent for maintenance

    (4) refunded when the defect liability period of six months or one monsoon whichever is later is over.

19. Which of the following documents will not be required for drafting the tender notice ?

    (1) Nature of work and its location    (2) Estimated cost of the work

    (3) Schedule - A of the work          (4) Mode of submitting tender

20. The rate of a particular item of work depends on :

    (a) Specifications of works and materials.

    (b) Quantities of materials and their rates.

    (c) Location of the site of work.

    (d) Profit and overhead expenses of contractor.

    Answer options :

    (1) (a) and (b)           (2) only (d)

    (3) (a), (c) and (d)     (4) (a), (b), (c) and (d)

21. The brick work is not measured in m$^3$ in case of :

    (1) One or more than one brick thick wall.

    (2) Half brick thick wall.

    (3) Brick work in arches.

    (4) Reinforced brick work.

**SPACE FOR ROUGH WORK**

**22.** The method used for valuation of building is :

(1) Rental method of valuation    (2) Depreciation method of valuation

(3) Valuation based upon cost    (4) Any of the above

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**23.** Which of the following represents the requirements of valid contract :

(a) It must be in writing

(b) Can be enforced in court of law

(c) Parties should give the consent for agreement

(d) Parties concerned must be competent

Answer options :

(1) (a) and (b) of the above    (2) (a) and (c) of the above

(3) (c) and (d) of the above    (4) (a), (b), (c) and (d) of the above

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**24.** Find the specific gravity of soil grains with the help of a pycnometer if, weight of solids = 100 g, weight of pycnometer + soil + water = 610 g, weight of pycnometer + water = 550 g.

(1) 2.40     (2) 2.50     (3) 2.60     (4) 2.70

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**25.** The active earth pressure for 10 m high retaining wall supporting a cohesionless backfill with unit weight of 19.0 kN/$m^3$ and angle of frictional resistance as 30°, if water table is upto top of wall, is :

(Consider unit weight of water = 10 kN/$m^3$)

(1) 330 kN/m     (2) 1326 kN/m

(3) 166.67 kN/m     (4) 650 kN/m

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26. Cofferdam is a :

    (1) type of earthen dam for storage of water

    (2) type of bridge foundation

    (3) temporary enclosure in a river to create dry working area during construction

    (4) permanent structure to store water during floods

27. Compactive energy used for modified proctor test is how many times the compactive energy used in standard proctor test :

    (1) 2.5′      (2) 3.5′      (3) 4.5′      (4) 5.5′

28. In the method of slices used for analysing the stability of slopes ; each slice is assumed to be rectangular with a base in the shape of :

    (1) Straight line   (2) Log spiral   (3) Arc of circle   (4) Parabolic arc

29. The critical height of vertical excavation that can be made without any lateral support for a cohesive soil having unit weight of 19.2 $kN/m^3$, unit cohesion as 12 $kN/m^2$ and $\phi = 10°$, is :

    (1) 1.49 m      (2) 2.98 m      (3) 4.47 m      (4) 5.96 m

30. A footing of 4m × 2m in plan, transmit a pressure of 200 $kN/m^2$ on a cohesive soil having $F = 6 \times 10^4 \, kN/m^2$ and $\mu = 0.5$. The immediate settlement of the footing at the centre assuming rigid footing and $I_f = 1.2$, is :

    (1) 5 mm      (2) 6 mm      (3) 12 mm      (4) 10 mm

SPACE FOR ROUGH WORK

31. During oedometer tests on soils, the permeability of a saturated clay may be obtained from :

    (a) Voids ratio with the change in applied load.

    (b) Voids ratio with the change in logarithm of the applied load.

    (c) Unit weight of water and degree of consolidation.

    (d) Unit weight of water and coefficient of consolidation.

    Which of the following options is correct :

    (1) Both (a) and (d)                (2) Both (a) and (c)

    (3) Both (b) and (c)                (4) Both (a) and (b)

32. If saturated clay mass is sheared with normal stress of 220 kPa and pure water pressure of 120 kPa, the result gives $C' = 12$ kPa and $\phi' = 45°$. The shear strength in terms of effective stress is :

    (1) 139 kPa        (2) 69.7 kPa        (3) 81.28 kPa        (4) 112 kPa

33. The water content corresponding to maximum density is :

    (1) Optimum water content           (2) Maximum water content

    (3) Least water content             (4) Zero water content

34. Coefficient of discharge for an orifice is _____ of coefficient of velocity and coefficient of contraction.

    (1) an addition    (2) a difference    (3) a product    (4) a ratio

35. Reciprocating pump belongs to which of the following types ?

    (1) Rotary pump                     (2) Propeller pump

    (3) Mixed flow pump                 (4) Displacement pump

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36. For incompressible fluids in which of the following cases hydrostatic pressure remains constant ?

   (1) along horizontal plane

   (2) along vertical plane

   (3) along both horizontal and vertical planes

   (4) along inclined plane making an angle of 45° with the horizontal

37. In which of the following cases streamline, streak line and pathline will coincide with each other ?

   (1) Steady flow          (2) Unsteady flow

   (3) Laminar flow          (4) Turbulent flow

38. For steady uniform flow in prismatic channel, which of the following statements is true ?

   (1) Slope of energy line is more than slope of channel bed

   (2) Slope of energy line is same as slope of channel bed

   (3) Slope of energy line is more than slope of free surface

   (4) Slope of energy line is more than slope of channel bed but less than slope of free surface.

39. Which of the following terms are used to indicate vertical distance between energy grade line and hydraulic grade line at any point of flow at given section :

   (1) Piezometric head          (2) Velocity head

   (3) Elevation head          (4) Total head

SPACE FOR ROUGH WORK

40. Which of the following is the cause for separation of boundary layer ?

    (1) Positive pressure gradient

    (2) Negative pressure gradient

    (3) Boundary layer thickness reducing to zero

    (4) Laminar flow changing to turbulent flow

41. Bernoullis equation in it's original form is applicable to which of the following types of flow ?

    (1) flow along a streamline (2) flow of an ideal fluid

    (3) steady flow (4) all the above

42. Which of the following is correct dimension for dynamic viscosity ?

    (1) $MLT^{-1}$ (2) $ML^2T^{-1}$ (3) $ML^{-1}T^{-1}$ (4) $ML^{-1}T^{-2}$

43. Newtonian fluids satisfy which of the following equations ?

    (1) $\tau = \mu \left(\dfrac{du}{dy}\right)^2$ (2) $\tau = \tau_c + \mu \left(\dfrac{du}{dy}\right)$

    (3) $\tau = \mu \dfrac{du}{dy}$ (4) $\tau = \tau_c + \mu \left(\dfrac{du}{dy}\right)^2$

44. If the maximum depth of 50 years 10 h - rainfall depth at Nanded is 150 mm, the 50 years 4 h maximum depth at the same place is :

    (1) < 150 mm (2) > 150 mm

    (3) = 150 mm (4) Inadequate data

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45. A culvert is designed for a peak flow $Q_P$ on the basis of the rational formula. If a storm of the same intensity as used in the design but of duration twice larger occurs, the resulting peak discharge will be :

     (1)   $Q_P$         (2)   $2Q_P$         (3)   $Q_P/2$         (4)   $(Q_P)^2$

46. A unit hydrograph has _____ .

     (1)   One unit of peak discharge

     (2)   One unit of rainfall duration

     (3)   One unit of direct runoff

     (4)   One unit of the time base of direct runoff

47. The Muskingum method of flood routing is a

     (1)   hydrologic channel routing method

     (2)   form of reservoir routing method

     (3)   hydraulic routing method

     (4)   complete numerical solution of St. Venant equations

48. Surcharge storage in a reservoir is the volume of storage between :

     (1)   minimum pool level and normal pool level

     (2)   normal and maximum pool level

     (3)   dead storage level and maximum storage level

     (4)   minimum and average pool level

**SPACE FOR ROUGH WORK**

49. In routing a flood through a reach, the point of intersection of inflow and outflow hydrographs coincides with the peak of out flow hydrograph :

    (1) in all the cases of flood routing

    (2) when the inflow is into a reservoir with an uncontrolled outlet

    (3) in channel routing only

    (4) in all cases of reservoir routing

50. The discharge per unit drawdown at a well is known as :

    (1) Specific yield (2) Specific storage

    (3) Safe yield (4) None of these

51. If $S_y$ = specific yield and $S_r$ = specific retention, then .

    (1) $S_y + S_r = 0.50$ (2) $S_y + S_r = $ Porosity

    (3) $S_y + S_r = 1.0$ (4) $S_y + S_r = $ Permeability

52. An acquifer confined at the bottom but not at the top is called :

    (1) Semiconfined acquifer (2) Unconfined acquifer

    (3) Confined acquifer (4) Perched acquifer

53. The use of the unit hydrograph for estimating floods is limited to catchments of size less than ·

    (1) 5000 km² (2) 500 km² (3) 10⁴ km² (4) no upper limit

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54. Darcy's law is valid in a porous media flow if the Reynolds number (Re) is less than unity. This Reynolds number is obtained by :

    (1) (discharge velocity × maximum grain size)/$\mu$

    (2) (actual velocity × average grain size)/$v$

    (3) (discharge velocity × average grain size)/$v$

    (4) (discharge velocity × pore size)/$v$

55. An isochrone is a line on the basin map :

    (1) Joining raingauge stations with equal rainfall duration

    (2) Joining points having equal standard time

    (3) Connecting points having equal time of travel of the surface runoff to the catchment outlet

    (4) That connects points of equal rainfall depth in a given time interval

56. According to Dr. Khosla's theory, the exit gradient in the absence of a downstream cutoff is :

    (1) zero    (2) infinity    (3) unity    (4) very large

57. Uplift pressure on the dam :

    (1) virtually increases the downward weight of the body of the dam

    (2) increases the stability of dam

    (3) virtually decreases the downward weight of the body of the dam

    (4) has no effect on the stability of dam

58. Spillway is a structure constructed at a dam site for :

    (1) effectively disposing of dead storage for drinking water

    (2) effectively disposing of surplus water on downstream side

    (3) effectively disposing of water in canal for irrigation

    (4) storage of surplus water during floods

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59. What does an earthquake acceleration of 0.15 g acting vertically downward in a gravity dam cause ?

   (1)   an increase in the weight of dam by 15%

   (2)   reduction in unit weight of concrete only by 15%

   (3)   decrease in unit weight of concrete and water by 15%

   (4)   increase in uplift pressure by 15%

60. Elementary profile of a gravity dam will be right-angled triangle having zero width at the water level and a base width (B) at bottom :

   (1)   When subjected to water pressure on upstream side only

   (2)   When subjected to water pressure and silt pressure

   (3)   When subjected to silt pressure on upstream side only

   (4)   When subjected to ice pressure on upstream side only

61. The meander ratio is the ratio of

   (1)   the length of the river channel to the axial length of the river

   (2)   the axial length of the river to the length of the river channel

   (3)   the meander length to the meander belt

   (4)   the meander belt to the meander length

62. The following data is available for a cross drainage project :

   | Parameter | Canal | Drainage |
   |---|---|---|
   | FSL.(m) | 110 | 109 |
   | Bedlevel (m) | 105 | 107 |
   | Discharge (m³/s) | 90 | 15 |

   The most appropriate cross drainage work for this situation is :

   (1)   syphon aqueduct            (2)   syphon

   (3)   super passage              (4)   aqueduct

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63. At the base of a gravity dam section, the vertical stress at the toe is 4 MPa. The slope of downstream face of dam is 0.707 horizontal : 1 vertical. If there is no tail water, the major principal stress at the toe is :

(1) 4 MPa      (2) 5 MPa      (3) 6 MPa      (4) 8 MPa

64. In a solid-roller bucket type energy dissipator, the energy dissipation is :

(1) due to formation of a hydraulic jump.

(2) due to interaction of free jet with air and due to impact on downstream channel bed.

(3) due to interaction of two complementary rollers.

(4) due to lateral spreading of the jet and partly due to interaction of two rollers.

65. Identify the correct statements :

The ski-jump energy dissipator is used usually when :

(a) the tail water level is too low for hydraulic jump to form

(b) the bed of the stream is of sound rock

(c) the erosion from the jet is not a problem for the safety of the structure

(d) there is considerable air entrainment of the flow by the time it reaches the bucket
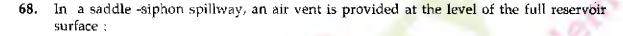
Answer options

(1) (a), (c) and (d)      (2) (b), (c) and (d)

(3) (a), (b) and (d)      (4) (a), (b) and (c)

66. The perimeter of a regime channel having width B and depth D is :

(1) $B + \sqrt{2}\,D$      (2) $B + 2\sqrt{2}\,D$      (3) $B + \sqrt{5}\,D$      (4) $B + 2\sqrt{5}\,D$

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67. Groynes are constructed to

    (1) control the river flood

    (2) protect the bank from which they are extended

    (3) permit the construction in flowing river

    (4) ensure effective disposal of sediment load

68. In a saddle -siphon spillway, an air vent is provided at the level of the full reservoir surface :

    (1) to break the siphonic action at that level.

    (2) to initiate the siphonic action at that level.

    (3) to prevent cavitation.

    (4) to maintain ventilation inside the siphon.

69. PIEV theory is related to

    (1) Accident study              (2) Pavement design

    (3) Sight distance study        (4) Origin and Destination study

70. Specific gravity of pure bitumen is in the range of :

    (1) 1.10 to 1.25    (2) 1.25 to 1.40    (3) 0.97 to 1.02    (4) Less than 1.0

71. Super elevation to be provided in horizontal curves of radius R in hill roads is given by :

    (1) $V^2/127R$    (2) $V^2/17.5\,R$    (3) $V^2/225R$    (4) $(V+8)^2/127R$

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72. Organisations/ Institutions involved with Road Development in India are :

    (1)  NHAI, IRC, BRO          (2)  NHAI, IRC, BCI

    (3)  IRC, HRB, BCI           (4)  NHAI, HRB, BCI

73. IRC has fixed the maximum limit of super elevation for mixed traffic in plain and rolling terrain as

    (1)  10%          (2)  7%          (3)  5%          (4)  4%

74. In hot climates, bitumen of what penetration grade is preferred ?

    (1)  80/100                  (2)  60/70

    (3)  30/40                   (4)  None of the above

75. Pavements of major roads should be designed for atleast a life period of :

    (1)  5 years     (2)  10 years     (3)  20 years     (4)  30 years

76. In flexible pavement design by Group Index method, for constant value of traffic volume, higher the value of G.I pavement thickness requirement would be :

    (1)  More     (2)  Less     (3)  Same     (4)  None of the above

77. The centrifugal force is acting on a vehicle negotiating a :

    (1)  Railway track crossing     (2)  River crossing

    (3)  Vertical curve             (4)  Horizontal curve

**SPACE FOR ROUGH WORK**

78. Origin and Destination studies are carried out for :

    (1) Planning of road network for vehicular traffic

    (2) Accident studies

    (3) Pavement Design

    (4) Geometric Design

79. The minimum stopping sight distance on single lane roads with two - way traffic movements is :

    (1) $2 \times$ SSD      (2) $0.5 \times$ SSD      (3) $4 \times$ SSD      (4) equal to SSD

80. On a rightangled road intersection with two -way traffic, the total number of conflict points are :

    (1) 24      (2) 11      (3) 6      (4) 4

81. Approach on either side of a bridge will have a minimum straight length of

    (1) 5 mt      (2) 15 mt      (3) 50 mt      (4) 150 mt

82. The selection of site for road bridges depends on :

    (1) Nature of river banks and appropriate arches

    (2) Width and depth of river at site to be bridged

    (3) Availability of good and safe foundation for bridge

    (4) All of the above

83. In class 70 - R loading, the minimum spacing between vehicles is :

    (1) 30 m      (2) 40 m      (3) 60 m      (4) 70 m

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84. A temporary enclosure built to exclude water from the working area and to provide free access to the area within, during the construction of a foundation or other structures that may be undertaken below water level is known as :

(1) Shell

(2) Cofferdam

(3) Caissions

(4) Any of the above

85. When is the span of the bridge economic ?

(1) When the cost of supporting system of one span is equal to cost of one pier

(2) When the cost of supporting system of one span is equal to cost of one abutment

(3) When the cost of one pier is equal to half the cost of abutment

(4) When the cost of supporting system of one span is equal to twice the cost of pier

86. The stream at the ideal bridge site should be :

(1) Well defined and as deep as possible

(2) Well defined and as wide as possible

(3) Well defined and as narrow as possible

(4) Deep and as wide as possible

87. The small submersible bridge having no openings is known as :

(1) Cause way

(2) Dead end bridge

(3) Irish bridge

(4) Either (1) or (3)

88. Suspension bridges are :

(1) Movable bridges

(2) Suitable for long spans

(3) Suitable for short spans

(4) Used over navigable channels

SPACE FOR ROUGH WORK

89. The wall which is a splayed extension of an abutment of a slope of the embankment is called _____

    (1) Retaining wall  (2) Parapet wall  (3) Support wall  (4) Wing wall

90. Strengthening of bridges is done for :

    (1) Safety against earthquake   (2) Safety during floods

    (3) Old bridges   (4) Newly constructed bridges

91. Match List I (Method of disposal) with List II (Terms related to method)

    | | List I | | List II |
    |---|---|---|---|
    | (a) | Sanitary land fill | (i) | High operational and maintenance cost |
    | (b) | Incineration | (ii) | Leachate collection and treatment |
    | (c) | Composting | (iii) | Pre-sorting, grinding and turning |
    | (d) | Salvage by seggregation | (iv) | Suitable for recyclable wastes |

    | | (a) | (b) | (c) | (d) |
    |---|---|---|---|---|
    | (1) | (ii) | (iii) | (i) | (iv) |
    | (2) | (ii) | (i) | (iv) | (iii) |
    | (3) | (i) | (ii) | (iii) | (iv) |
    | (4) | (ii) | (i) | (iii) | (iv) |

92. Time of concentration is relevant to determine the design of _____ :

    (1) Storm sewer

    (2) Sanitary sewer

    (3) Both storm and sanitary sewers

    (4) Neither storm sewer nor sanitary sewer

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93. The relation between BOD and COD IS :

(1) BOD is always less than COD.

(2) BOD is greater than COD.

(3) BOD is equal to COD.

(4) There is no relation between BOD and COD.

94. Which of the following are the methods of treatment and disposal of biomedical waste ?

(1) Hydroclave method      (2) Autoclave method

(3) Incineration             (4) All the above

95. What is the typical moisture content range of Municipal Solid Waste (MSW) for Indian conditions ?

(1) 25 to 40%    (2) 45 to 60%    (3) 62 to 70%    (4) 5 to 15%

96. Which one of the following methods can be employed for solid waste excluding garbage ?

(1) Composting        (2) Incineration

(3) Engineered land fill    (4) Pyrolysis

97. Assertion (A) : If the intake is to be located on the curve, it should be located on the concave bank and not on the convex bank.

Reasoning (R)    The scouring tendencies will be more on the convex bank of the river

Select the answer from the following :

(1) Both (A) and (R) are correct and (R) is the correct explanation of (A).

(2) Both (A) and (R) are correct but (R) is not the correct explanation of (A).

(3) (A) is true but (R) is false.

(4) (A) is false but (R) is true.

SPACE FOR ROUGH WORK

98. What is the treatment for removal of color due to colloidal organic matter ?

    (1) Aeration

    (2) Primary sedimentation

    (3) Co-agulation at low pH with alum salts

    (4) All the above

99. In London Smog episode, which was the responsible pollutant ?

    (1) Carbon monoxide      (2) Oxides of Nitrogen

    (3) Sulphur dioxide      (4) Ozone

100. Which of the following statements are not correct in relation to water distribution system ?

    (a) Tree system requires more number of valves and length of pipe.

    (b) Reticulation system has multiple flow paths and pressures are equalised.

    (c) Hardy-Cross method is used to analyze both tree and reticulation systems.

    Answer options :

    (1) (a), (b) and (c)    (2) (a) and (b)    (3) (b) and (c)    (4) (a) and (c)

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महाराष्ट्र अभियांत्रिकी सेवा (स्थापत्य), गट- ब (मुख्य) परीक्षा - २०१३ या स्पर्धा परीक्षेच्या प्रश्नपत्रिकेची उत्तरतालिका उमेदवारांच्या माहितीसाठी संकेतस्थळावर प्रसिध्द करण्यात आली होती. त्यासंदर्भात उमेदवारांनी अधिप्रमाणित (Authentic) स्पष्टीकरण / संदर्भ देऊन पाठविलेली लेखी निवेदने, तसेच तज्ज्ञांचे अभिप्राय विचारात घेऊन आयोगाने उत्तरतालिका सुधारित केली आहे. या उत्तरतालिकेतील उत्तरे अंतिम समजण्यात येतील. यासंदर्भात आलेली निवेदने विचारात घेतली जाणार नाहीत व त्याबाबत कोणताही पत्रव्यवहार केला जाणार नाही, याची कृपया नोंद घ्यावी.

## उत्तरतालिका - KEY
### पेपर - II

| प्रश्न क्रमांक | संच A | संच B | संच C | संच D | प्रश्न क्रमांक | संच A | संच B | संच C | संच D |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4 | 2 | 4 | 2 | 26 | 3 | 2 | 2 | 2 |
| 2 | 4 | 4 | 4 | 1 | 27 | 3 | 3 | 1 | 3 |
| 3 | 2 | 4 | 4 | 4 | 28 | 1 | 1 | 2 | 2 |
| 4 | 1 | 4 | 1 | 1 | 29 | 2 | 1 | 1 | 1 |
| 5 | 4 | 4 | 2 | 2 | 30 | 2 | 3 | 4 | 3 |
| 6 | 2 | 2 | 4 | 4 | 31 | 4 | 2 | 3 | 4 |
| 7 | 1 | 2 | 4 | 1 | 32 | 4 | 2 | 3 | 4 |
| 8 | 4 | 1 | 1 | 4 | 33 | 1 | 4 | 4 | 1 |
| 9 | 4 | 4 | 2 | 4 | 34 | 3 | 4 | 2 | 1 |
| 10 | 1 | 2 | 4 | 4 | 35 | 4 | 2 | 2 | 3 |
| 11 | 2 | 1 | 2 | 2 | 36 | 1 | 1 | 4 | 3 |
| 12 | 2 | 4 | 1 | 4 | 37 | 1 | 3 | 3 | 2 |
| 13 | 4 | 1 | 2 | 2 | 38 | 2 | 4 | 4 | 1 |
| 14 | 1 | 2 | 3 | 2 | 39 | 2 | 1 | 1 | 1 |
| 15 | 1 | 4 | 2 | 1 | 40 | 1 | 1 | 3 | 4 |
| 16 | 4 | 4 | 1 | 4 | 41 | 4 | 3 | 1 | 4 |
| 17 | 2 | 1 | 4 | 1 | 42 | 3 | 2 | 1 | 3 |
| 18 | 4 | 3 | 4 | 4 | 43 | 3 | 3 | 3 | 2 |
| 19 | 3 | 4 | 4 | 4 | 44 | 1 | 2 | 1 | 1 |
| 20 | 4 | 4 | 2 | 3 | 45 | 1 | 1 | 3 | 4 |
| 21 | 2 | 2 | 4 | 4 | 46 | 3 | 2 | 1 | 2 |
| 22 | 4 | 1 | 4 | 4 | 47 | 1 | 2 | 3 | 2 |
| 23 | 4 | 4 | 1 | 2 | 48 | 2 | 4 | 1 | 1 |
| 24 | 2 | 3 | 2 | 2 | 49 | 2 | 3 | 2 | 2 |
| 25 | 3 | 4 | 3 | 3 | 50 | 4 | 1 | 3 | 3 |

| प्रश्न क्रमांक | संच A | संच B | संच C | संच D | प्रश्न क्रमांक | संच A | संच B | संच C | संच D |
|---|---|---|---|---|---|---|---|---|---|
| 51 | 2 | 3 | 2 | 1 | 76 | 1 | 3 | 3 | 1 |
| 52 | 2 | 1 | 2 | 2 | 77 | 4 | 2 | 1 | 1 |
| 53 | 1 | 2 | 2 | 3 | 78 | 1 | 3 | 1 | 3 |
| 54 | 3 | 3 | 4 | 3 | 79 | 1 | 1 | 1 | 3 |
| 55 | 3 | 1 | 1 | 1 | 80 | 1 | 1 | 1 | 3 |
| 56 | 2 | 4 | 2 | 1 | 81 | 2 | 4 | 4 | 2 |
| 57 | 3 | 3 | 2 | 1 | 82 | 4 | 3 | 3 | 1 |
| 58 | 2 | 2 | 3 | 2 | 83 | 1 | 2 | 2 | 2 |
| 59 | 3 | 3 | 1 | 3 | 84 | 2 | 2 | 2 | 4 |
| 60 | 1 | 4 | 2 | 4 | 85 | 1 | 1 | 1 | 4 |
| 61 | 4 | 3 | 3 | 3 | 86 | 3 | 1 | 4 | 4 |
| 62 | 1 | 2 | 1 | 1 | 87 | 4 | 4 | 1 | 2 |
| 63 | 3 | 1 | 3 | 3 | 88 | 2 | 3 | 3 | 1 |
| 64 | 3 | 3 | 3 | 4 | 89 | 4 | 2 | 2 | 3 |
| 65 | 4 | 1 | 1 | 2 | 90 | 3 | 4 | 4 | 3 |
| 66 | 3 | 3 | 3 | 2 | 91 | 4 | 4 | 4 | 4 |
| 67 | 2 | 1 | 4 | 3 | 92 | 1 | 3 | 1 | 4 |
| 68 | 1 | 2 | 4 | 3 | 93 | 1 | 4 | 3 | 3 |
| 69 | 3 | 3 | 4 | 1 | 94 | 4 | 3 | 1 | 4 |
| 70 | 3 | 4 | 3 | 2 | 95 | 1 | 3 | 3 | 1 |
| 71 | 3 | 1 | 2 | 3 | 96 | 3 | 1 | 4 | 3 |
| 72 | 1 | 1 | 2 | 2 | 97 | 3 | 4 | 3 | 3 |
| 73 | 2 | 2 | 3 | 1 | 98 | 3 | 1 | 1 | 3 |
| 74 | 3 | 3 | 3 | 1 | 99 | 3 | 3 | 4 | 1 |
| 75 | 2 | 1 | 1 | 4 | 100 | 4 | 1 | 3 | 1 |

Date -   03 Oct, 2013