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Maharashtra Engineering Services Main Exam-2011 2011
04 15/1/2012 प्रश्नपुस्तिका क्रमांक
BOOKLET No.

Code :
107609

प्रश्नपुस्तिका

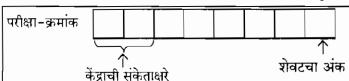स्थापत्य अभियांत्रिकी

वेळ : 2 (दोन) तास

एकूण प्रश्न : 100

एकूण गुण : 100

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.

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

परीक्षा-क्रमांक

केंद्राची संकेताक्षरे
शेवटचा अंक

(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 त्याना 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 नय.

(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 प्रकार शेवटच्या प्रश्नापर्यंत पोहोचल्यानंतर वेळ शिल्लक राहिल्यास कठीण म्हणून वगळलेल्या प्रश्नांकडे परतणे सोईस्कर ठरेल.

(6) उत्तरपत्रिकेत एकदा नमूद कलेले 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 अचूक 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 व्यक्तीविरुद्ध उक्त अधिनियमानुसार कारवाई करण्यात येईल व दोषी व्यक्ती शिक्षेस पात्र होईल.

पुढील सूचना प्रश्नपुस्तिकेच्या अंतिम पृष्ठावर पहा

पर्यवेक्षकांच्या सूचनेविना ही सील उघडू नये

SEAL

SPACE FOR ROUGH WORK

1. $\displaystyle \lim_{x \to 0} \left(\frac{2x+1}{x+1} \right)^{1/x}$ is

   (1) one
   (2) e
   (3) does not exist
   (4) none of the above

2. If a matrix $A = \begin{bmatrix} 1 & -2 & 3 \\ 0 & -1 & 2 \\ 0 & 0 & 1 \end{bmatrix}$ then the Eigen values of $A^2 + A^{-1} + 3\,adjA$ are

   (1) 1, 3, 1
   (2) –1, 3, 1
   (3) –1, –3, 1
   (4) –1, 3, –1

3. Laplace transform of $\dfrac{d}{dt}\left(\dfrac{\sin t}{t} \right)$ is

   (1) $1 - s \cot^{-1} s$
   (2) $1 - s \tan^{-1} s$
   (3) $s \cot^{-1} s - 1$
   (4) $s \tan^{-1} s - 1$

4. If $\bar{F} = (xy^2)i + (yz^2)j + (zx^2)k$ and S is the surface of the sphere $x^2 + y^2 + z^2 = 4$ then the value of $\displaystyle \oiint_S \bar{F} \cdot d\bar{s}$ is

   (1) $\dfrac{16\pi}{5}$
   (2) $\dfrac{128\pi}{5}$
   (3) $\dfrac{64\pi}{5}$
   (4) $\dfrac{32\pi}{5}$

5. General solution of wave equation $\dfrac{\partial^2 y}{\partial t^2} = c^2 \dfrac{\partial^2 y}{\partial x^2}$ s.t. $y(0, t) = 0 = y(l, t)$ is

   (1) $\displaystyle \sum_{n=1}^{\infty} \left[A_n \cos \frac{n\pi c x}{l} + B_n \sin \frac{n\pi x c}{l} \right] \sin \frac{n\pi t}{l}$

   (2) $\displaystyle \sum_{n=1}^{\infty} \left[A_n \cos \frac{n\pi c t}{l} + B_n \sin \frac{n\pi c t}{l} \right] \sin \frac{n\pi x}{l}$

   (3) $\displaystyle \sum_{n=1}^{\infty} \left[A_n \cos \frac{n\pi t}{l} + B_n \sin \frac{n\pi t}{l} \right] e^{\frac{n\pi c x}{l}}$

   (4) $\displaystyle \sum_{n=1}^{\infty} A_n \sin \frac{n\pi x}{l} e^{-c^2 n^2 \pi^2 t / l^2}$

6. If A is 37×37 matrix with $A^2 = I$ then rank of A is

(1) 0

(2) i

(3) 37

(4) such a matrix is not possible

7. If $\bar{a}$ is a non-zero constant vector with magnitude $a \neq \dfrac{1}{\sqrt{2}}$ and $\bar{r} = x\hat{i} + y\hat{j} + z\hat{k}$ then

$\text{div}\left[\bar{a} \times (\bar{r} \times \bar{a})\right]$ is

(1) 0 　　　　(2) 1 　　　　(3) $2a^2$ 　　　　(4) a^2

8. The velocity 'V' of particle at distance 'D' from a point on its path given by below table

D (in metre)	0	10	20	30	40	50	60
V (m/sec)	47	58	64	65	61	52	38

The time taken to travel 60 meters by using Simpson's one third rule is

(1) 1.0445166 sec

(2) 1.0635166 sec

(3) 1.0534166 sec

(4) 1.0746166 sec

9. If bulk modulus and modulus of rigidity for a material are K and G respectively, then what will be Poisson's ratio

(1) $\dfrac{3K + 4G}{6K - 4G}$ 　　(2) $\dfrac{3K - 4G}{6K + 4G}$ 　　(3) $\dfrac{3K - 2G}{6K + 2G}$ 　　(4) $\dfrac{3K + 2G}{6K - 2G}$

10. A bar of steel $(E = 2.1 \times 10^6 \text{ kg/cm}^2)$ 70 cm long varies in its cross section with 2.5 cm dia for the first 20 cm, 2 cm dia for next 30 cm and 1.5 cm dia for the rest of the length. Find the elongation if the bar is subjected to a tensile load of 15 tonnes.

(1) 0.118 cms 　　(2) 0.25 cms 　　(3) 0.178 cms 　　(4) 0.354 cms

11. A solid circular shaft of diameter 100 mm is subjected to a torque of 25 kNm. The angle of twist over a length of 3 m is observed to be 0.09 rad. The modulus of rigidity of material is

(1) $7.64 \times 10^{-5} \text{ N/mm}^2$

(2) $8.49 \times 10^4 \text{ N/mm}^2$

(3) $2.1 \times 10^5 \text{ N/mm}^2$

(4) $6.74 \times 10^4 \text{ N/mm}^2$

12. A propped cantilever of span 'L' is carrying a point load 'P' acting at midspan. The plastic moment of the section is Mp. The magnitude of collapse load is

(1) 6 Mp/L 　　(2) 8 Mp/L 　　(3) 2 Mp/L 　　(4) 4 Mp/L

SPACE FOR ROUGH WORK

13. Find the Euler's crippling load for a hollow cylinder column (E = 205 GPa) of 3_ external diameter and 2.5 mm thick, with a length of 2.3 m and fixed at both of its en_

    (1) 17.16 kN   (2) 14.29 kN   (3) 16.88 kN   (4) 21.49 kN

14. A bar of 400 mm length and of uniform cross-section 20 mm diameter is subjected to tensile load of 50 kN, assuming E = 200 GPa the elongation of bar is

    (1) 2.481 mm   (2) 3.203 mm

    (3) 0.318 mm   (4) 0.187 mm

15. Reaction at a prop in a propped cantilever when it is subjected to UDL of 'w/m' over a entire span 'L' is equal to

    (1) $\dfrac{3wL}{8}$ (2) $\dfrac{5wL}{8}$ (3) $wL^2/8$ (4) $\dfrac{wL^4}{8EI}$

16. The curved geometry of masonry arches allows its load carrying capability only in the form of

    (1) Compressive forces   (2) Tensile forces

    (3) Bending forces   (4) Torsional forces

17. The slope of cantilever beam having span 'L', at the free end due to concentrated load 'P' applied at free end is

    (1) PL^2/EI (2) $PL^2/2\ EI$ (3) $PL^3/3\ EI$ (4) $PL^3/2\ EI$

18. In moment distribution method the sum of distribution factors for all the members meeting at a joint is always

    (1) Equal to zero   (2) Equal to one

    (3) Greater than one   (4) Smaller than one

19. If the Young's Modulus and Poisson's ratio of a material is 2×10^6 kg/cm^2 and 0.25 respectively. Find the Bulk Modulus.

    (1) $\dfrac{6}{5} \times 10^6$ kg/cm^2 (2) $\dfrac{3}{4} \times 10^6$ kg/cm^2

    (3) $\dfrac{5}{6} \times 10^6$ kg/cm^2 (4) $\dfrac{4}{3} \times 10^6$ kg/cm^2

20. A continuous beam ABCDE has four simple supports A, B, C and D. DE is overhang. Hinge 'F' is provided along span BC. The degree of static indeterminacy is

    (1) 4   (2) 1   (3) 2   (4) 3

21. Shear stress at the centre of shaft having 200 mm radius and subjected to twist moment of 300 N.m. is

(1) $0.19 \, N/mm^2$ (2) Zero   (3) $0.38 \, N/mm^2$ (4) $0.095 \, N/mm^2$

22. Using limit state method, find the area of steel required for a beam 300 mm × 600 mm effective, if concrete M_{20} and steel Fe 415 are used

(1) $1019 \, mm^2$ (2) $1728 \, mm^2$ (3) $1256 \, mm^2$ (4) $958 \, mm^2$

23. For a rectangular beam section the limiting value of $\dfrac{xu, max}{d} = 0.479$. However, for the beam data $\dfrac{xu}{d} = 0.504$. Following statement is true for the beam

(1) The beam is under-reinforced and failure shall be with warning

(2) The beam is over-reinforced and failure shall be sudden and without warning

(3) The beam is under-reinforced and failure shall be sudden and without warning

(4) The beam is balanced section

24. Flexural strength of M_{25} concrete is

(1) $3.00 \, N/mm^2$ (2) $3.5 \, N/mm^2$ (3) $5.00 \, N/mm^2$ (4) $17.5 \, N/mm^2$

25. The sudden failure of a prestressed member without any warning is generally due to

(1) Fracture of steel in compression zone

(2) Fracture of steel in tension zone

(3) Crushing of concrete

(4) Web shear cracks

26. For gravity retaining wall earth pressure exerted by back-fill is resisted by

(1) Bending action of stem and bottom slab

(2) Tension in the counterfort

(3) Dead weight of wall

(4) None of the above

27. A concrete rectangular beam of size 180 mm × 300 mm is prestressed with a straight tendon to an effective force of 200 KN at an eccentricity of 50 mm below the centroidal axis. The stresses at top and bottom fibre of structure are

(1) $3.70 \, N/mm^2$ (Compression)   (2) $3.70 \, N/mm^2$ (Compression)
    $3.70 \, N/mm^2$ (Compression) $7.40 \, N/mm^2$ (Compression)

(3) $7.40 \, N/mm^2$ (Tension)   (4) $0 \, N/mm^2$
    $0 \, N/mm^2$ $7.40 \, N/mm^2$ (Compression)

SPACE FOR ROUGH WORK

28. When the steel plates are placed end to end and flushed with each other and joined by means of cover plates on either side such a joint is known as

(1) Zig-Zag rivet lap joint   (2) Chain riveted lap joint

(3) Double cover butt joint   (4) Flushed rivet joint

29. The shape factor for a rectangular beam of width 100 mm and depth 300 mm is

(1) 2.00   (2) 1.50   (3) 1.00   (4) 1.25

30. The ratio of plastic moment to yield moment is called as

(1) Modulus of rupture   (2) Proof resilience

(3) Plastic section modulus   (4) Shape factor

31. Find the effective length of a compression steel column of length 'L' which is effectively held in position at both ends and restrained against rotation at one end.

(1) 1.00 L   (2) 0.80 L   (3) 0.65 L   (4) 1.5 L

32. A beam is subjected to bending moment of 148.2 kN m. Assume $\gamma_{mo} = 1.10$ and yield stress $f_y = 250$ MPa. The plastic section modulus Z_p for the section is

(1) 538.91×10^3 mm^3 (2) 652.08×10^3 mm^3

(3) 1.856 mm^3 (4) 40.755×10^3 mm^3

33. What is the coefficient for calculating net effective c/s area of a single 'T' section connected to Gusset plate through its flange by rivet ?

(1) $\dfrac{3A_1}{3A_1 + A_2}$ (2) $\dfrac{5A_1}{5A_1 + A_2}$ (3) $Ag - ndt$ (4) $\dfrac{5A_1}{5A_1 - A_2}$

34. Residual soil is a soil

(1) Which stays at the place of its formation

(2) Which deposits at a place away from place of its origin

(3) Both 1 and 2

(4) Neither 1 nor 2

35. For compacted soil, maximum dry density is obtained corresponding to

(1) Minimum water content   (2) Optimum water content

(3) Maximum water content   (4) None of the above

SPACE FOR ROUGH WORK   **P.T.O.**

36. A silty soil gives positive reaction in

(1) Dry strength test

(2) Toughness test

(3) Dilatancy test

(4) None of the above

37. In a cohesionless soil, quick sand condition occurs when effective pressure is

(1) High

(2) Zero

(3) Less

(4) None of the above

38. The seismic refraction methods cannot be used if the wave velocity is

(1) Greater than the velocity in the upper layer

(2) Less than the velocity in the lower layer

(3) More than four times

(4) More than thrice

39. Submergence of foundation due to rise of water table causes

(1) Increase in bearing capacity

(2) Decrease in bearing capacity

(3) No change in bearing capacity

(4) None of the above

40. The radius of friction circle is equal to

(1) $R \sin \phi$

(2) $R \cos \phi$

(3) $R \tan \phi$

(4) $R \phi$

41. To resist heavy lateral loads which type of piles are used ?

(1) Friction and bearing piles

(2) Displacement piles

(3) Under reamed piles

(4) Batter piles

42. A shallow foundation is defined as foundation which has

(1) Depth less than 0.6 m

(2) Depth less than its width

(3) Depth less than 1 m

(4) None of the above

43. Allowable soil pressure for foundation in cohesive soils is generally controlled by

(1) Settlements

(2) Bearing capacity

(3) Both 1 and 2

(4) Neither 1 nor 2

44. Sample procured in a sandy soil by split spoon sampler is

(1) Disturbed sample

(2) Undisturbed sample

(3) Representative sample

(4) Wash sample

SPACE FOR ROUGH WORK

45. Slip circle method is used for determination of

    (1) Stability of finite slope   (2) Stability of infinite slope

    (3) Stability of finite and infinite slope   (4) None of the above

46. The precompression method is useful for compacting

    (1) Silts   (2) Organic soils   (3) Clays   (4) All the above

47. In situ vane shear test is used to measure shearing strength of

    (1) Very soft and sensitive clays   (2) Stiff and fissured clays

    (3) Sandy soils   (4) All of the above

48. Pile foundation is one of the type of

    (1) Shallow foundation   (2) Raft foundation

    (3) Deep foundation   (4) Machine foundation

49. Dynamic Viscosity (μ) has the dimensions as

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

50. In a turbulent flow in a pipe, the shear stress is

    (1) Maximum at the centre

    (2) Maximum at the boundary and decreases linearly to zero at the centre

    (3) Maximum at the boundary and decreases logarithmically towards the centre

    (4) Maximum at a finite distance from the boundary

51. The critical depth is the depth of flow at which

    (1) Discharge is maximum   (2) Reynold number is unity

    (3) The specific energy is minimum   (4) Perimeter is minimum

52. Boundary layer on a flat plate is called laminar boundary layer if

    (1) Reynold number is less than 2000   (2) Reynold number is less than 4000

    (3) Reynold number is less than 5×10^5 (4) None of the above

53. The net or effective head at the turbine is

    (1) The sum of gross head plus the head loss in the penstock

    (2) Sum of gross head plus head loss in the penstock and velocity head at turbine exit

    (3) The difference between gross head minus head loss in penstock

    (4) The difference between gross head minus head loss in penstock and velocity head at turbine exit

54. The salinity in water

(1) Reduces the evaporation   (2) Increases the evaporation

(3) Does not affect evaporation   (4) None of the above

55. A triangular DRH due to a 6-h storm in a catchment has a time base of 100 h and a peak flow of 40 m^3/s. The catchment area is 180 km^2. The 6-h unit hydrograph for this catchment will have a peak flow in m^3/s of

(1) 10   (2) 20   (3) 30   (4) 40

56. In a flow-mass curve the demand line drawn from a ridge in the curve did not intersect the mass curve again. This implies that

(1) The reservoir was not full at the beginning

(2) The storage was not adequate

(3) The demand can not be met by the inflow as the reservoir will not refill

(4) The reservoir is wasting water by spill

57. The word unit in the unit hydrograph refers to the

(1) Unit depth of runoff   (2) Unit duration of the storm

(3) Unit base period of the hydrograph   (4) Unit area of the basin

58. A rectangular plot having direction of overland flow parallel to its larger side, has time of concentration of 25 minutes. Following four rainfall patterns are considered for purpose of design of drainage

A = 35 mm/h for 15 minutes

B = 45 mm/h for 10 minutes

C = 10 mm/h for 60 minutes

D = 15 mm/h for 25 minutes

The greatest peak rate of runoff is expected in the storm

(1) A   (2) B   (3) C   (4) D

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

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

60. The eccentricity of the resultant permitted on either side of centre of base in gravity dam is given as

(1) e = 6B   (2) e = 6/B   (3) e = B/6   (4) None of the above

SPACE FOR ROUGH WORK

61. The spillway crest is located at

    (1) Maximum water level of dam

    (2) Normal pool level

    (3) Crest of dam

    (4) None of the above

62. In leaching process

    (1) Land is flooded with adequate depth of water

    (2) Land is provided with adequate drainage

    (3) Land is provided with salt layer

    (4) None of the above

63. Ozone layer in the stratosphere is being destroyed by

    (1) Sulphur dioxide

    (2) Carbon dioxide

    (3) Photochemical oxidants

    (4) Chlorofluro carbon

64. The surface area of a clarifier for 0.43 m^3/s design flow, using surface overflow rate of 40 m^3/m^2.d is

    (1) 928.80 m^2
    (2) 930.23 m^2
    (3) 1720 m^2
    (4) 172 m^2

65. Among the following, what is the best suitable range of pH for Ferrous Sulphate ($Fe SO_4.7H_2O$) as a coagulant

    (1) 5.5 − 8.0
    (2) 5.5 − 11.0
    (3) 4.5 − 9.5
    (4) 8.5 − 11.0

66. The most desirable pH range for drinking water as per BIS is

    (1) Less than 7.00

    (2) More than 7.00

    (3) 7.00 to 8.50

    (4) 6.00 to 7.00

67. Acid rain is caused by increase in the atmospheric concentration of

    (1) Ozone and dust

    (2) Sulphur dioxide (SO_2) and nitrogen dioxide (NO_2)

    (3) Sulphur trioxide (SO_3) and carbon monoxide (CO)

    (4) Carbon dioxide (CO_2) and oxygen (O_2)

68. Speed of paddles rotation in mechanical flocculator ranges between

    (1) 2-3 rpm
    (2) 5-10 rpm
    (3) 10-20 rpm
    (4) 100-200 rpm

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69. The volumetric organic loading and aeration period of aeration tank, having BOD$_5$ of 200 mg/L, $\frac{Food}{Microorganisms}$ $\left(F/M\right)$ ratio 0.2 and mixed liquor suspended so concentration 3000 mg/L, respectively are

(1) 0.6 Kg BOD$_5$/m^3.d and 4 hrs.

(2) 0.4 Kg BOD$_5$/m^3.d and 8 hrs.

(3) 1.2 Kg BOD$_5$/m^3.d and 8 hrs.

(4) 0.6 Kg BOD$_5$/m^3.d and 8 hrs.

70. The short circuiting occurring in sedimentation tank is represented by

(1) Surface loading

(2) Recirculation ratio

(3) Detention time

(4) Displacement efficiency

71. The important gaseous pollutants contributing to acid rain are

(1) SO_2 and NO_x (2) NO_x and O_3 (3) CO_2 and H_2S (4) None of these

72. The factors responsible for self purification of a polluted river when it flows on the down stream of point of disposal are

(1) Dilution and dispersion, sedimentation, oxidation and reduction, effect of sunlight and turbulence

(2) Rainfall and surface runoff

(3) Sewage treatment by activated sludge process

(4) Evaporation, percolation etc.

73. Efficiency of conventional cyclones as air pollution control device for particle size range 5-20μ lies between

(1) 50 to 80%

(2) Less than 50%

(3) 80 to 95%

(4) 95 to 99%

74. The minimum per capita water demand for domestic use as recommended by BIS is

(1) 500 Lpcd

(2) Less than 50 Lpcd

(3) 135 Lpcd

(4) 1000 Lpcd

75. The average calorific value of the urban solid waste produced in India is about

(1) 1000 Kcal/Kg (2) 1500 Kcal/Kg (3) 2000 Kcal/Kg (4) 2500 Kcal/Kg

76. The ambient air quality standards of noise in industrial area during day time and night time are respectively

(1) 75 and 70 dB(A) Leq.

(2) 70 to 75 dB(A) Leq.

(3) 65 to 55 dB(A) Leq.

(4) 55 to 65 dB(A) Leq.

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77. Among the following which equipment can not be used for measurement of n...

   (1) Sound Level Meter
   (2) Octave Band Analyser
   (3) Tintometer
   (4) Cassette recorder

78. As per IRC, maximum limit of superelevation for mixed traffic in plain and rolling terrain roads is

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

79. Bituminous materials are commonly used in highway construction because of their good

   (1) tensile and compression properties
   (2) binding and water proofing properties
   (3) shear strength and tensile properties
   (4) bond and tensile properties

80. A flexible pavement of 40 cm thickness is designed for a wheel load of 4100 kg and tyre pressure of 6 kg/cm^2. The required California Bearing Ratio (CBR) of subgrade soil is

   (1) 2.95%
   (2) 5%
   (3) 3.95%
   (4) 10%

81. The cross slope for shoulders should be

   (1) Steeper than the cross slope of adjoining pavement
   (2) Flatter than the cross slope of adjoining pavement
   (3) Same as the cross slope of adjoining pavement
   (4) None of the above

82. Maximum number of passenger cars that can pass a given point on a road during one hour under the most ideal roadway and traffic conditions is known as

   (1) traffic density
   (2) basic capacity of traffic lane
   (3) probable capacity of traffic lane
   (4) all of the above

83. It is generally satisfactory to design the highway facilities for the traffic volume corresponding to

   (1) Peak hour
   (2) Annual average daily traffic
   (3) 30th hour
   (4) 29th hour

84. Number of vehicles occupying a unit length of roadway at a given instant is called as

   (1) Traffic volume
   (2) Traffic capacity
   (3) Traffic density
   (4) None of the above

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85. Optimum signal cycle using Webster's formula is given by

(1) $C_0 = \dfrac{L + 1.5}{1 - Y}$ (2) $C_0 = \dfrac{1.5L + 5.5}{Y - 1}$ (3) $C_0 = \dfrac{1.5L + 5}{1 - Y}$ (4) $C_0 = \dfrac{1.5L + }{Y - 1}$

86. The imaginary line joining the intersection of cross hairs of diaphragm to the optical centre of object glass and its continuation is called as

(1) Axis of telescope   (2) Line of sight
(3) Axis of diaphragm   (4) Line of telescope

87. The least count of levelling staff is

(1) 1 mm   (2) 1 cm   (3) 5 mm   (4) 5 cm

88. In a closed theodolite traverse ABCDA, the following latitudes and departures were calculated

Station	N	S	E	W
A	300.50			200.25
B	200.50		299.05	
C		298.50	199.50	
D		199.50		300.25

If the relative error of closure is 1 in 5000, then the perimeter of traverse is

(1) 71560.11 m   (2) 1397.41 m   (3) 17890.30 m   (4) 5000 m

89. The U fork blumb bomb is used for

(1) masonry work   (2) levelling of plane table
(3) centering of plane table   (4) orientation of plane table

90. The latitude of line is given as

(1) $l\cos\theta$ (2) $l\sin\theta$ (3) $l\tan\theta$ (4) None of the above

91. Two tangents intersect at the chainage 1200 m, the deflection angle being 40°. The number of 30 m long normal chords for setting a circular curve of 300 m radius between these two tangents are

(1) 7   (2) 4   (3) 5   (4) 6

92. The representative fraction of a map scale 1 cm = 5 km is

(1) 1/500000   (2) 1/500   (3) 1/5000   (4) 1/50000

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93. What is the minimum 7 day strength of _____ low heat cement ?
    (1) 24 M.Pa   (2) 16 M.Pa   (3) 30 M.Pa   (4) 28 M.Pa

94. M-20 grade concrete means, concrete having characteristic compressive strength 28 days.
    (1) Less than 20 N/mm^2
    (2) Less than 20 Kg/mm^2
    (3) More than 20 N/mm^2
    (4) More than 200 N/mm^2

95. Match List I (defect in painting) with List II (cause of defect) and select the correct answer using the codes given below the Lists :

List I (defect)	**List II (cause)**
A. Blistering	i) Too smooth surface to be painted
B. Crawling	ii) Insufficient opacity of final coat
C. Grinning	iii) Application of too thick paint
D. Running	iv) Formation of bubbles under the film of paint

	A	B	C	D
(1)	iv	iii	ii	i
(2)	iii	iv	ii	i
(3)	iv	iii	i	ii
(4)	iv	ii	iii	i

96. Which liquid thins the consistency of the paint ?
    (1) Primer   (2) Solvent   (3) Filler   (4) Drier

97. King post roof truss is used for spans.
    (1) 3 to 4 m   (2) 5 to 8 m   (3) 10 to 15 m   (4) 16 to 20 m

98. The estimated cost of a building is ₹ 20,00,000 (exclusive of water supply and sanitary works, electrification works, contingencies and work charged establishment). If 8% for water supply and sanitary works, 8% for electrification work, 3% for contingencies and 2% for work charged establishments are considered the total estimated cost of the building is
    (1) ₹ 24,36,000
    (2) ₹ 24,20,000
    (3) ₹ 24,37,392
    (4) ₹ 22,05,000

99. In which year was National Building Code published ?
    (1) 1950   (2) 1978   (3) 1952   (4) 1970

100. Original cost of property minus depreciation is
    (1) Book value
    (2) Salvage value
    (3) Market value
    (4) Obsolescence value

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SEAL

सूचना – (पृष्ठ 1 वरून पुढे....)

(8) प्रश्नपुस्तिकेमध्ये विहित केलेल्या विशिष्ट जागीच कच्चे काम (रफ वर्क) करावे. प्रश्नपुस्तिकेव्यतिरिक्त उत्तरपत्रिक वा इतर कागदावर कच्चे काम केल्यास ते कॉपी करण्याच्या उद्देशाने केले आहे, असे मानले जाईल व त्यानुसार उमेदवारावर शासनाने जारी केलेल्या ''परीक्षांमध्ये होणाऱ्या गैरप्रकारांना प्रतिबंध करण्याबाबतचे अधिनियम-82'' यातील तरतुदीनुसार कारवाई करण्यात येईल व दोषी व्यक्ती कमाल एक वर्षाच्या कारावासाच्या आणि/किंवा रुपये एक हजार रकमेच्या दंडाच्या शिक्षेस पात्र होईल.

(9) सदर प्रश्नपत्रिकेसाठी आयोगाने विहित केलेली वेळ संपल्यानंतर उमेदवाराला ही प्रश्नपुस्तिका स्वतः बरोबर परीक्षाकक्षाबाहेर घेऊन जाण्यास परवानगी आहे. **मात्र परीक्षाकक्षाबाहेर जाण्यापूर्वी उमेदवाराने आपल्या उत्तरपत्रिकेचा भाग – 1 समवेक्षकाकडे न विसरता परत करणे आवश्यक आहे.**

नमुना प्रश्न

Pick out the correct word to fill in the blank :

Q. No. 201. I congratulate you _____ your grand success.

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

ह्या प्रश्नाचे योग्य उत्तर ''(3) on'' असे आहे. त्यामुळे या प्रश्नाचे उत्तर ''(3)'' होईल. यास्तव **खालीलप्रमाणे** प्र. क्र. 201 समोरील उत्तर-क्रमांक ''③'' हे वर्तुळ पूर्णपणे छायांकित करून दाखविणे आवश्यक आहे.

प्रश्न क्र. 201.   ①   ②   ●   ④

अशा पद्धतीने प्रस्तुत प्रश्नपुस्तिकेतील प्रत्येक प्रश्नाचा तुमचा उत्तरक्रमांक हा तुम्हाला स्वतंत्ररीत्या पुरविलेल्या उत्तरपत्रिकेवरील त्या त्या प्रश्नक्रमांकासमोरील संबंधित वर्तुळ पूर्णपणे छायांकित करून दाखवावा. **ह्याकरिता फक्त काळ्या शाईचे बॉलपेन वापरावे, पेन्सिल वा शाईचे पेन वापरू नये.**

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