Do not open this booklet until you are asked to do so.
इस पुस्तिका को तब तक न खोलें जब तक कहा ना जाए।

Question Booklet
प्रश्न पुस्तिका

Subject: Civil Degree
विषयः– सिविल डिग्री

Code: C
कोडः सी

Duration: 2 hours
समय : 2 घण्टे

Max. Marks: 100
अधिकतम अंकः 100

1. Candidate's Roll no. परीक्षार्थी क्रमांक	2. Question booklet Serial number : प्रश्न पुस्तिका क्रमांकः

Important Instructions
महत्वपूर्ण निर्देश

1. Number of pages in the booklet : 13
2. This Booklet is divided into Two Parts namely Part A and Part B. Part A contains 20 questions and Part B contains 80 questions.
3. Questions in Part A are in both English and Hindi language and in Part B in English language only.
4. All questions carry equal marks.
5. Please use **Black ink Ball Point Pen** to fill OMR answer sheet.
6. Answer all the questions in OMR sheet.
7. Each que stion has four alte rnative responses marked serially as A,B,C, and D. You have to darken only one circle in the supplied OMR sheet for each question.
8. **Negative marking** will be done in c ase of each wrong/m ultiple reply. 1/3rd part of the mark(s) allotted to the question will be deducted.
9. If more than one options for an answer are marked correct then it will be treated as wrong answer.
10. Rough work should be done only in the space provided at the end of the Question Booklet
11. Use of mobile phone or any type of electronic device (except non programmable calculator) is strictly prohibited in the examination hall. Any candidate found with s uch objectionable material/device will be strictly dealt as per state government rules.
12. Please hand over both Answer Sheet and the Question Booklet to the Invigilator before leaving the Examination Hall.
13. In case of any variation in English or Hindi version, English version should be treated as correct.

Warning: If a candidate is found copying or if any unauthorized material is found in his/her possession, F.I.R will be lodged against his/her in the police station and he/she will be prosecuted under section 3 of the R.P.F. (Prevention of unfair means) Act, 1992.

1. पुस्तिका में पृष्ठों की संख्याः 13
2. पुस्तिका में प्रश्नों को दो पार्ट में विभाजित किया गया है, क्रमशः ए एवं बी. पार्ट ए में 20 प्रश्न तथा पार्ट बी में 80 प्रश्न दिये हुए हैं।
3. पार्ट ए हिन्दी एवं अंग्रेजी (द्विभाषीय) में एवं पार्ट बी में प्रश्न केवल अंग्रेजी (एकभाषीय) में दिये हुए हैं।
4. सभी प्रश्नों के अंक समान है।
5. ओ एम आर पत्रक (OMR) भरने के लिए केवल **काली स्याही वाले बॉल पोईन्ट पेन** का ही प्रयोग करें।
6. सभी प्रश्नों के उत्तर पत्रक (OMR) पर दें।
7. प्रत्येक प्रश्न के चार वैकल्पिक उत्तर दिये गये हैं, जिन्हें क्रमशः A, B, C, D अंकित किया गया है। अभ्यर्थी को सही उत्तर निर्दिष्ट करते हुए उनमें से केवल एक गोले अथवा बबल को उत्तर–पत्रक पर काले बॉल प्वाइंट पेन से गहरा करना है।
8. प्रत्येक गलत उत्तर के लिए प्रश्न अंक का 1/3 भाग काटा जोयगा। गलत उत्तर से तात्पर्य अशुद्ध उत्तर अथवा किसी भी प्रश्न के एक अधिक उत्तर से है।
9. एक से अधिक उत्तर देने की दशा में प्रश्न के उत्तर को गलत माना जाएगा।
10. रफ कार्य केवल परीक्षा पुस्तिका के अंतिम पृष्ठ पर दिये गये खाली जगह पर ही करें।
11. मोबाईल फोन अथवा इलेक्ट्रोनिक यंत्र (नॉन प्रोग्रामेबल केलकूलेटर को छोडकर) का परीक्षा हॉल में प्रयोग पूर्णतया वर्जित है। यदि किसी अभ्यर्थी के पास ऐसी कोई वर्जित सामग्री मिलती है तो उकसे विरूद्ध आयोग द्वारा नियमानुसार कार्यवाही की जायेगी।
12. परीक्षा कक्ष छोड़ने से पहले प्रश्न पत्र एवं उत्तर पत्र की पुस्तिका कक्ष निरीक्षक को लौटा दें।
13. अंग्रेजी या हिंदी संस्करणों में किसी भी असमानता के मामले में अंग्रेजी संस्करण को सही माना जायेगा।

चेतावनीः–अगर कोई अभ्यर्थी नकल करते पकड़ा जाता है या उसके पास से कोई अनधिकृत सामग्री पाई जाती है, तो उस अभ्यर्थी के विरूद्ध पुलिस में प्राथमिकी दर्ज कराई जायेगी और आ.पी.ई. (अनुसूचित साधनों की रोकथाम) अधिनियम, 1992 के नियम 3 के तहत कार्यवाही की जायेगी। साथ ही आयोग ऐसे अभ्यर्थी को भविष्य में होने वाली आयोग की समस्त परीक्षाओं से विवर्जित कर सकता है।

PART – A

1. Thar Desert extends from ..... and surrounded by the Aravalli Ranges on the east.
   A. Indus River
   B. Ghaggar River
   C. Sutlej River
   D. None of the above

2. The Ajmer district is divided into ..... subdivisions,
   A. 2
   B. 3
   C. 4
   D. 5

3. Mount Abu, famous for Dilwara Temples, a sacred pilgrimage for.... .
   A. Buddhists
   B. Sikhs
   C. Hindus
   D. Jains

4. 'Chhappan' basin is in the district of ?
   A. Alwar
   B. Banswara
   C. Pali
   D. Tonk

5. Dhaman, Karad and Anjan are the?
   A. Varieties of Sheep in Rajasthan
   B. Varieties of Caster seed of Gujarat
   C. Varieties of Grass in Rajsthan
   D. Three heroes of Gawari dance

6. Allah Jilai Bai of Rajasthan is ?
   A. Rajasthan Author
   B. Rajasthani Folk Singer
   C. Musician
   D. Social worker

7. Rani Sati temple is situated at ?
   A. Sikar
   B. Jhunjhunu
   C. Karoli
   D. Udaipur

8. Banganga river flows in following three districts
   A. Jaipur, Dausa, Bharatpur
   B. Alwar, Sikar, Jhunjhunu
   C. Jodhpur, Bikaner, barmer
   D. Kota, Baran, Jhalawar

9. Which is not true for "Block Development Officer"
   A. Appointed by the Government
   B. Working at Taluka or Block level
   C. He functions as the leader of the Block
   D. Elected person by people

10. The highest number of state level animal fairs in Rajasthan are held in the district?
    A. Jhalawar
    B. Nagour
    C. Barmer
    D. Hanumangarh

11. Identify the incorrect pair relation:
    A. Gindar dance : Shekhawati
    B. Dhol dance : Jalor
    C. Bamarasia dance : Bikaner
    D. Dandia dance : Marwar

12. Which article of the constitution directs the government to organise Village Panchayats-
    A. Art-32
    B. Art-40
    C. Art-48
    D. Art-51

13. Who among the following is known as 'the father of local self government' in India ?
    A. Mahatma Gandhi
    B. Lord Canning
    C. Lord Ripon
    D. Lord Wellesley

continued...

14. The State Election Commission conducts, controls and supervises municipal elections under—
    A. Article 240(1)
    B. Article 241(2)
    C. Article 243(K)
    D. Article 245(D)

15. Village Panchayat is accountable to the—
    A. Panchayat Samiti
    B. Zila Parishad
    C. Chairman of the Village Panchayat
    D. None of the above

16. Which is at the apex of the three-tier system of Panchayati Raj ?
    A. Gram Sabha
    B. Gram Panchayat
    C. Zila Parishad
    D. Panchayat Samiti

17. Total number of members of Rajasthan state legislative assembly is:
    A. 200
    B. 175
    C. 210
    D. 190

18. On which eve is the Banganga Fair celebrated?
    A. Vaishakh Purnima
    B. Magha Purnima
    C. Chaitra Purnima
    D. Kartik Purnima

19. When is Kapil Muni Fair held?
    A. Vaishakh poornima
    B. Magha poornima
    C. Chaitra poornima
    D. Kartik Purnima

20. Main bench of Rajasthan high Court is situated at:
    A. Jaipur
    B. Udaipur
    C. Jodhpur
    D. Kota

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continued...

पार्ट – ए

1. थार रेगिस्थान ——————— से पूर्व की ओर अरावली पहाड़ियों से घिरा हुआ है-
   A. सिंधु नदी
   B. घग्गर नदी
   C. सतलज नदी
   D. इनमें से कोई नहीं

2. अजमेर जिला कितने उपखण्डों में विभाजित है?
   A. 2
   B. 3
   C. 4
   D. 5

3. माउंट आबू स्थित दिलवाड़ा मंदिर किस धर्म का धर्मस्थल है?
   A. बौद्ध धर्म
   B. सिख धर्म
   C. हिंदू धर्म
   D. जैन धर्म

4. छप्पन बेसिन किस जिले में स्थित है?
   A. अलवर
   B. बाँसवाड़ा
   C. पाली
   D. टोंक

5. धामन, करड और अंजन निम्नलिखित है-
   A. राजस्थान में भेड़ की प्रजाति
   B. राजस्थान में अरंडी के बीज की प्रजाति
   C. राजस्थान में घास की प्रजाति
   D. गवरी नृत्य के तीन कलाकार

6. अल्लाह जिल्ला बाई ——————— है-
   A. राजस्थानी लेखक
   B. राजस्थानी लोक गायक
   C. संगीतकार
   D. समाज सेविका

7. रानी सती मंदिर कहाँ स्थित है?
   A. सीकर
   B. झुन्झुनू
   C. करौली
   D. उदयपुर

8. बाणगंगा नदी निम्न में से किन तीन जिलों में बहती है?
   A. जयपुर, दौसा, भरतपुर
   B. अलवर, सीकर, झुन्झुनू
   C. जोधपुर, बीकानेर, बाड़मेर
   D. कोटा, बारां, झालावाड़

9. इनमें से ब्लॉक डेवलपमेन्ट ऑफिसर के लिए क्या सत्य नहीं है?
   A. सरकार द्वारा नियुक्ति
   B. तालुका/ब्लॉक स्तर पर कार्य
   C. ब्लॉक प्रमुख के रूप में कार्यरत
   D. जनता द्वारा निर्वाचित

10. राजस्थान में सर्वाधिक राज्य–स्तरीय पशु मेले किस जिले में आयोजित होते हैं?
   A. झालावाड़
   B. नागौर
   C. बाड़मेर
   D. हनुमानगढ़

11. निम्न में से कौनसा सम्बन्ध असत्य है?
   A. गींदड़ नृत्यः शेखावाटी
   B. ढोल नृत्यः जालौर
   C. बमरसिया नृत्यः बीकानेर
   D. डांडिया नृत्यः मारवाड़

continued...

12. संविधान का कौनसा अनुच्छेद राज्य सरकार को ग्राम पंचायत बनाने के निर्देश देता है?
A. अनुच्छेद 32
B. अनुच्छेद 40
C. अनुच्छेद 48
D. अनुच्छेद 51

13. इनमें से कौन स्थानीय स्वायत्त शासन के जनक माने जाते है?
A. महात्मा गाँधी
B. लॉर्ड केनिंग
C. लॉर्ड रिपन
D. लॉर्ड वेलेस्ले

14. राज्य निर्वाचन आयोग संविधान के किस अनुच्छेद के अंतर्गत नगर पालिका चुनावों का आयोजन, पर्यवेक्षण एवं नियंत्रण करता है?
A. अनुच्छेद 240(1)
B. अनुच्छेद 241 (2)
C. अनुच्छेद 243 (K)
D. अनुच्छेद 245 (D)

15. ग्राम पंचायत निम्न में से किसके प्रति उत्तरदायी है?
A. पंचायत समिति
B. जिला परिषद
C. ग्राम पंचायत के अध्यक्ष
D. इनमें से कोई नहीं

16. निम्न में से कौन सी संस्था पंचायती राज की त्रिस्तरीय प्रणाली के शीर्ष पर है?
A. ग्राम सभा
B. ग्राम पंचायत
C. जिला परिषद
D. पंचायत समिति

17. राजस्थान विधान सभा के कुल सदस्य है-
A. 200
B. 175
C. 210
D. 190

18. निम्न में से किसकी पूर्व संध्या पर बाणगंगा मेला आयोजित किया जाता है?
A. वैशाख पूर्णिमा
B. माघ पूर्णिमा
C. चैत्र पूर्णिमा
D. कार्तिक पूर्णिमा

19. कपिल मुनि का मेला कब आयोजित किया जाता है?
A. वैशाख पूर्णिमा
B. माघ पूर्णिमा
C. चैत्र पूर्णिमा
D. कार्तिक पूर्णिमा

20. राजस्थान उच्च न्यायालय की मुख्य पीठ कहाँ पर स्थित है?
A. जयपुर
B. उदयपुर
C. जोधपुर
D. कोटा

.....

continued...

PART – B

21. The raw bricks shrink during drying and warp during burning because of
    A. less lime in brick earth
    B. less silica and excess magnesia in brick earth
    C. excess of alumina and silica in brick earth
    D. alkalis in brick earth

22. The chemical used to protect stones in industrial towns is
    A. $Ba(OH)_2$
    B. $Cacl_2$
    C. H_2So_4
    D. Caustic Alkalis

23. Knots reduce the tensile strength of wood
    A. along the grain
    B. across the grain
    C. tangential to the grain
    D. none of these

24. To produce low heat cement, it is necessary to reduce the compound
    A. C_4AF
    B. C_3S
    C. C_2S
    D. C_3A

25. The maximum bulking of sand is likely to occur at a moisture content of
    A. 5%
    B. 8%
    C. 11%
    D. 14%

26. The difference in 7 days compressive strength of cubes and cylinders prepared with impure and pure water should not differ by more than
    A. 2%
    B. 5%
    C. 10%
    D. 12%

27. The lime used for finishing coat in plastering is
    A. semi hydraulic lime
    B. kankar lime
    C. magnesium lime
    D. eminently hydraulic lime

28. The best application of puzzolana in cement concrete is in
    A. Dams
    B. Bridges
    C. RCC slabs
    D. domes

29. The maximum mixing time of cement concrete in minutes is limited to
    A. 2
    B. 4
    C. 6
    D. 10

30. To make one cubic meter of 1:2:4 by volume concrete , the volume of coarse aggregate required is
    A. 0.94 m^3
    B. 0.85 m^3
    C. 0.75 m^3
    D. 0.65 m^3

31. The cement content in a mix design is 378kg/m^3, water content 170 kg, sand is 30% of total aggregate, entrapped air is 1%, specific gravity of cement, coarse aggregate and fine aggregate are 3.15, 2.70 and 2.60, respectively. The fine aggregate will be approximately
    A. 510 kg
    B. 550 kg
    C. 600 kg
    D. 450 kg

continued...

32. The ratio of Young's modulus of high tensile steel to that of mild steel is about
    A. 0.5
    B. 1.0
    C. 1.5
    D. 2.0

33. The grade of wood tar used for grouting purpose is
    A. RT-1
    B. RT-2
    C. RT-4
    D. RT-5

34. Rig and ball apparatus is used for which of the following test of bitumen
    A. Penetration
    B. Viscosity
    C. Softening point
    D. Ductility

35. Self-compacting concrete is characterized by
    A. high powder component
    B. high water-powder ratio
    C. cementitious material up to 30%
    D. rough surface finish

36. The shrinkage factor of an old map is 24/25 and the RF is 1/2400, then the corrected scale for the map is
    A. 1/2400
    B. 1/2500
    C. 1/600
    D. 1/60000

37. The required slope correction for a length of 30m, along a gradient of 1 in 20 is
    A. 3.75 cm
    B. 0.375 cm
    C. 27.5 cm
    D. 2.75 cm

38. Survey is preferred with true meridians because these
    A. converge at poles
    B. do not change with time
    C. facilitate plotting
    D. all of these

39. The difference between face left and face right observations of a thedolite is $3'$. The error is
    A. $45''$
    B. $1'30''$
    C. $3'$
    D. $0'$

40. In reciprocal leveling the error which is not completely eliminated is due to
    A. Curvature
    B. Refraction
    C. Non-adjustment of line of collimation
    D. Parallax

41. If the spacing of cross-hairs in a stadia diaphragm of tacheometer is 12 mm and the focal length of the object glass is 24cm, then the multiplying constant of the tacheometer is
    A. 20
    B. 100
    C. 0.005
    D. 200

42. The method usually adopted to contour a rough country whose ordinary leveling is tedious and chaining is slow and inaccurate is
    A. Spirit leveling
    B. Differential leveling
    C. Plane tabling
    D. Tacheometry

continued...

43. The curvature correction in the earthwork computation is
    A. Always positive
    B. Always negative
    C. Positive if the centriod and centre of curvature are to the opposite side of the centre line
    D. Positive if the centroid and centre of curvature are to the same side of the centre line

44. An ideal transition curve is a
    A. Cubic parabola
    B. Cubic spiral
    C. Parabola
    D. True spiral

45. In a compound curve there are seven factors which decide the nature of curve. These are radii of the curves, back tangent and forward tangent, total deflection angle, deflection angle between back tangent and common tangent, and deflection angle between forward and common tangent. How many elements should be known for designing the curve
    A. any 4
    B. any 3
    C. any 2
    D. all

46. Hydraulic gradient line represents the sum of
    A. pressure head and kinetic head
    B. kinetic head and datum head
    C. pressure head, kinetic head and datum head
    D. pressure head and datum head

47. Boundary layer on a flat plate is called laminar boundary layer if
    A. Reynold number is less than 2000
    B. Reynold number is less than 4000
    C. Reynold number is less than 5×10^5
    D. None of these

48. For a floating body, if the meta-centre is below the centre of gravity, the equilibrium is called
    A. Stable
    B. Unstable
    C. Neutral
    D. None of these

49. Cipolletti weir is a trapezoidal weir having side slope of
    A. 1 horizontal to 4 vertical
    B. 4 horizontal to 1 vertical
    C. 1 horizontal to 2 vertical
    D. 2 vertical to 1 horizontal

50. The pressure rise due to water hammer depends on
    A. length and diameter of pipe only
    B. time required to close the valve only
    C. elastic properties of the pipe material and liquid flowing through pipe only
    D. all of these

51. The separation of boundary layer takes place in case of
    A. negative pressure gradient
    B. positive pressure gradient
    C. zero pressure gradient
    D. none of these

52. If the Froude number in open channel flow is more than 1, the flow is called
    A. critical flow
    B. super critical flow
    C. sub-critical flow
    D. shooting flow

continued...

53. A turbine is called impulse turbine if at the inlet of the turbine
    A. total energy is only kinetic energy
    B. total energy is sum of kinetic energy
    C. total energy is sum of kinetic energy and pressure energy
    D. total energy is difference of kinetic energy and pressure energy

54. Numerical value of gauge pressure is
    A. more than absolute pressure
    B. less than absolute pressure
    C. equal to the absolute pressure
    D. zero

55. The water content of a saturated soil is 50%. If the specific gravity of the solids is 2.4, the void ratio is
    A. 0.6
    B. 1.2
    C. 1.8
    D. 2.4

56. The ratio of plasticity index to flow index is called
    A. activity ratio
    B. liquidity index
    C. toughness index
    D. flow index

57. For loose deposits of sand or silt, if void ratio is taken as 0.67 and specific gravity G as 2.67, the critical hydraulic gradient would be
    A. 0.1
    B. 0.5
    C. 1.0
    D. none of these

58. In an earthen dam, the pheratic line is
    A. straight line
    B. parabolic
    C. elliptical
    D. zig-zag

59. The relationship between the time factor T_v , coefficient of consolidation C_v , the length of drainage path d, and time t is given by
    A. $T_v = \frac{c_v d^2}{t}$
    B. $T_v = \frac{c_v t^2}{d}$
    C. $T_v = \frac{c_v t}{d^2}$
    D. $T_v = \frac{c_v t^2}{d^2}$

60. According to Indian code, the permissible values of differential settlements in case of clays and sands are
    A. 25 mm, 40 mm
    B. 40 mm, 25 mm
    C. 25 mm, 50 mm
    D. 50 mm, 25 mm

61. The type of shear failure that is expected for a loose sand (or) a soft clay is
    A. general shear failure
    B. local shear failure
    C. punching shear failure
    D. all of these

62. Westergaard's theory is more appropriate for
    A. layered soils
    B. homogeneous deposits
    C. anisotropic soils
    D. normally consolidated homogeneous soils

continued...

63. A composite bar is made of steel and aluminum strips each having 2 cm^2 area of cross-section. The composite bar is subjected to load P. If the stress in aluminum is 10 N/mm^2 and $E_{steel} = E_{aluminum}$, the value of load P is

A. 4 kN
C. 8 kN
B. 6 kN
D. 10 kN

64. A cylindrical tank 1 m inside diameter and 20 m high is filled with water of specific weight 10 kN/m^3 . If the thickness of the tank is 2.5 cm, the maximum stress induced in the wall of the tank is

A. 4 N/mm^2
C. 1 N/mm^2
B. 5 N/mm^2
D. 2 N/mm^2

65. A beam 10 m long supported over 8 m span having equal overhang on both sides, carries loads of 8 kN each at its ends and a load of 2 KN at its centre, the points of contraflexure will lie at

A. the supports
C. 2m from each end
B. the centre
D. none of these

66. A beam of I-section of depth 200mm is subjected to a bending moment M. The flange thickness is 10mm. If the maximum stress induced in I section is 100 N/mm^2, the stress developed at the inner edge of the flange will be

A. 95 N/mm^2
C. 47.5 N/mm^2
B. 90 N/mm^2
D. 45 N/mm^2

67. Consider the following statements: A simply supported beam is subjected to a couple somewhere in the span. It would produce
    1. a rectangular SF diagram
    2. parabolic B.M. diagram
    3. parabolic B.M. diagrams
    4. both +ve and –ve bending moments, which are maximum at the point of application of couple of these statements

A. 1,2 and 3 are correct
C. 2 and 3 are correct
B. 1 and 2 are correct
D. 1 and 3 are correct

68. Static and kinematic indeterminacies of a portal frame with fixed supports are

A. 0,0
C. 3,3
B. 3,0
D. 3,6

69. In case of a 3-hinged parabolic arch carrying a uniformly distributed load on the entire-span, the bending moment will be

A. maximum at crown
C. zero at center
B. maximum at quarter span
D. zero throughout the span

70. A hollow circular section of column has external and internal diameter as D and d, respectively. It is subjected to a compressive load having an eccentricity e. For no tension condition at the base , which one of the following conditions should be satisfied ?

A. $e \leq \frac{D^2+d^2}{4\sqrt{Dd}}$
C. $e \leq \frac{D/3+d/4}{2}$
B. $e \leq \frac{D^2+d^2}{8d}$
D. $e > \frac{D^2+d^2}{8d}$

continued...

71. A cantilever beam AB, fixed at A and carrying a load W at the free end B, is found to deflect by δ at the mid-point of AB. The deflection of B due to load W/2 at the midpoint will be
    A. 2 δ
    B. δ
    C. δ/2
    D. δ/4

72. A simply supported beam of span L and flexural rigidity EI carries a unit point load at its centre. The strain energy in the beam due to bending is
    A. $\frac{L^3}{48EI}$
    B. $\frac{L^3}{96EI}$
    C. $\frac{L^3}{192EI}$
    D. $\frac{L^3}{16EI}$

73. A load W is moving on a simply supported beam of span L from left to right. The maximum bending moment at a distance 0.4 L from left support is
    A. 0.16 WL
    B. 0.2 WL
    C. 0.24 WL
    D. 0.25 WL

74. Two concentrated loads of magnitude 'P' each acting at a distance L/4 moves on a simply supported beam of span L. The maximum bending moment will be
    A. $\frac{96PL}{256}$
    B. $\frac{98PL}{256}$
    C. $\frac{90PL}{256}$
    D. $\frac{94PL}{256}$

75. Due to some point load anywhere on a fixed beam, the maximum free bending moment is M. The sum of fixed end moments is
    A. 3 M
    B. 2 M
    C. 1.5 M
    D. M

76. Consider the following statements: sinking of an intermediate support of a continuous beam
    1. reduces the negative moment at support
    2. increase the negative moment at support
    3. reduces the positive moment at the centre of span
    4. increases the positive moment at the centre of span

    Of these statements
    A. 1 and 4 are correct
    B. 1 and 3 are correct
    C. 2 and 3 are correct
    D. 2 and 4 are correct

77. The ratio of the collapse load of a propped cantilever of span L, carrying a UDL throughout the span to that of a simply supported beam carrying the same load is
    A. 1.457
    B. 1.5
    C. 2
    D. 3

78. Equilibrium condition, yield conditions and mechanism conditions are the conditions to be satisfied by any correct plastic analysis results. Which of the above conditions are used in the statical methods of plastic analysis
    A. Equilibrium conditions alone
    B. Equilibrium and mechanism conditions
    C. Yield and mechanism conditions
    D. Equilibrium and yield conditions

continued...

79. The ratio of the stiffness of a beam at the near end when the far end is hinged to the stiffness of the beam at the near end when the far end is fixed will be
    A. ½
    B. ¾
    C. 1
    D. 4/3

80. Number of simultaneous equation to be solved in the slope- deflection method is equal to
    A. the degree of static indeterminacy
    B. the degree of kinematic indeterminacy
    C. number of joints in the structure
    D. none of these

81. Three identical prismatic member AD, BD and CD are rigidly joined at D to form a plane frame. The end A and B are fixed and end C is simply supported. If a moment of 8.25 kNm is applied at the simply supported end C, then the magnitude of the moment at the end A is,
    A. 2.75 kNm
    B. 0
    C. 1.5kNm
    D. 0.75 kNm

82. The order of the flexibility matrix for a structure is
    A. equal to the number of redundant forces
    B. more than the number of redundant forces
    C. less than the number of redundant forces
    D. equal to the number of redundant forces plus three.

83. The ratio of strengths of a rivet in double shear to that in a single shear will be
    A. 1
    B. ½
    C. 2
    D. 4

84. The S-curve hydrograph is used
    A. to estimate the peak flood from a basin due to a given storm
    B. to convert the unit hydrograph of given duration into a unit hydrograph of any other duration
    C. to develop synthetic unit hydrograph
    D. to estimate the infiltration losses

85. A flood with a return period of 100 years is the flood which occurs
    A. every 100^{th} year
    B. the maximum observed flood in the past 100 years
    C. once in every 100 years on the averages
    D. only after 100 years in the immediate future

86. For submerged curved surface, the vertical component of hydrostatic force is
    A. mass of the liquid supported by the curved surface
    B. weight of the liquid supported by the curved surface
    C. the force of the projected area of the curved surface on vertical plane
    D. none of the above

87. The value of the kinetic energy correction factor for the viscous flow through a circular pipe is
    A. 1.33
    B. 1.50
    C. 2.0
    D. 1.25

continued...

88. On sharp curves, widening of carriageway is done by
    A. providing more width on the inner curve
    B. providing more width on the outer curve
    C. distributing half on inner and half on the outer
    D. distributing ¾ on the outer and ¼ on the inner

89. For an earthen road the minimum desirable gradient is
    A. 1 in 12
    B. 1 in 20
    C. 1 in 120
    D. 1 in 200

90. The ratio of the permissible bearing stress of power driven shop rivets to the yield stress of mild steel is
    A. 0.67
    B. 0.87
    C. 0.9
    D. 1.0

91. If 20 ml of an odourous water sample is needed with 180 ml of odour free distilled water to produce 200 ml mixture, then the threshold odour number (TON) of water sample is
    A. 0.9
    B. 1.0
    C. 9.0
    D. 10

92. Coagulants should be used for sedimentation when turbidity of raw water exceeds
    A. 5 ppm
    B. 10 ppm
    C. 50 ppm
    D. 100 ppm

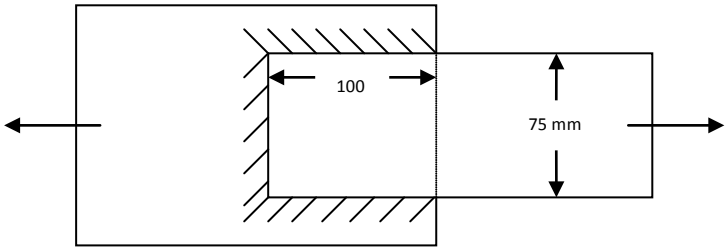
93. A flow net constructed for an earth dam storing water to a height of 20 m. The number of flow channels and the number of potential drops are found to be 4 and 10 respectively. If the permeability of the dam material is 3 m/day, the seepage per m length of the dam is equal to
    A. 12 m^3/day
    B. 24 m^3/day
    C. 48 m^3/day
    D. 96 m^3/day

94. A canal has to irrigate 12000 hectares of rice with a duty of 1000 hectares/cumecs. If the capacity factor is 0.8 and the time factor is 0.75, then the design discharge of canal, is
    A. 9.6 m^3/sec
    B. 12.8 m^3/sec
    C. 20 m^3/sec
    D. 26 m^3/sec

95. If S_l is the specific gravity of lighter liquid in manometer, S_0 is the specific gravity of the fluid flowing and x is the difference of lighter liquid levels in differential manometer, then the difference of pressure head (h) measured by differential manometer containing lighter liquid is
    A. $h = x\left[1 - \frac{S_l}{S_0}\right]$
    B. $h = x\left[\frac{S_l}{S_0} - 1\right]$
    C. $h = x[S_0 - S_0]$
    D. none of these

96. Two footings, one with circular and the other of square are founded on the surface of cohesionless soil. Assuming that the diameter of circular footing is same as the width of square footing, then the ratio of their ultimate bearing capacities according to Terzaghi, is
    A. 0.75
    B. 1.0
    C. 1.3
    D. 1.5

97. If the size of fillet weld as shown in the figure is 8 mm, then the safe load carried by the welded joint without exceeding the stress of 100 N/mm^2, will be



A. 140 kN
B. 154 kN
C. 176 kN
D. 220 kN

98. If the total alkalinity of a water sample is 300 mg/l and the total hardness is 100 mg/l, then the carbonate and non-carbonate hardnesses are respectively
A. 100 mg/l and 0
B. 300 mg/l and 0
C. 100 mg/l and 200 mg/l
D. 200 mg/l and 100 mg/l

99. Five day BOD of a wastewater sample at 20^{0}C was found as 120 mg/L. Then 8-day BOD of the same wastewater sample at 20^{0}C *(Given that deoxygenation constant at 20^{0}C (base 10) = 0.1 d^{-1},* will be
A. 75.5 mg/L
B. 147.7 mg/L
C. 175.5 mg/L
D. 181.3 mg/L

100. A filter unit has dimension 4.5 m x 9.0 m. After filtering 10000 m^3/day in 24 hours, the filter is backwashed at a rate of 10 litres/m^2/sec for 15 minutes. The rate of filtration of filter in m^3/m^2/hour is
A. 5.29
B. 10.29
C. 12.29
D. 14.3
