महाराष्ट्र राजपत्रित तांत्रिक सेवा (मुख्य) स्पर्धा परीक्षा
अभियांत्रिकी सेवा (स्थापत्य) गट-अ व ब मुख्य परीक्षा २०२२

प्रश्नपुस्तिका क्रमांक
BOOKLET No.

202141

2022

प्रश्नपुस्तिका – II I17 संच क्र. **A**

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. तसेच अन्य काही दोष आढळल्यास ही प्रश्नपुस्तिका समवेक्षकांकडून लगेच बदलून घ्यावी.

(2) आपला परीक्षा-क्रमांक ह्या 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 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. एकापेक्षा जास्त उत्तरे नमूद केल्यास ते उत्तर चुकीचे धरले जाईल व त्या चुकीच्या उत्तराचे गुण वजा केले जातील.

(7) **प्रस्तुत परीक्षेच्या उत्तरपत्रिकांचे मूल्यांकन करताना उमेदवाराच्या उत्तरपत्रिकेतील योग्य उत्तरांनाच गुण दिले जातील. तसेच ''उमेदवाराने वस्तुनिष्ठ बहुपर्यायी स्वरूपाच्या प्रश्नांची दिलेल्या चार उत्तरांपैकी सर्वात योग्य उत्तरेच उत्तरपत्रिकेत नमूद करावीत. अन्यथा त्यांच्या उत्तरपत्रिकेत सोडविलेल्या प्रत्येक चुकीच्या उत्तरांसाठी 25% किंवा 1/4 गुण वजा/कमी करण्यात येतील''.**

पर्यवेक्षकांच्या सूचनेविना हे सील उघडू नये

SEAL

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

कच्च्या कामासाठी जागा/SPACE FOR ROUGH WORK

1. The relationship between porosity (n%), air content (a_c%) and percentage air voids (n_a%) is given by

(1) $n = n_a a_c$ (2) $a_c = nn_a$

(3) $n_a = n.a_c$ (4) $a_c = n - n_a$

2. For a soil OMC is 27%. If the water content is decreased to 24%, the maximum dry density of soil will _____ .

(1) Increase (2) Decrease

(3) Remain same (4) None of the above

3. Given that for a soil deposit :

k_o = Coefficient of earth pressure at rest

k_p = Coefficient of passive earth pressure

k_a = Coefficient of active earth pressure

and μ = Poisson's ratio

The value of $(1-\mu)/\mu$ is given by

(1) k_a/k_p (2) k_o/k_a

(3) k_p/k_a (4) $1/k_o$

4. Match the following :

(a)	Earth pressure	(i)	Hansen
(b)	Slope stability	(ii)	Hiley
(c)	Bearing capacity	(iii)	Culmann
(d)	Pile capacity by dynamic method	(iv)	Bishop

Answer options :

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

5. Two footings, one circular and other square are founded in pure clay. The diameter of the circular footing is the same as the side of the square footing. The ratio of their net ultimate bearing capacity

(1) is 1·3

(2) is $\frac{1}{1 \cdot 3}$

(3) is unity

(4) cannot be determined without some more data

6. A temporary structure constructed in a river/lake to provide a working area for the purpose of excluding water during construction is known as

(1) Caisson (2) Conduit
(3) Levee (4) Cofferdam

---

7. For the design of strap footing, which of the following assumptions is ***not*** made ?

(1) The soil pressure varies linearly.
(2) The strap is perfectly rigid.
(3) The strap is weightless.
(4) The interior footing is centrally loaded.

---

8. Match the following :

(a)	End bearing pile	(i)	To protect water front structures
(b)	Tension pile	(ii)	To resist against horizontal pull from sheet piling
(c)	Anchor pile	(iii)	Transfer load to rock
(d)	Fender pile	(iv)	To resist uplift due to hydrostatic pressure

Answer options :

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

---

9. The diameter of the main cell of a cellular cofferdam is usually kept as

(1) 0·5 H to 0·6 H (2) 0·7 H to 0·8 H
(3) 1·0 H to 1·2 H (4) 1·5 H to 2·0 H

---

10. The specific volume of a fluid is the reciprocal of _____ .

(1) density (2) relative density
(3) specific weight (4) specific gravity

---

11. The most economical section of an open channel is one for which

(1) area of section is least (2) wetted perimeter is least
(3) discharge is minimum (4) depth of flow is critical

---

12. Which law is given in the following statement ?
"The pressure or intensity of pressure at a point in a static fluid is equal in all directions."
(1) Newton's law (2) Pascal's law
(3) Ohm's law (4) Second law of Thermodynamics

---

13. The metacentric height is the distance between the
(1) centre of gravity of the floating body and the centre of buoyancy.
(2) centre of gravity of the floating body and the metacentre.
(3) metacentre and centre of buoyancy.
(4) original centre of buoyancy and new centre of buoyancy.

---

14. A piezometer gives _____ .
(1) local atmospheric pressure (2) small magnitude of pressure
(3) large vacuum pressure (4) total head

---

15. When fluid is at rest, shear stress is _____ .
(1) + 1 (2) – 1
(3) Zero (4) None of the above

---

16. In network of pipes, for correct distribution of flow,
(1) the head loss around each elementary circuit must be zero.
(2) the head loss in all circuits is the same.
(3) the elevation of hydraulic grade line is assumed for each junction.
(4) elementary circuits are replaced by equivalent pipe.

---

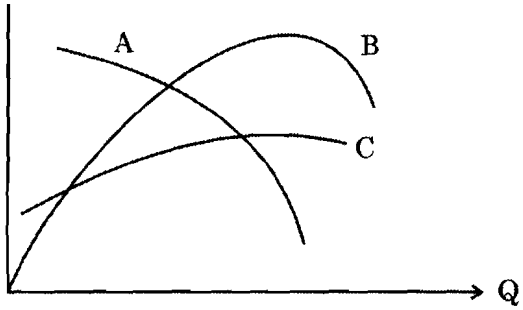
17. A body floats in stable equilibrium if the _____ .
(1) metacentre is above the Centre of Gravity
(2) metacentric height is zero
(3) Centre of Gravity is above the centre of buoyancy
(4) Centre of Gravity is below or at the centre of buoyancy

---

18. The coefficient of velocity is determined experimentally by using the relation (with standard notations)
(1) $C_v = \sqrt{\frac{y^2}{4xH}}$ (2) $C_v = \sqrt{\frac{x^2}{4yH}}$
(3) $C_v = \sqrt{\frac{4xH}{y^2}}$ (4) $C_v = \sqrt{\frac{4yH}{x^2}}$

---

19. The operating characteristic curves of a centrifugal pump are shown in the figure below, curve A is for



(1) Head (2) Efficiency

(3) Power (4) None of the above

---

20. A turbine develops 8000 kW when running at a speed of 130 rpm and under a head of 30 m. The specific speed of the turbine will be

Given : $\sqrt{8000} = 89{\cdot}44$

$H^{5/4} = 70{\cdot}2104$

(1) 110 rpm (2) 146 rpm

(3) 216 rpm (4) 166 rpm

---

21. During a certain period, the load of the plant is varying from 12000 kW to 26000 kW. Calculate the load factor.

(1) 0·8308 (2) 0·6308

(3) 0·9308 (4) 0·7308

---

22. An air vessel in the delivery side of a reciprocating pump

(1) maintains steady discharge output.

(2) prevents cavitation in the system.

(3) enables suction head to be increased.

(4) enables the pump to run at higher speed.

---

23. The capacity factor is the ratio of

(1) maximum load to the plant capacity.

(2) actual capacity to the rated capacity.

(3) average load to the plant capacity.

(4) energy output to the available energy within the capacity and characteristics of the plant.

कच्च्या कामासाठी जागा / **SPACE FOR ROUGH WORK**

24. The velocity heads of water at the inlet and outlet sections of a draft tube fitted in a reaction turbine are 4·0 m and 0·5 m respectively. The frictional and other losses in the draft tube are 0·50 m. What is the efficiency of the draft tube ?

(1) 25% (2) 50% (3) 75% (4) 90%

---

25. The reciprocating pump is called as

(1) negative displacement pump
(2) positive displacement pump
(3) zero displacement pump
(4) All of the above

---

26. Kaplan turbine is suitable for the condition of

(1) low head and high discharge
(2) high head and low discharge
(3) medium head and medium discharge
(4) All of the above

---

27. Which of the following statements pertaining to centrifugal pump installation is ***incorrect*** ?

(1) The discharge control valve is fitted in the suction pipe.
(2) The suction pipe has larger diameter as compared to that of the delivery pipe.
(3) The suction pipe is provided with a foot valve and a strainer.
(4) The discharge control valve is fitted in the delivery pipe.

---

28. A canal is 10 km long and has an average width of 10 m over its length. The evaporation as measured in a Class-A PAN is 0·10 cm/day. What would be the volume of water evaporated (in m^3) in a week ? Consider the Pan-coefficient equal to 0·70.

(1) 100 m^3 (2) 490 m^3
(3) 1000 m^3 (4) 4900 m^3

---

29. According to National Commission on Agriculture (1976), which of the following does ***not*** come in the category of drought ?

(1) Grain Drought
(2) Meterological Drought
(3) Hydrological Drought
(4) Agricultural Drought

---

30. Channel routing is the computation of

(1) changes in the shape of the outflow hydrograph when the flow has passed through a channel.

(2) changes in the shape of the inflow hydrograph while a flood wave passes through a channel downstream.

(3) the quantity of storage in a channel.

(4) changes in the direction of outflow from the channel.

---

31. Which of the following is ***not*** a direct stream flow determination technique ?

(1) Dilution technique (2) Ultrasonic method

(3) Area-Velocity method (4) Slope area method

---

32. Lysimeter is used to measure

(1) Infiltration (2) Evaporation

(3) Evapotranspiration (4) Vapour pressure

---

33. A unit hydrograph consists of one unit of

(1) effective rainfall duration

(2) peak discharge

(3) hydrograph time base

(4) direct runoff due to 1 cm effective rainfall

---

34. The runoff volume above φ-Index is usually known as

(1) Afflux (2) Rainfall Excess

(3) Infiltration (4) True Runoff

---

35. A Hyetograph is a plot of

(1) time against water

(2) time against air

(3) the intensity of rainfall against the time interval

(4) flood against time

---

36. The basic assumptions of the unit hydrograph theory are

(1) non-linear response and time invariance

(2) time invariance and linear response

(3) linear response and linear time variance

(4) non-linear time variance and linear response

कच्च्या कामासाठी जागा / **SPACE FOR ROUGH WORK**

37. Water is released at the rate of 5 cumecs at the head sluice. If the duty at the field is 100 hectares/cumec and the loss of water in transit is 30%, find the area of the land that can be irrigated.

(1) 150 ha (2) 350 ha (3) 400 ha (4) 450 ha

---

38. Which of the following is considered as the limitation of sprinkler irrigation system ?

(1) Seepage losses are eliminated
(2) No cultivation area is lost
(3) This method leaches down salts
(4) High winds may distort sprinkler pattern

---

39. The water distribution method adopted specially for orchard trees is

(1) Border flooding (2) Check flooding
(3) Basin flooding (4) Wild flooding

---

40. Which of the following river training structures is used for maintaining axial flow in the river ?

(1) Pitched Island (2) Groynes
(3) Levees (4) Guide Bunds

---

41. Flume is an artificially narrowed section of the channel which is used for

(1) protecting the banks (2) removal of silt
(3) diverting the flow (4) measuring the discharge

---

42. Which of the following types of failures is classified as a structural failure of an earth dam ?

(1) Piping through foundation (2) Sliding of embankment
(3) Erosion of upstream face (4) Erosion of downstream face

---

43. 10 cumecs of water is delivered to a 24 hectare field for 4 hours. It is observed that 0·3 m of water has been stored in the root zone. Compute the water application efficiency.

(1) 20% (2) 40% (3) 50% (4) 60%

---

44. "Cavitation" over spillways occurs when

(1) operating head is more than the designed head.
(2) operating head is less than the designed head.
(3) there is no flow over spillway.
(4) operating head is equal to designed head.

---

45. A steady sloping open channel placed along a dam abutment or through a flank is called as

(1) Ogee spillway (2) Trough spillway
(3) Shaft spillway (4) Side channel spillway

---

46. Match the pair :

(a)	Jayakar Committee	(i)	1934
(b)	IRC formation	(ii)	1952
(c)	CRRI Establishment	(iii)	1956
(d)	NH Act	(iv)	1927

Answer options :

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

---

47. As per IRC, the reaction time considered for OSD calculation is _____ seconds.

(1) 2 (2) 2·5 (3) 2·7 (4) 1·7

---

48. As per 3rd 20 Year Road Plan, the length of National Highways is given by area of country divided by _____ .

(1) 20 (2) 25 (3) 50 (4) 75

---

49. Consider the following statements about camber :

(a) Camber is the slope provided to road surface in the transverse direction.
(b) It is provided to remove the rainwater from pavement surface as quickly as possible.
(c) Value of camber does not depend on the amount of rainfall.

Which of the above statements are correct ?

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

---

50. The ruling design speed recommended by IRC for National Highways passing through rolling terrain is _____ .

(1) 120 kmph (2) 40 kmph (3) 20 kmph (4) 80 kmph

कच्च्या कामासाठी जागा / SPACE FOR ROUGH WORK

51. Consider the following statements about phases of highway planning :

(a) Assessment of requirement of road length for an area.

(b) Preparation of Master Plan showing the phasing in Five Year Plan or annual plan.

Which of the above statements is/are correct ?

(1) Only (a) is correct. (2) Only (b) is correct.

(3) Neither (a) nor (b) are correct. (4) Both (a) and (b) are correct.

---

52. The consistency of paving grade bitumen is determined by _____ .

(1) Ductility test (2) Viscosity test

(3) Softening point test (4) Penetration test

---

53. As per IRC, the passenger car unit for a motorcycle in rural areas is _____ .

(1) 0·50 (2) 0·75 (3) 0·80 (4) 1·00

---

54. Tie bars in cement concrete pavement are used across _____ .

(1) Contraction joints (2) Expansion joints

(3) Construction joints (4) Longitudinal joints

---

55. Consider the following statements about estimation of flood discharge for bridge design :

(a) It can be estimated by using empirical formula such as Dicken's formula.

(b) It can be estimated by using rational method.

(c) It can be estimated by using Area-Velocity method.

Which of the above statements is/are correct ?

(1) Only (c) (2) (a) and (c) (3) (b) and (c) (4) All of the above

---

56. For vehicular traffic, minimum roadway width for two-lane bridge is _____.

(1) 425 cm (2) 750 cm

(3) 200 cm (4) 300 cm

---

57. From the following methods, which is ***not*** used to work out safe bearing capacity of an existing bridge ?

(1) Correlation method

(2) Load testing method

(3) Impact method

(4) Theoretical method

---

58. Find the ***incorrect*** answer.
'Force acting on bridge foundation', is
(1) Self-weight of foundation
(2) Weight of superstructure
(3) Uplift pressure
(4) Earth pressure

---

59. It is considered reasonable to design bridges for flood occurring once in _____ years and to design culverts for floods occurring once in _____ years.
(1) 100, 30 (2) 100, 40
(3) 100, 20 (4) 100, 50

---

60. Weep holes are provided in which of the following components of bridge ?
(1) Foundation (2) Abutment
(3) Pier (4) Slab

---

61. Which of the following is ***not*** used to estimate maximum discharge through stream ?
(1) Dickens formula
(2) Inglis formula
(3) Chezy formula
(4) Khosla formula

---

62. Abutment pier is used in construction of
(1) Culvert (2) Slab drain
(3) Minor bridge (4) Arch bridge

---

63. Which of the following statements is/are correct regarding afflux ?

(a) Greater the afflux, greater will be the velocity under the downstream side of bridge.

(b) Greater the afflux, lesser will be the depth of foundation required.

Answer options :

(1) Only (a)

(2) Only (b)

(3) Both (a) and (b)

(4) Neither (a) nor (b)

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64. Consider the following statements related to tunnel lighting :

(a) The spacing of lights will depend on size of light source.

(b) The spacing of lights will depend on tunnel dimensions.

(c) It is desirable to have few lights of more wattage.

(d) It is desirable to have more lights of small wattage.

Which of the above statements are correct ?

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

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

---

65. Which of the following statements is/are correct ?

The open cut is not desirable because

(a) It requires shorter lengths due to approaches.

(b) The maintenance cost of railway tracks and pavements is very high.

(c) It requires larger locomotives due to grades.

(d) It will require more time for construction.

Answer options :

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

(3) (b), (c) and (d) are correct (4) (b) and (c) are correct

---

66. Which of the following shape of tunnel gives self-cleansing velocity in dry weather flow and proves to be quite effective in resisting external as well as internal pressures ?

(1) Circular section (2) Rectangular section

(3) Egg-shaped section (4) Horseshoe form

---

67. Consider the following statements with respect to electric detonators used in blasting operations :

(a) They are safe and certain.

(b) They do not permit successive firing of holes with required delay.

(c) They are not waterproof.

(d) The process of ignition is smoother as compared to blasting fuse.

Which of the above statements is/are ***incorrect*** ?

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

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

68. Which of the following methods is ***not*** the popular method of tunneling in rocks ?

(1) Full-face method

(2) New Zealand method

(3) Drift method

(4) Heading and Benching method

---

69. Which of the following options is the governing factor in deciding the size of shaft provided in tunnel during construction ?

(1) Amount of muck to be removed

(2) Hoisting system used

(3) Size of muck car

(4) All of the above

---

70. What should be the interval for cross-sectioning the tunnel accurately ?

(1) 1 M – 2 M (2) 4 M – 6 M

(3) 2 M – 4 M (4) 8 M – 15 M

---

71. Consider the following factors :

(a) Nature of rock

(b) Method of tunnelling

(c) Profile of tunnel

(d) Depth of lift

Which of the factors stated above affect the quantity of explosives required for blasting ?

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

(3) (c) and (d) (4) All of the above

---

72. Which of the following is ***not*** the type of lighting used in tunnels ?

(1) Lamps and lanterns using burning oil

(2) Gobar gas lighting

(3) Coal gas lighting

(4) Acetylene lighting

---

73. How much percentage of the total BOD is the first stage BOD for sewage ?

(1) 90% (2) 100% (3) 99% (4) 98·5%

---

74. Which of the following points are valid for design of sewage treatment plants ?

(a) It is better to provide more than one unit for each treatment process.

(b) Preferably by-passes should be avoided for all units.

(c) Hydraulic design should ensure self-cleaning velocity wherever required.

Answer options :

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

(3) Only (a) and (c) (4) All of the above

---

75. Which of the following statements are applicable to Bangalore method of composting ?

(a) Biodegradable solid waste and night soil is placed in alternate layers, in earthen trenches.

(b) It is primarily anaerobic in nature.

(c) The fill is turned regularly for 3 months.

(d) The fill is covered with 15 cm layer of earth.

Answer options :

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

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

---

76. A list of advantages of the activated sludge process is given below. Which of them is/are ***not*** correct ?

(a) Smaller area of land is required

(b) Efficiency of the process is high

(c) Less quantity of sludge is produced

(d) No fly nuisance

Answer options :

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

(3) Only (c) (4) Only (d)

77. Those streams which dry up in summer and contain water only during rainfall are known as

(1) Intermittent streams

(2) Dry streams

(3) Rainy streams

(4) Perennial streams

---

78. Name the Indian Standard Code used for basic requirements of water supply in India.

(1) IS : 12183 (2) IS : 1343

(3) IS : 456 (4) IS : 1172

---

79. Which of the following is a disadvantage of mechanical floculators in case of water treatment ?

(1) Dead spaces in the corners

(2) Less capacity of tank is required

(3) Better floc formation

(4) More flexible in operation

---

80. Which of the following formulae clearly define moisture content in solid waste ?

Where a = Initial mass of sample as delivered

b = Mass of sample after drying

(1) $\left(\frac{a-b}{a}\right) \times 100$ (2) $\left(\frac{b-a}{b}\right) \times 100$

(3) $\left(\frac{a+b}{a}\right) \times 100$ (4) $\left(\frac{a}{a+b}\right) \times 100$

---

81. In case of air pollution, particle size of cement dust and fly ash falls in the range of

(1) 0·001 to 0·01 μm

(2) 0·01 to 100 μm

(3) 100 to 1000 μm

(4) 1000 to 2000 μm

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82. A curve provided to change the horizontal alignment from infinite at the straight end to desired radius of the circular curve gradually is called

(1) Compound Curve (2) Vertical Curve
(3) Reverse Curve (4) Transition Curve

---

83. Which of the following is ***not*** an indirect method of measuring distances ?

(1) Tacheometry
(2) Odometer
(3) Trigonometric Levelling
(4) Electromagnetic Distance Measurement

---

84. What correction needs to be applied for observed staff reading in levelling for curvature correction for a distance of 1000 m ?

(1) 0·0785 m (2) 0·06783 m
(3) 0·0785 km (4) 0·112 km

---

85. The bisector of the angle of tilt which meets the photograph at a point, which in a vertical aerial photograph coincides with photo-nadir point and the principal point is called as

(1) Nadir Point (2) Principal Point
(3) Isocentre (4) Plumb Point

---

86. The distance AB on the ground on a plan drawn to a scale of 1 cm = 50 m was found to be 50 m. Later it was detected that the surveyor wrongly used a scale of 1 cm = 40 m in the calculations. Find the true ground length of the line AB.

(1) 500 m (2) 625 m (3) 2000 m (4) 200 m

---

87. Which are multiplying and additive constants of tacheometry respectively ?

(1) 100 and 0 (2) 0 and 100
(3) 125 and 10 (4) 10 and 125

---

88. In order to obtain the exact volume, in case the cross-sectional areas are calculated by the end area formula, the prismoidal correction

(1) is additive (2) may be additive or subtractive
(3) None of the above (4) is subtractive

---

89. Which of the following is ***not*** a method of geodetic surveying ?

(1) Triangulation (2) Precise Traversing
(3) Tacheometric Surveying (4) Trilateration

---

90. The contour interval for a particular map is

(1) kept constant (2) made variable

(3) made irregular (4) made plane

---

91. In hydrographic surveying, if the speed of sound in water is v, the time interval between the transmitter and receiver is t, the depth h is given by the formula

(1) $h = 2vt$ (2) $h = vt^2$ (3) $h = vt + \frac{1}{2}gt^2$ (4) $h = \frac{1}{2}vt$

---

92. In view of the general principles of specification writing, which of the following statement/s is/are ***not*** correct ?

(a) The specification writer should give reasons for what he specifies.

(b) Cross-references should be minimized, and only titles be referred, if need be.

(c) All items affecting the cost of the work should be included and described in detail.

(d) Commercial sizes should be specified as far as possible.

Answer options :

(1) Only (a) (2) Only (b)

(3) Only (b) and (c) (4) None of the above

---

93. Which of the following is ***not*** an approximate method of Estimate ?

(1) Annual Repair or Maintenance Estimate

(2) Plinth Area Estimate

(3) Cubical Content Estimate

(4) Service Unit Method

---

94. What is the volume of coarse aggregate required to make 100 m^3 of finished concrete of grade M–15 ?

Take the dry volume to wet volume ratio as 1·54.

(1) 76 m^3 (2) 88 m^3 (3) 96 m^3 (4) 106 m^3

---

95. Which of the following statement/s is/are applicable to cost-plus type contracts, generally ?

(a) Early completion of the work is possible.

(b) A better quality work is produced.

(c) A lot of account-keeping is required.

(d) It is commonly employed for public works.

Answer options :

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

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

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96. The net annual income from a property deducting all outgoings is ₹ 3,00,000. What would be the capitalized value of the property, if the rate of interest is 10% per annum ?

(1) ₹ 3,00,000 (2) ₹ 33,00,000

(3) ₹ 30,00,000 (4) ₹ 3,30,000

---

97. Which of the following are the items to be included for computing the cost of owning and operating construction equipment ?

(a) Running costs

(b) Investment costs

(c) Cost of maintenance and repairs

(d) Depreciation

Answer options :

(1) All of the above

(2) Only (a) and (b)

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

(4) Only (a), (b) and (d)

---

98. The following is ***not*** a purpose of valuation of a property :

(1) Assessment of different Taxes

(2) Fixation of Rent

(3) Security for Loans or Mortgage

(4) Rate Analysis

---

99. Find out the book value, after 6 years of an asset costing ₹ 10 lakh originally, assuming 10 years as life of the asset and the scrap value of ₹ 1 lakh. (Assume straight line depreciation) Select the correct option.

(1) ₹ 4·6 lakh (2) ₹ 5·4 lakh

(3) ₹ 4·0 lakh (4) ₹ 6·0 lakh

---

100. If cement and steel are supplied by the Department and ***not*** by the contractor, then the percentage of profit on steel and cement in Rate Analysis is deducted by

(1) 20% (2) 15%

(3) 25% (4) 10%

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सूचना – (पृष्ठ 1 वरून 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 स्वत: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 प्रश्न क्र. **201** समोरील उत्तर-क्रमांक "③" हे वर्तुळ पूर्णपणे छायांकित करून दाखविणे आवश्यक आहे.

प्र. 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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