(1) सदर प्रश्नपत्रकेंद्र 100 अनिवार्य प्रश्न आहेत. उमेदवारांनी प्रश्नांची उत्तरे दिखावणारे मुख्यांकणारे लोप प्रश्न आहेत किंवा नाहीत याची खात्री करून याच्या. असा तरींतन अन्य काहीं दोन आदित्यास ही प्रश्नपत्रिका सवाळकशंकाकाळून लोप बदलत याच्या.

(2) आपल्या पैकेट-क्रमांक हा चौकोणात न विसरता बोलवणारे नियम.

(3) वर सापडला प्रश्नपत्रिका क्रमांक तुम्हाच्या उत्तरपत्रिकेच्या विशिष्ट जाणी उत्तरपत्रिकेच्या सुंदरप्रमाणे न विसरता नवऱ्यात.

(4) प्रश्नपत्रिकेंद्रील प्रश्नसंख्या 4 पर्यंत अनुसार लयां 1, 2, 3 आणि 4 असे क्रमांक दिले आहेत. त्याच्या उत्तरांनी सर्वत्र ध्येयाच्या सर्वांकणारी प्रश्नपत्रिकेंवरील सुंदरप्रमाणे तुम्हाच्या उत्तरपत्रिकेच्या नवऱ्यात करवली. असा प्रकारे उत्तरपत्रिके हे उत्तरक्रमांके पर्यंत साहित्यात ध्येयाच्या उत्तरांनी सर्वांकणारे प्रश्नपत्रिकेंवरील सुंदरप्रमाणे तुम्हाच्या उत्तरपत्रिकेच्या नवऱ्यात करवली. आपल्या उत्तरांनी सर्वांकणारे प्रश्नपत्रिकेंवरील सुंदरप्रमाणे तुम्हाच्या उत्तरपत्रिकेच्या नवऱ्यात करवले.

(5) त्याच्या उत्तरांनी स्वयं गुणांत आहेत. यामध्ये त्याच्या उत्तरांनी लयां 1, 2, 3 आणि 4 असे क्रमांक दिले आहेत. प्रश्नपत्रिकेंवरील सुंदरप्रमाणे तुम्हाच्या उत्तरपत्रिकेच्या नवऱ्यात करवली. असा प्रकारे शेवटच्या प्रश्नपत्रिकेंवरील लयां 1, 2, 3 आणि 4 असे क्रमांक दिले आहेत. प्रश्नपत्रिकेंवरील सुंदरप्रमाणे तुम्हाच्या उत्तरपत्रिकेच्या नवऱ्यात करवले.

(6) उत्तरपत्रिकेंद्रील एका नवऱ्यात मोडफी केलेले उत्तर खोडलेले येणाऱ्यात नाही. नमुंद केलेले उत्तर खोडले नसले उत्तर दिशांत ते तपासले वापरार येणाऱ्यात नाही.

(7) प्रश्नपत्रिकेंद्रील एका नवऱ्यात मोडफी केलेले उत्तरां आपल्यांनी उत्तर दिशांत ते तपासले वापरार येणाऱ्यात नाही.

पुढील सूचना प्रश्नपत्रिकेंद्रील आपल्यांनी विभिन्न केलेले उत्तरां संपूर्णपणे ही प्रश्नपत्रिका आपल्यांनी मालिकासा अनुसूची ते परिशीलित केलेले उत्तरपत्रिकेंद्रील वापरपत्र देशनाला ऐतेयात आहेत. ही उपलंब संपूर्णपणे ही प्रश्नपत्रिकेंद्रील उत्तरपत्रिकेंद्रील काळी आशय कोणत्याही स्वरूपात प्रस्तुत वा अस्त्यंतच्या कोणत्याही व्यक्तीस भुविवेक, तसेच प्रतिष्ठ करणाऱ्यात हा गुणां अनुसूची असू लक्ष्य करणारा व्यक्ती शासनाचा आर्थिक व योयांचा व्यवहाराला एक व्यक्ती कारावासास आणि किंवा साधने एक हजर तालुक्यांमध्ये शिक्षण पाठ केले.

तसेच हा प्रश्नपत्रिकेंद्रील विभिन्न केलेले उत्तरपत्रिकेंद्रील आपल्यांनी संपूर्णात ही प्रश्नपत्रिका अनिवार्य भाषणापासून बांधणारे हा सुंदर गुणां अनुसूची तसेच परिशीलित केलेले व्यक्ती आपल्यांनी कार्यरतीत नवऱ्यात असलेले, तसेच परिशीलित पर्यवेक्षकीयपुढीपक असलेले तरीही अशा व्यक्तीपासून तरीही अशा व्यक्तीपासून असलेले तरीही अशा व्यक्तीपासून असलेले तरीही अशा व्यक्तीपासून असलेले तरीही अशा व्यक्तीपासून असलेले तरीही अशा व्यक्तीपासून.
SPACE FOR ROUGH WORK
1. The modern electronic Tacheometers are a combination of:
   (a) An electronic theodolite
   (b) An electronic data collector
   (c) An Electric distance measurement

   **Answer options**:
   (1) (a) and (b) only   (2) (b) and (c) only
   (3) (a) and (c) only   (4) All of the above

2. In chain surveying, perpendiculars to the chain line are set out by:
   (1) a theodolite       (2) a prismatic compass
   (3) a clinometer       (4) an optical square

3. Least count of a levelling staff is:
   (1) 1 cm               (2) 5 mm
   (3) 1 mm               (4) None of the above

4. The backsight reading on a B.M. = R.L. of 150 m was (-2.250 m). The erected staff reading on the top of workshop floor was 1.450 m. The R.L. of the top of workshop floor is:
   (1) 154.300 m   (2) 146.300 m   (3) 150.800 m   (4) 145.800 m

5. If 'n' is the number of sides of a traverse, while theodolite traversing the sum of the interior included angles should be:
   (1) \((2n-4) \times 90^\circ\)   (2) \((2n+4) \times 90^\circ\)
   (3) \((2n \pm 4) \times 90^\circ\) (4) 360°

6. What will be the curvature correction for staff reading, in levelling for a distance of 1000 m?
   (1) 0.0673 m   (2) 0.0785 m   (3) 78.50 m   (4) 6.73 m

7. Spire test is carried out for the permanent adjustment of:
   (1) Dumpy level   (2) Auto level   (3) Tilting level   (4) None of these

8. The lines joining the points of equal elevations on the surface of the earth are known as:
   (1) isohyets   (2) isogonics   (3) agonics   (4) contours
9. What is the magnetic declination at a place if the magnetic bearing of the sun at noon at that place is 186°?

(1) 6° W  (2) 6° E  (3) 0° W  (4) 0° E

10. The process of locating the instrument station occupied by plane table from stations whose positions have already been plotted on plan is known as:

(1) Orientation  (2) Radiation  (3) Intersection  (4) Resection

11. Salvage value is defined as:

(1) value of dismantled materials of a property at the end of its utility period
(2) estimated value of a built up property at the end of its useful life without being dismantled
(3) value of the property shown in the account book in that particular year
(4) present value of a property considering it to be replaced at the current market rates

12. The rights and privileges which an owner of a property enjoys through or over the property of another is known as:

(1) Property right  (2) Lease right  (3) Legal right  (4) Easement

13. For a contract to be valid:

(a) Parties to the contract should be competent
(b) Proper proposal and its acceptance
(c) Free consent of parties involved in the agreement
(d) Lawful consideration

Answer options:

(1) (a) and (c)  (2) (c) only
(3) (a), (b) and (d)  (4) All of the above

14. The unit of measurement for earthwork in surface excavation exceeding 1.5 m in width as well as 10 sqm on plan but not exceeding 30 cm in depth, is in:

(1) cu. m  (2) sq. m  (3) 10 sq.m  (4) Rmt
15. A tender is said to be informal:
   (a) When it is not submitted in the form sold by the department
   (b) When the tender is not properly filled in or signed by the contractor
   (c) When the tender is made conditional by way of adding indefinite and uncertain liabilities of usual character to it.
   (d) When it is not supported by the requisite earnest money in the manner prescribed for the purpose in PWD form:

Answer options:
(1) (a), (b), (c) (2) (a), (b), (c), (d) (3) (a), (d) (4) (d)

16. At what change of price level is a revised estimate prepared?
(1) 2.0% (2) 2.5% (3) 4.0% (4) 5.0%

17. Which committee recommended that an allowance of 10% of the prime cost as the contractor's profit would be reasonable?
(1) The Rates and Costs Committee, 1957 (2) MPWD Committee, 1940
(3) CPWD Committee, 1950 (4) MPSC Committee, 2010

18. The capitalised value of a property fetching a net annual rent of ₹1000 with highest rate of interest prevailing being 5%, would be:
(1) ₹800 (2) ₹1000 (3) ₹10,000 (4) ₹20,000

19. While submitting a tender, the contractor is required to deposit some amount with the department, as guarantee of the tender, known as:
(1) Bank Guarantee (2) EMD. (3) S.D. (4) F.D.

20. If the porosity of a soil sample is 40%, its void ratio is:
(1) \( \frac{2}{3} \) (2) \( \frac{1}{3} \) (3) \( \frac{1}{2} \) (4) 1

21. A cube of soil specimen having dimensions 2 cm x 2 cm x 2 cm weighs 16 gm when it is fully saturated. If void ratio of the specimen is 1.0, the dry density of the specimen will be:
(1) 2000 kg/m³ (2) 1500 kg/m³ (3) 1200 kg/m³ (4) 1600 kg/m³

P.T.O.
22. Statement (A): In Boussinesq’s theory of stress computations, soil is considered to be un-stressed before application of the load.
Statement (B): The contact pressure distribution under a rigid footing in cohesionless soil, is uniform throughout the width of the footing.

(1) Both the statements (A) and (B) are correct.
(2) Statement (A) is correct but (B) is wrong.
(3) Statement (A) is wrong but (B) is correct.
(4) Both the statements (A) and (B) are wrong.

23. A sample of dry sand was tested in direct shear test apparatus under a normal load of 72 kg. The shear load required to fail the sample was found to be 36 kg. The angle of internal friction (φ) will be:

\[
\begin{align*}
(1) & \quad \tan^{-1}\left(\frac{72+36}{36}\right) \\
(2) & \quad \tan^{-1}\left(\frac{72+36}{72}\right) \\
(3) & \quad \tan^{-1}\left(\frac{36}{72}\right) \\
(4) & \quad \tan^{-1}\left(\frac{72}{36}\right)
\end{align*}
\]

24. A point load exerts a maximum vertical stress at a radial distance of 1 m and at a depth of:

(1) 0.817  (2) 0.477  (3) 1.00  (4) 1.225

25. Statement (A): Coffer-dam is a structure to be constructed in standing water condition prior to the construction of bridge foundations.
Statement (B): Cutting edge and steining are the two essential component parts of the coffer-dam.

(1) Both the statements (A) and (B) are true.
(2) Both the statements (A) and (B) are false.
(3) Statement (A) is true but (B) is false.
(4) Statement (B) is true but (A) is false.

26. From the following statements, select the most appropriate statement:
Westergaard’s analysis for stress computation within soil mass assumes:

(1) Point load at the surface and soil being homogeneous and isotropic
(2) Line load at the surface and soil being homogeneous and non-isotropic
(3) Point load at the surface and soil being homogeneous and non-isotropic
(4) Line load at the surface and soil being non-homogeneous and isotropic
27. An all-around RCC peripheral retaining wall is constructed for a basement to retain soil on the other side. The retaining wall has RCC floor slab constructed at the top. The earth pressure on retaining wall will be analyzed in:

(1) Passive condition
(2) Active condition
(3) At rest condition
(4) Partially active and partially passive condition

28. Match the pairs:

(a) Compaction (ii) Expulsion of water
(b) Swelling (ii) Sudden volume decrease
(c) Consolidation (iii) Increase in volume
(d) Collapse (iv) Expulsion of air

**Answer options:**

(a) (i) (iii) (iv) (ii)
(b) (ii) (iii) (iv) (i)
(c) (i) (iv) (ii) (iii)
(d) (iv) (iii) (i) (ii)

29. The specific speed of turbine is defined as:

(1) \( \frac{H^{3}}{N\sqrt{P}} \)
(2) \( \frac{NP^{5}}{\sqrt{H}} \)
(3) \( \frac{N\sqrt{P}}{H^{4}} \)
(4) \( \frac{N^{5}P}{\sqrt{H}} \)

30. Muschel curves belong to the category of:

(1) main characteristic curves of a turbine
(2) operating characteristic curves of a turbine
(3) constant efficiency curves of a turbine
(4) operating characteristics of a pump

31. Pathlines refer to the motion of identified fluid particles of elements and therefore constitute a feature of the:

(1) Lagrangian Approach
(2) Eulerian Approach
(3) Rayleigh's Approach
(4) None of the above

कच्च्हा कामासाठी जाणा /SPACE FOR ROUGH WORK

P.T.O.
32. The separation of a boundary layer occurs when:
(1) the flow is accelerated past a boundary
(2) the boundary layer comes to rest
(3) any adverse pressure is encountered
(4) the fluid is ideal

33. Choose the correct match:
(a) Inertial force to surface tensile force
(b) Inertial force to viscous force
(c) Inertial force to pressure force
(d) Inertial force to elastic force

Answer options:
(a) (b) (c) (d)
(1) (iii) (i) (ii) (iv)
(2) (iii) (ii) (iv) (i)
(3) (iv) (v) (ii) (iii)
(4) (iv) (i) (ii) (iii)

34. The centre of pressure will coincide with the centre of gravity if a plane surface is:
(1) Vertical
(2) Horizontal
(3) Immersed in a gas
(4) None of the above

35. A horizontal pipe line conveys a constant rate of flow which is measured by venturimeter installed on it. When the pipe is inclined upwards in the direction of flow, the reading of level difference on a differential U-tube manometer:
(1) will increase
(2) will remain same
(3) will decrease
(4) may fluctuate with time

36. A surge tank is provided in hydropower schemes to
(1) strengthen the penstocks
(2) reduce water hammer pressure
(3) reduce frictional losses in the system
(4) increase the net head

कक्ष्याकामासाठीजागा/SPACE FOR ROUGH WORK
37. If three pipes of different diameters, lengths and friction factors are connected in series, then:

(1) \( f = f_1 + f_2 + f_3 \)  
(2) \( h_f = h_f_2 = h_f_3 \)  
(3) \( Q = Q_1 + Q_2 + Q_3 \)  
(4) \( Q_1 = Q_2 = Q_3 \)

38. The difference between theoretical discharge and actual discharge of pump is known as:

(1) gap of discharge  
(2) differential discharge  
(3) slip of pump  
(4) suction gap

39. A unit speed is obtained by which of the following equations with usual notations?

(1) \( N_u = \frac{N}{\sqrt{H}} \)  
(2) \( N_u = \frac{\sqrt{N}}{H} \)  
(3) \( N_u = \frac{\sqrt{N}}{\sqrt{H}} \)  
(4) \( N_u = \frac{N^2}{H} \)

40. A turbine is a device which converts:

(1) Hydraulic energy into mechanical energy  
(2) Mechanical energy into hydraulic energy  
(3) Kinetic energy into mechanical energy  
(4) Electrical energy into mechanical energy

41. Operating characteristic curves of a turbine are:

(1) Varying speed curves  
(2) Constant efficiency curves  
(3) Constant head curves  
(4) Constant speed curves

42. Overall efficiency of a pump is obtained by which of the following equations with usual notations?

(1) \( \eta_0 = \eta_{\text{man}} \times \eta_{\text{mech}} \)  
(2) \( \eta_0 = \eta_{\text{hy}} \times \eta_{\text{mech}} \)  
(3) \( \eta_0 = \eta_{\text{man}} \times \eta_{\text{hy}} \)  
(4) \( \eta_0 = \eta_{\text{vol}} \times \eta_{\text{min}} \)

43. To produce a high head multi-stage centrifugal pumps, the impellers are connected:

(1) in parallel  
(2) in series  
(3) in parallel and in series both  
(4) none of the above

कल्याण कामाक्षी जागा /SPACE FOR ROUGH WORK

P.T.O.
44. The specific speed \( N_s \) of a pump is given by:

\[
(1) \quad N_s = \sqrt[3]{\frac{Q}{H_m}} \\
(2) \quad N_s = \sqrt[3]{\frac{P}{H_m^2}} \\
(3) \quad N_s = \sqrt[3]{\frac{Q}{H_m^2}} \\
(4) \quad N_s = \sqrt[3]{\frac{P}{H_m^2}}
\]

45. Number of buckets on a Pelton wheel are calculated by which equation with usual notations:

\[
(1) \quad Z = 15 + \frac{D}{2d} \\
(2) \quad Z = 15 + \frac{2D}{d} \\
(3) \quad Z = 15 + 2\left(\frac{D}{d}\right)n \\
(4) \quad Z = 15 + \frac{d}{D}
\]

46. Which of the following statements is correct?

(1) Pelton wheel is a reaction turbine
(2) Pelton wheel is a radial flow turbine
(3) Pelton wheel is an impulse turbine
(4) None of the above

47. When specific information about the density of snowfall is not available, the water equivalent of snowfall is taken as:

(1) 50%  (2) 30%  (3) 10%  (4) 90%

48. The percentage of total quantity of fresh water in the world available in the liquid form is about:

(1) 30%  (2) 70%  (3) 11%  (4) 51%

49. The precipitation in the form of water drops of sizes larger than 0.5 mm is known as:

(1) snow  (2) drizzle  (3) glaze  (4) rainfall

50. The chemical that is found to be more suitable as water evaporation inhibitor is:

(1) ethyl alcohol  (2) methyl alcohol  (3) cetyl alcohol  (4) bytyl alcohol
51. In a DAD analysis the maximum average depth of rainfall for an 18 hr storm was 28 cm in an area of size 10 km$^2$. For the same duration the maximum average depth in an area of 1000 km$^2$ can be expected to be:

(1) $= 28$ cm
(2) $< 28$ cm
(3) $> 28$ cm
(4) depends upon the type of rainfall

52. The direct runoff is made up of:
(1) overland flow and infiltration
(2) surface runoff, prompt interflow and channel precipitation
(3) surface runoff, infiltration and evapotranspiration
(4) rainfall and evaporation

53. Precipitation falling during the growing period of a crop that is available to meet the evapo-transpiration needs of the crop is known as:
(1) effective rainfall
(2) transpiration
(3) conjuctive use
(4) potential rainfall

54. Evapotranspiration is confined to:
(1) daylight hours
(2) night-time only
(3) land surfaces only
(4) none of the above

55. The prismoidal formula with usual notations is:

(1) $\Delta S = \text{storage} = \frac{\Delta h}{5} [A_1 + 4A_2 + A_3 ...]$ 
(2) $\Delta S = \text{storage} = \frac{\Delta h}{6} [A_1 + 4A_2 + A_3 ...]$ 
(3) $\Delta S = \text{storage} = \frac{\Delta h}{3} [A_1 + 4A_2 + A_3 ...]$ 
(4) $\Delta S = \text{storage} = \frac{\Delta h}{6} [A_1 + 3A_2 + 4A_3 ...]$
56. An aqueduct is a cross drainage work provided to carry canal over a natural drain when:
   (1) canal bed is at the same level as the bed of the natural drain.
   (2) canal bed is below the H.F.L. of the natural drain.
   (3) canal bed is well above the H.F.L. of the natural drain.
   (4) canal bed is below the bed of the natural drain.

57. Open flume outlet is:
   (1) an orifice
   (2) a weir
   (3) a meter
   (4) none of the above

58. In a saddle-siphon spillway, an air vent is provided at the level of the full reservoir surface to:
   (1) break the siphonic action at that level
   (2) initiate the siphonic action at that level
   (3) prevent cavitation
   (4) maintain ventilation inside the siphon

59. ______ is aligned along a watershed and runs for most of its length on a watershed.
   (1) Ridge canal
   (2) Contour canal
   (3) Side slope canal
   (4) None of the above

60. As per IS 10430-1982, the life of canal for concrete lining is assumed to be:
   (1) 40 years
   (2) 60 years
   (3) 80 years
   (4) 99 years

61. ______ maintain a deep channel in front of the head regulator and dispose of heavy silt and a part of flood discharge on the down stream side of the barrage.
   (1) Radial gates
   (2) Spillway
   (3) Stilling basin
   (4) Under sluice

62. In a syphon aqueduct, severe condition of maximum uplift on the floor occurs when:
   (1) canal runs full, drain is dry but water table is at the stream bed.
   (2) canal is dry and drain is passing the highest flood.
   (3) canal runs dry and drain also runs dry.
   (4) both canal and drain run full.

कक्ष्या क्रांताचांती जांगा /SPACE FOR ROUGH WORK
63. In ________ the overflowing water is guided smoothly over the crest and profile of the spillway.
   (1) Straight drop Spillway       (2) Ogee Spillway
   (3) Tunnel Spillway            (4) Siphon Spillway

64. The ratio of rate of change of discharge of an outlet to the rate of change of the discharge of the distribution channel is known as ________.
   (1) Flexibility       (2) Setting       (3) Sensitivity       (4) Efficiency

65. Match the pairs for determination of thickness of flexible pavement by appropriate method.

(a) California Bearing Ratio Method
(b) California Resistance Valve Method
(c) Triaxial Method
(d) McLeod Method

(1) \( T = \frac{K(TI)(90-R)}{C^{\frac{1}{3}}} \)
(2) \( T = K \log_{10}\frac{P}{P} \)
(3) \( T = \left[ \frac{1.75P}{CBR} - \frac{A}{\pi} \right]^{\frac{1}{2}} \)
(4) \( T = \sqrt{\frac{3PXY}{2\pi E_{4\Delta}}} - a^2 \)

Answer options:
   (a) (b) (c) (d)
   (1) (i) (iv) (iii) (ii)
   (2) (iii) (iv) (ii) (i)
   (3) (i) (iii) (ii) (iv)
   (4) (iii) (i) (iv) (ii)

66. The maximum width of expansion joint and maximum spacing between expansion joint for rough interface layer is:
   (1) 2.5 cm and 160 m    (2) 2.0 cm and 130 m
   (3) 2.5 cm and 140 m    (4) 2.5 cm and 100 m
67. The total length of tie bar of 1 cm diameter embedded in a cement concrete pavement with allowable working stress in steel in tension equal to 1400 kg/cm² and allowable bond stress in deformed bars in concrete 24.6 kg/cm², is:

(1) 18.87 cm  (2) 113.82 cm  (3) 56.9 cm  (4) 28.45 cm

68. The tests performed for detecting whether bitumen is cracked or not, is/are:
(a) Spot test  (b) Solubility test
(c) Float test  (d) Ductility test
Select the correct alternative out of the following:
(1) (a) only  (2) (a) and (b) only
(3) (a), (c) and (d) only  (4) (b) and (d) only

69. The dowel bars are provided at:
(1) Expansion joint
(2) Contraction joint
(3) Both (1) and (2)
(4) Both (1) and (2) and Longitudinal joint

70. Failures in flexible pavements are due to the failure of:
(a) Sub grade
(b) Base course
(c) Wearing Course
Answer options:
(1) (a) and (b) only  (2) (a) and (c) only
(3) (b) and (c) only  (4) (a), (b) and (c)

71. Bitumen grade is specified as 80-100 or $\frac{80}{100}$ grade, this means:
(1) Bitumen content is between 80 to 100.
(2) Ductility of bitumen is between 80 to 100 mm.
(3) Penetration value of bitumen is between 80 to 100.
(4) Temperature of the bitumen is between 80 to 100°C
72. The critical condition of stresses for combination of stresses in cement concrete pavement during summer is:
   (1) load stress + warping stress – frictional stress
   (2) load stress + warping stress
   (3) load stress + warping stress + frictional stress
   (4) load stress + frictional stress

73. Arrange the following layers of flexible pavement from top to bottom:
   (a) Sub-base course  (b) Base course
   (c) Surface course   (d) Sub-grade

   Answer option:
   (1) (c), (a), (d), (b)
   (2) (c), (b), (d), (a)
   (3) (c), (a), (b), (d)
   (4) (c), (b), (a), (d)

74. A culvert can be defined as a crossing with a total length not exceeding ______ between the faces of the abutments:
   (1) 6 m  (2) 7 m  (3) 8 m  (4) 10 m

75. What should be the minimum width of foot path while designing a bridge for rural areas?
   (1) 1.5 m  (2) 2.0 m  (3) 2.5 m  (4) 3.0 m

76. Maximum scour depth at a severe bend is:
   (1) 1.25 D  (2) 1.50 D  (3) 1.75 D  (4) 2.00 D

77. ________ can be defined as a rise of water level on the upstream side of a bridge.
   (1) Scour  (2) Afflux  (3) HFL  (4) Discharge

78. The area through which the water flows under a bridge superstructure is known as ________ of the bridge.
   (1) stream  (2) scour  (3) waterway  (4) afflux
79. The type of bearing used on a bridge depends on:

(1) Extent of movement at the bridge ends
(2) Temperature Variations
(3) Load carried
(4) All of the above

80. The minimum vertical clearance for opening of high level bridges for discharge of 0.3-3.0 m$^3$ per second is:

(1) 150 mm  (2) 250 mm  (3) 350 mm  (4) 450 mm

81. A bridge designed to allow normal floods to pass through its vents but allowed to be overtopped during floods is called:

(1) Submersible bridge  (2) Under bridge
(3) Seasonal bridge  (4) None of the above

82. Advantages of asphaltic concrete (Bituminous Concrete) are:

(a) Durability  (b) Imperviousness
(c) Load spreading properly  (d) Quickly openable to traffic
(e) Good skid Resistance

Answer options:

(1) (a) and (b) only.  (2) (a), (b) and (c) only.
(3) (a), (b), (c) and (d) only.  (4) All of the above.

83. Pick up the explosive used for tunnelling in soft rocks from the following:

(1) Special gelatine  (2) Blasting gelatine
(3) Ammonia dynamite  (4) Semi-gelatine

84. Which one of the following tunnelling methods is used for laying under ground sewers?

(1) Needle beam method  (2) German method
(3) Army method  (4) English method

85. To attain the required shape of the tunnel we use:

(1) Cutholes  (2) Chisels  (3) Easers  (4) Trimmers
86. For initial surveys of tunnel, the following activities are involved:
    (a) Marking portal points with concrete pillars on the ground.
    (b) Marking tunnel obligatory points on the topographical maps.
    (c) Driving lines between the fixed obligatory points.
    (d) Preliminary setting of the tunnel on the topographical survey of Indian maps.

The correct sequence of the activities are:
(1) (b), (a), (d), (c)  (2) (a), (b), (c), (d)  (3) (d), (b), (c), (a)  (4) (c), (b), (d), (a)

87. If 'D' is a diameter of tunnel in meters, then the thickness of lining in mm as per the empirical formula is given by:
(1) 72 D  (2) 82 D  (3) 92 D  (4) 102 D

88. The concentration of dust particles of the size 0.5 to 5 microns adjacent to the working face should not be more than:
(1) 450 particles/cm³  (2) 350 particles/cm³  
(3) 250 particles/cm³  (4) 150 particles/cm³

89. For highways, tunnelling is preferred if the open cut exceeds:
(1) 10 m depth  (2) 15 m depth  (3) 20 m depth  (4) 25 m depth

90. In compressed air tunnelling the volume of free air provided is:
(1) 10 cuft per seconds per sq.ft. of face area
(2) 10 m³ per min. per m² of face area
(3) 20 cuft per min. per sq.ft. of face area
(4) 6 m³ per hour per m² of face area

91. The length of the needle beam used in the needle beam method of tunnelling is usually:
(1) 2 m to 4 m  (2) 1.5 m to 4.5 m  (3) 6 m to 7 m  (4) 5 m to 6 m

92. Indian municipal solid waste is not suitable for incineration due to:
(1) less moisture content  (2) high moisture content
(3) high calorific value  (4) Lesser organic content
93. In waste water treatment plant secondary settling tanks are designed to remove:
   (1) Organic settleable solids (2) Inorganic settleable solids
   (3) Bioflocculated solids (4) Dissolved solids

94. During inversion condition:
   (1) Air temperature decreases with altitude
   (2) Air temperature increases with altitude
   (3) Air temperature remains constant
   (4) Air temperature is zero

95. As per Central Pollution Control Board (CPCB) Air Quality Index for satisfactory condition is in the range of:
   (1) 301 to 400 (2) 201 to 300 (3) 101 to 200 (4) 51 to 100

96. When is a photochemical smog formed?
   (1) Air stagnation
   (2) High concentrations of hydrocarbon and nitrogen
   (3) Both (1) and (2)
   (4) None of these

97. For taking sewer line below road/canal/railway line, following type of sewer appurtenances should be provided.
   (1) Storm water relief work (2) Siphon spillways
   (3) Jumping weir (4) Inverted syphon

98. Permanent hardness is removed by:
   (a) Lime soda process
   (b) Boiling
   (c) Demineralisation process
   (d) Base exchange process

   Answer options:
   (1) (a) only (2) (b) only
   (3) All of the above (4) (a), (c) and (d) only

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99. As per CPCB, ambient Air Quality Standards in respect of noise during day time and night time for residential area are:

(1) 75 dB and 70 dB respectively  
(2) 65 dB and 55 dB respectively  
(3) 55 dB and 45 dB respectively  
(4) 50 dB and 40 dB respectively

100. What is the food to micro-organism ratio in an aeration tank having following data?
Flow = 1 m/d, MLSS = 2000 mg/L  
Influent BOD$_5$ = 200 mg/L  
Volume of aeration tank = 500 m$^3$

(1) 0.20  
(2) 5.00  
(3) 0.80  
(4) 1.25
Pick out the correct word to fill in the blank:

नमुना प्रश्न

प्र. क्र. 201. I congratulate you ________ your grand success.

(1) for (2) at (3) on (4) about

हा प्रश्नाचे योग्य उत्तर "(3) on" असे आहे. त्याप्रमाणे प्रश्नक्रमाकासमावेश संपल्यात "(3)" होईल, वास्तव खालीलप्रमाणे प्रश्न क्र. 201 समावेश उत्तर-क्रमांक "(3)" हे वाढून पूर्णपणे छायांकित करून दाखविले आवश्यक आहे.

प्र. क्र. 201. ① ② ③ ④

अशा पद्धतीने प्रश्नाचे माहितीसंबंधी प्रश्नक्रमांक सुमाचा उत्तरक्रमांक हा तुम्हाचा स्वतंत्रप्रमाणे पुरविलेखना उत्तरप्रदेशीला त्या त्या प्रश्नक्रमांकशोधीला संबंधित वाढून पूर्णपणे छायांकित करून दाखविला. अशा पद्धतीत फक्त काही शाळेस बालपणे वापरायचे, पंचस वा शाळेस चें बापस नये.

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