महाराष्ट्र अभियांत्रिकी (स्थापत्य) सेवा मुख्य परीक्षा - 2012

प्रश्नपुस्तिका क्रमांक
BOOKLET No.

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प्रश्नपुस्तिका

स्थापत्य अभियांत्रिकी
पेपर – II

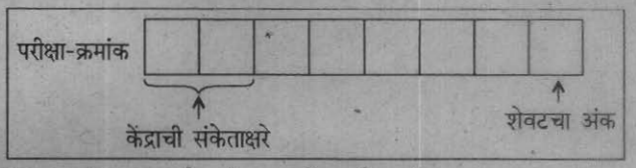
वेळ : 2 (दोन) तास

एकूण प्रश्न : 100
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.

(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 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

SEAL

पर्यवेक्षकांच्या सूचनेविना हे सील उघडू नये

कच्च्या कामासाठी जागा / SPACE FOR ROUGH WORK

1. A survey which consists of observations of the heavenly bodies such as Sun or any fixed star, is known as

(1) Celestial Survey (2) Astrological Survey

(3) Heaven Survey (4) Astronomical Survey

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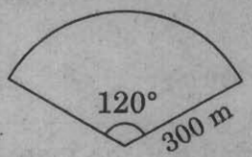
2. If the radius of simple circular curve is 300 m and intersection angle between two straight lines is 120°, the tangent length of curve is



(1) 173·105 m (2) 174·305 m

(3) 173·205 m (4) 175·050 m

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3. In the change point procedure, change point is the point of

(1) the initial position of dumpy level.

(2) the portion of staff where instrument is shifted.

(3) the final position of dumpy level.

(4) None of the above

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4. The process of establishing number of intermediate points between two fixed end points on ground is known as

(1) Ranging (2) Offsets

(3) Station points (4) Auxiliary points

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5. The latitude of a line of closed traverse is its length multiplied by

(1) tangent of reduced bearing (2) sine of reduced bearing

(3) cosine of reduced bearing (4) secant of reduced bearing

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6. When lines come close together in a contour map, it indicates

(1) Hill (2) Reservoir

(3) Steep slope (4) Flat slope

SPACE FOR ROUGH WORK

7. In geodetical observations, the correction for refraction is
   (1) subtractive to both the angle of elevation and the angle of depression
   (2) additive to both the angle of elevation and the angle of depression
   (3) subtractive to the angle of elevation and additive to the angle of depression
   (4) additive to the angle of elevation and subtractive to the angle of depression

8. A road section of length 2 km scales 9 cm on a vertical photograph. The focal length of the camera is 180 mm. If the terrain is fairly level, then the flying height will be
   (1) 40 m (2) 4000 m
   (3) 40 km (4) 400 km

9. The process of determining the location of the station (on the map) occupied by the plane table is
   (1) Intersection (2) Two-point problem
   (3) Resection (4) Traversing

10. The area of irregular plotted figure can be easily determined by using instrument named as
   (1) Pentagraph (2) Planimeter
   (3) Subtense bar (4) Vernier

11. In case of a truly vertical photographic survey, which of the following points coincide ?
   I. Principal point
   II. Isocentre
   III. Plumb point
   (1) I and II only (2) I and III only
   (3) II and III only (4) I, II and III

12. Measurement of discharge of river usually forms a part of
   (1) Topographic surveying (2) Hydrographic surveying
   (3) Geodetic surveying (4) Route surveying

13. A total station is an instrument consisting of the combination of
   (1) prismatic compass, theodolite and dumpy level
   (2) auto level, tacheometer and compass
   (3) electronic theodolite and electronic distance meter
   (4) digital planimeter with auto level

SPACE FOR ROUGH WORK

14. The most reliable estimate is

(1) Detailed estimate (2) Preliminary estimate

(3) Plinth area estimate (4) None of these

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15. While computing masonry work, no deductions are generally made for

(1) opening each up to 0·10 sq. m

(2) ends of beam up to 0·05 sq. m

(3) bed plates and wall plates up to 10 cm

(4) All the above

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16. The estimated quantity of cement required per m^3 in a compacted cement concrete of 1 : 2 : 4 nominal mix is

(1) 305 kg (2) 330 kg

(3) 285 kg (4) 255 kg

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17. Identity correct statements from the following :

a. Centre line method is the most common method for calculating the quantities of walls.

b. Centre line method is suitable for determining quantities of walls which are curved in plan.

c. Out-to-out and in-to-in method is the most common method for calculating quantities of walls.

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

(3) a only (4) b and c

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18. Annual income from a property is ₹ 25,000. The capitalized value of this property for a prevailing rate of 12·5% interest is

(1) ₹ 5,00,000 (2) ₹ 2,00,000

(3) ₹ 2,50,000 (4) ₹ 3,12,000

SPACE FOR ROUGH WORK

19. A property whose owner is in the absolute possession of the property, and the owner can utilise the same in any manner he likes subject to the rules and regulations of Govt. and local authorities is known as

(1) Leasehold property (2) Saleable property

(3) Freehold property (4) Absolute property

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20. 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) Mode of submitting tender

(4) Schedule 'A' of the proposed work

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21. In case of beams, the ratio of breadth to depth is usually taken as

(1) 0·5 to 0·7 (2) 0·9 to 1·0

(3) 1·2 to 1·4 (4) 1·8 to 2·0

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22 *Assertion (A) :* Rate analysis is carried out to work out the actual cost of the structure or building.

Reason (R) : Rate analysis is carried out to revise the schedule of rates.

State whether

(1) Both A and R are true (2) A is true and R is false

(3) A is false and R is true (4) Both A and R are false

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23. Which value of asset will fetch more money from market ?

(1) Distress value (2) Monopoly value

(3) Sentimental value (4) Potential value

SPACE FOR ROUGH WORK

24. Main improvement of Indian Standard Soil Classification system over Unified Soil Classification system was

(1) division of fine-grained into four groups and inclusion of peat.

(2) division of fine-grained soil portion into six groups.

(3) division of fine-grained soil portion into six groups and inclusion of peat.

(4) division of fine-grained soil based on compressibility.

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25. The maximum vertical stress occurs when the angle made by the polar ray attains a value corresponding to value of $\frac{r}{2}$ equal to

(1) 39° 13′ 53·5″ and 0·817 (2) 39° 13′ 53·5″ and 0·488

(3) 33° 33′ 33″ and 0·817 (4) 33° 33′ 33″ and 1·000

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26. The shear strength of loamy soil depends upon

(1) internal friction

(2) cohesion

(3) both internal friction and cohesion

(4) neither internal friction nor cohesion

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27. The mechanics of consolidation was demonstrated by Terzaghi by means of

(1) Newmark's influence chart (2) Spring analogy

(3) Isobar diagrams (4) Pressure bulb

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28. Bearing capacity of soil is ***not*** influenced by

(1) shape and depth of footing (2) position of water table

(3) overcoming load on footing (4) type of soil

SPACE FOR ROUGH WORK

29. Large movement of retaining structure is required to produce

(1) active earth pressure

(2) passive earth pressure

(3) both active and passive earth pressures

(4) at rest pressure

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30. When the allowable soil pressure is low or building loads are heavy, suitable type of foundation is

(1) Strap footing (2) Raft footing

(3) Spread footing (4) Combined footing

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31. A normally consolidated clay stratum 5 m deep is underlain by hard rock. The average effective overburden pressure before and after construction was 25 KPa and 250 KPa. The laboratory tests on this strata indicated : natural moisture content of 50%, specific gravity of '3' and liquid limit of 54%. The consolidation settlement of this layer will be nearly equal to

(1) 0·4 m (2) 0·8 m

(3) 1·6 m (4) 2·0 m

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32. The allowable load on a pile from pile load test is calculated as

(1) 50% load corresponding to a settlement of 10% pile diameter

(2) $\frac{2}{3}$ of load corresponding to a settlement of 12 mm

(3) 50% load corresponding to a settlement of 25 mm

(4) lesser of (1) and (2)

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33. Pneumatic cassions are preferred in situations where the soil flow into the excavated area is _____ than it can be removed.

(1) slower (2) faster

(3) initially faster (4) initially slower

SPACE FOR ROUGH WORK

34. Surface tension is a phenomenon due to

(1) cohesion only

(2) viscous force

(3) adhesion between liquid and solid molecules

(4) difference in magnitude between the forces due to adhesion and cohesion

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35. An object weighs 100 N in air and 75 N in water when fully submerged in it. The specific gravity of the object is

(1) 4·0 (2) 4·5

(3) 2·5 (4) 1·25

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36. A flow of fluid has diverging straight streamlines. If the flow is steady, the flow

(1) is a uniform flow with local acceleration

(2) has convective normal acceleration

(3) has convective tangential acceleration

(4) has convective normal as well as tangential accelerations

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37. The head over a 90° V-notch increases from 0·20 m to 0·40 m. The ratio of the new discharge to the original discharge is

(1) 1·414 (2) 2·000

(3) 4·000 (4) more than 4·000

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38. For a given open channel carrying a certain discharge, the critical depth depends on

(1) the geometry of the channel (2) the viscosity of the liquid

(3) the roughness of the channel (4) the longitudinal slope of the channel

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39. In flow through pipe bends, the pressures on inner and outer radii

(1) do not vary and are same as at center of pipe

(2) vary, it being more on the inner one

(3) are different; pressure increases with increase in radius and is more on outer radius

(4) stand at same level, increasing towards centre

SPACE FOR ROUGH WORK

40. The fluid flow in the model and the prototype will be dynamically similar if

(1) the forces in the two systems are same

(2) the two systems are geometrically similar

(3) the two systems are kinematically similar

(4) the forces at similar points in the two systems have same ratio throughout the flow field

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41. The main function of the surge tank is to

(1) restrict the water hammer effects to small length of penstock

(2) provide a free water surface near turbines

(3) act as a reservoir

(4) protect the penstock from bursting

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42. In all reaction turbines, the following conditions should be satisfied for maximum efficiency :

(1) The velocity of whirl at entrance must be zero

(2) The velocity of flow at outlet must zero

(3) Velocity of whirl at outlet must be zero

(4) Velocity of flow at entrance must be zero

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43. In centrifugal pump, the inlet angle will be designed to have

(1) relative velocity vector in radial direction

(2) absolute velocity vector in radial direction

(3) velocity of flow to be zero

(4) peripheral velocity to be zero

SPACE FOR ROUGH WORK

44. In a hydrological cycle, the average residence time of water in the global
(1) atmospheric moisture is larger than that in the global rivers
(2) oceans is smaller than that of the global groundwater
(3) rivers is larger than that of the global groundwater
(4) oceans is larger than that of the global groundwater

45. An isohyet is a line joining points having
(1) equal evaporation value
(2) equal barometric pressure
(3) equal height above the MSL
(4) equal rainfall depth in a given duration

46. Anticyclone is a
(1) low pressure zone that occurs in the northern hemisphere only
(2) high pressure zone with moderate winds
(3) zone of low pressure with clockwise winds in the northern hemisphere
(4) zone of low pressure with anticlockwise winds in the northern hemisphere

47. Hydrograph is a graph which shows the variation of discharge with
(1) rainfall (2) time
(3) runoff coefficient (4) rainfall excess

48. If the maximum depth of a 50 years – 15h rainfall depth at Bhubaneshwar is 260 mm, the 50 year-3h-maximum rainfall depth at the same place is
(1) < 260 mm (2) > 260 mm
(3) $= 260$ mm (4) None of the above

49. A catchment was found to have a ϕ-index of 0·6 cm/h in winter season. If a rainfall of 3 cm occurs in that season at a uniform rate in a 6 h storm, the resulting direct runoff is
(1) 0·6 cm (2) – 0·6 cm
(3) 0 cm (4) 6·6 cm

50. Indicate the ***incorrect*** statement out of following four statements in which PET stands for Potential Evapotranspiration :
(1) PET depends essentially on climatic factors and is not critically dependent on soil and plant factors.
(2) PET is same as the consumptive use of an irrigated crop.
(3) Decrease in PET of an area on the basis of mean annual value reflects an increase in runoff.
(4) The ratio of PET to lake evaporation is always greater than unity.

SPACE FOR ROUGH WORK

51. The process by which plants dissipate water from the surface of their leaves, stalks and trunks in known as

(1) evaporation (2) evapo-transpiration

(3) delta (4) conjunctive use

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52. Match the following lists :

List I (*Plot of*)		*List II* (*Name*)
a.	Accumulated precipitation vs time in chronological order	I. Hydrograph
b.	Rainfall intensity vs time	II. Hyetograph
c.	Stream flow vs time in chronological order	III. Flow-duration curve
d.	Steam discharge vs percent time the flow is equalled or exceeded	IV. Mass curve of rainfall

	a	b	c	d
(1)	IV	II	I	III
(2)	IV	II	III	I
(3)	II	IV	I	III
(4)	II	IV	III	I

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53. If a soil has an infiltration capacity of f_c, actual infiltration rate f is given by

(1) $f < f_c$ when $i < f$ (2) $f = i$ when $i > f_c$

(3) $f = f_c$ when $i < f_c$ (4) $f < f_c$ when $i > f$

(where i = Rainfall intensity in above options)

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54. The chemical that is found to be most suitable as water evaporation inhibitor is

(1) ethyl alcohol (2) methyl alcohol

(3) cetyl alcohol (4) butyl alcohol

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55. A peak ordinate of a 4-h unit hydrograph for a catchment is 80 m^3/s. The peak ordinate of an 8-h unit hydrograph for the same catchment will be

(1) $> 80\ m^3/s$ (2) $= 80\ m^3/s$

(3) $< 80\ m^3/s$ (4) Data inadequate

SPACE FOR ROUGH WORK

56. Conjunctive use of water in a basin means

(1) the sum of evapo-transpiration and the amount of water used up in plant metabolism.

(2) combined use of surface and ground water resources.

(3) combined use of water for irrigation and hydropower generation.

(4) the sum of evapo-transpiration and infiltration losses.

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57. The moisture content of the soil after free drainage removes most of the gravity water is known as

(1) Wilting point (2) Available moisture

(3) Saturation capacity (4) Field capacity

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58. If the duty on crop is reduced the irrigated area will be

(1) less (2) more

(3) does not depend on duty (4) None of the above

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59. For the irrigation of a crop, the base period is 100 days and delta is 150 cm. Then the duty in ha/m^3. s on the field is

(1) 5·76 (2) 576 (3) 0·576 (4) 13·06

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60. The ratio of the quantity of water stored in the root zone of the crop to the quantity of water actually delivered in the field is known as

(1) water conveyance efficiency (2) water application efficiency

(3) water use efficiency (4) water storage efficiency

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61. Consumptive use for a particular crop is defined as

(1) water used by plant in transpiration only

(2) water used in evaporation from adjacent soils and plant leaves

(3) water used by plant in transpiration and evaporation also

(4) None of the above

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62. Which of the statements given below are correct ?

In the check-basin method of irrigation

a. the ridges interfere with the movement of tractor drawn implements.

b. considerable land is wasted by ridges and lateral channels.

c. the surface drainage is unhindered and as such, is excellent.

d. is unsuitable for growing crops which are sensitive to wet-soil conditions around their stem.

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

SPACE FOR ROUGH WORK

63. The maximum application rate of sprinklers is limited by

(1) the infiltration capacity of the soil

(2) the prevailing wind velocity

(3) the quantity of water available

(4) the prevailing humidity and radiation

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64. Leaching is the process in which

(1) water table is lowered by using pumps

(2) land is flooded with adequate depth of water to reduce salts in the top layer

(3) land is flooded with adequate depth of water to reduce salts in the bottom layer

(4) None of the above

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65. An irrigant has the ionic concentrations of Na^{+}, Ca^{+2} and Mg^{+2} as 30, 10 and 8 meq/L respectively. The Sodium Adsorption Ratio (SAR) of this water is

(1) 0·10 (2) 3·33 (3) 10 (4) 1·66

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66. A land is known as waterlogged when

(1) gravity drainage has ceased

(2) permanent wilting point is reached

(3) the soil becomes completely saturated

(4) capillary fringe reaches the root zone of the plants

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67. An aqueduct means

(1) passing canal below the drainage

(2) passing canal below the road

(3) passing the drain through the canal

(4) passing the canal over the drainage

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68. The uplift pressure is reduced _____ in a gravity dam when a drainage gallery with its drainage pipe system is provided.

(1) at all levels below the upstream level

(2) at all levels below the drainage gallery

(3) at all levels below the downstream level

(4) at the foundation level only

SPACE FOR ROUGH WORK

69. In planning surveys for highways, which of the following studies is concerned with collection of details about the trend of population growth ?

(1) Engineering studies (2) Economic studies

(3) Financial studies (4) Traffic studies

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70. Which of the following statements gives the most suitable meaning of highway alignment ?

(1) Fixing the direction of highway

(2) Deciding the radius of horizontal and vertical curves

(3) Determining the gradient of volley and summit curves

(4) Layout of the centre line of the highway on ground

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71. Which of the following values is recommended by IRC as longitudinal friction coefficient for calculation of the stopping sight distance ?

(1) 0·05 to 0·10 (2) 0·15 to 0·20

(3) 0·25 to 0·30 (4) 0·35 to 0·40

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72. Which of the following terms represents cross slope provided to the road surface to drain off the rainwater ?

(1) Shoulder (2) Camber

(3) Kerb (4) Drain

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73. Width of the carriageway for single lane as standardised by IRC is

(1) 2·44 m (2) 2·50 m

(3) 3·50 m (4) 3·75 m

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74. The mechanical widening of pavement required on horizontal curve along a two traffic lane road is given by which of the following equations ?

(1) $W_m = l^2/2R$ (2) $W_m = l^2/R$

(3) $W_m = 2l^2/R$ (4) $W_m = l^2/\sqrt{R}$

SPACE FOR ROUGH WORK

75. It is not desirable to provide transition curve on which of the following types of curves ?

(1) Summit curves (2) Valley curves

(3) Sharp curves (4) Steep curves

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76. In traffic engineering, which of the following information is collected by road side interview method ?

(1) Origin and destination data (2) Traffic capacity data

(3) Traffic volume data (4) Parking studies

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77. CBR test is developed to evaluate which of the following ?

(1) Shearing resistance of soil (2) Modulus of subgrade reaction

(3) Stability of soil subgrade (4) Stress – strain relationship of soil

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78. To study weathering action on road aggregate, which of the following tests is carried out ?

(1) Abrasion test (2) Crushing test

(3) Impact test (4) Soundness test

---

79. Guidelines of design of flexible pavement are recommended in which of the following IRC codes ?

(1) IRC 29 (2) IRC 37

(3) IRC 58 (4) IRC 86

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80. As per IRC recommendations for design of concrete pavements, the flexural strength of cement concrete used in the pavement should ***not*** be less than

(1) 6 kg/cm^2 (2) 24 kg/cm^2

(3) 30 kg/cm^2 (4) 40 kg/cm^2

SPACE FOR ROUGH WORK

81. A small bridged passage for the conveyance of water, under the road, from one side of the roadway to the other side is known as
(1) Underground drain (2) Channel
(3) Aqueduct (4) Culvert

82. If afflux is more, scour depth
(1) will be less (2) will be more
(3) will have no effect on it (4) None of the above

83. IRC recommendations for minimum width of footpath on bridge is
(1) 1·0 m (2) 1·5 m (3) 2·0 m (4) 2·5 m

84. IRC standard loading for bridge designs are
(1) Class A, Class B, Class AB and Class 70-R
(2) Class A, Class B, Class AB and Class 90-R
(3) Class A, Class B, Class BB and Class 70-R
(4) Class A, Class B, Class AA and Class 70-R

85. The type of bearing used on a bridge, depends on
(1) Amount of movement of the bridge ends
(2) Temperature variations
(3) Load carried
(4) All of the above

86. Abutment piers are provided in multiple span
(1) Arch bridges (2) Submersible bridges
(3) Temporary bridges (4) Suspension bridges

87. The difference between the designed H.F.L. allowing for afflux, if any, and the level of crown of road at its lower point, whether on the bridges or its approaches, is known as
(1) Head room (2) Free room
(3) Highest water level (4) Free board

88. Culverts are provided for linear waterway upto maximum of
(1) 6 m (2) 9 m (3) 12 m (4) 15 m

89. A thin wall used as a shield or protection against scouring action of stem is called
(1) Baffle wall (2) Dwarf wall
(3) Curtain wall (4) Any of the above

90. Floats are used to measure
(1) Discharge of stream (2) Velocity of stream
(3) Flood discharge (4) Afflux

SPACE FOR ROUGH WORK

91. Which air pollutant is ***not*** included in National Ambient Air Quality Standards 2009 ?

(1) Ozone (2) Benzene

(3) Mercury (4) Arsenic

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92. The fire demand for a population of 1·5 lakh as per the recommendation of IS 9668 : 1990 is

(1) 1800 litre/min (2) 3600 litre/min

(3) 5400 litre/min (4) 7200 litre/min

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93. The following characteristics pertain to the sand filters in water treatment :

a. The effective size of filter medium is 0·25 mm to 0·35 mm.

b. Backwashing is carried out by air scouring followed by water washing.

c. The suspended solids are removed at the surface on biofilm mat.

Which of these are related to slow sand filters ?

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

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

---

94. What are the Ambient Air Quality Standards in respect of noise in daytime for industrial and commercial areas respectively ?

(1) 75, 65 dB(A) Leq. (2) 75, 70 dB(A) Leq.

(3) 75, 55 dB(A) Leq. (4) 65, 55 dB(A) Leq.

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95. The following data pertain to a sewage sample at 20°C :

Initial dissolved oxygen = 6 mg/L

Final dissolved oxygen after 5 days = 3·5 mg/L

Dilution ratio = 0·02

The BOD_5 of the above sample at 20°C is

(1) 500 mg/L (2) 125 mg/L

(3) 175 mg/L (4) 12·5 mg/L

SPACE FOR ROUGH WORK

96. Which of the following is attached growth process used for waste water treatment ?

(1) Rotating Biological Contactor (2) Activated Sludge Process

(3) Aerated Lagoon (4) Waste Stabilization Pond

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97. Which of the following pairs is/are correctly matched ?

a. Trickling filter – Attached growth anaerobic treatment system

b. Activated sludge process – Suspended growth aerobic treatment system

c. Oxidation pond – Suspended growth aerobic treatment system

d. Oxidation ditch – Modified activated sludge process

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

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

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98. Factors that influence sedimentation process are

(1) size, viscosity, density and temperature of water

(2) surface overflow rate, detention time

(3) inlet and outlet characteristics, depth of settling

(4) All the above

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99. Which of the following statements are correct ?

a. The burning of gasoline fuel emits carbon monoxide.

b. Sulphur dioxide is formed from coal burning.

c. The burning of tyres results in hydrocarbons.

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

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

---

100. What is the standard for *E. coli* as per Drinking Water Quality Standards IS : 10500 ?

(1) 10/100 mL (2) 5/100 mL

(3) 0/100 mL or absent (4) 1/100 mL

SPACE FOR ROUGH WORK

सूचना - (पृष्ठ 1 वरुन पुढे....)

(8) प्रश्नपुस्तिकेमध्ये विहित केलेल्या विशिष्ट जागीच कच्चे काम (रफ वर्क) करावे. प्रश्नपुस्तिकेव्यतिरिक्त उत्तरपत्रिकेवर 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 परीक्षा कक्षाबाहेर 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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