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ROLL NUMBER | |

WRITTEN TEST FOR THE POST OF JUNIOR ENGINEER (CIVIL) - A

DATE: 24/05/2023 **TIME: 10 To 11.30**

DURATION: 90 MINUTES **Total Marks: 100**

INSTRUCTIONS TO THE CANDIDATES

1. Write your Roll Number on the top of the Question Booklet and in the answer sheet.
2. Each question carries 1 mark.
3. There will not be any Negative Marking.
4. Write legibly the alphabet of the most appropriate answer (A, B, C or D) in the separate answer sheet provided.
5. Over-writing is not permitted.
6. Candidate should sign in the question paper and answer sheet.
7. No clarifications will be given.
8. Candidate should hand over the answer sheet to the invigilator before leaving the examination hall.

Signature of the Candidate

Rupa Sreedhar
24/5/2023

SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES AND TECHNOLOGY
THIRUVANANTHAPURAM, KERALA – 695 011
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WRITTEN TEST FOR THE POST OF JUNIOR ENGINEER (CIVIL)

1) Match List 1 with List 2 and select correct answer:

List 1	List 2
a) Water cement ratio	1. Durability
b) Water content	2. Compressive Strength
c) Minimum cement content	3. Stability of Mix
d) Segregation	4. Workability

	(a)	(b)	(c)	(d)
(A)	4	1	3	2
(B)	2	4	1	3
(C)	4	1	2	3
(D)	2	4	3	1

2) The ratio of direct stress to volumetric strain

(A) Modulus of elasticity (B) Bulk modulus

(c) Rigidity modulus (D) Poisson's ratio

3) I.S Sieve NOS. 10 mm and 4.75 mm are generally used for grading of

(A) Coarse aggregate (B) Fine aggregate

(C) neither (A) nor (B) (D) both (A) and (B)

4) The minimum compressive strength of second class bricks should be

(A) 75 kg/cm^2 (B) 90 kg/cm^2

(C) 100 kg/cm^2 (D) 120 kg/cm^2

5) The hardest rock is

(A) marble (B) diamond

(C) talc (D) quarts

6) Plaster of Paris is obtained by calcining

(A) bauxite (B) gypsum

(C) kankar (D) lime

7) Bulking of Sand is caused due to

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24/5/2021

(A) surface moisture (B) air voids

(C) viscosity (D) clay contents

8) Minimum required water cement ratio for a workable concrete is

(A) 0.30 (B) 0.40

(C) 0.50 (D) 0.60

9) Galvanising means covering iron with a tin coat of

(A) tin (B) Zinc

(C) glaze (D) coal tar

10) As per I.S code (IS 399 – 1963), the weight of timber is specified at

(A) 8 % moisture content (B) 10 % moisture content

(C) 12 % moisture content (D) 14 % moisture content

11) The slope of stair should not be more than

(A) 40° (B) 45°

(C) 50° (D) 55°

12) The co-efficient of hardness of stone used in road work should be greater than

(A) 10 (B) 12

(C) 15 (D) 17

13) According to Rankine's formula, minimum depth of foundations, is

(A) $P/\gamma\,(1+\text{Sin}\Phi/1-\text{Sin}\Phi)^2$ (B) $P/\gamma\,(1-\text{Sin}\Phi/1+\text{Sin}\Phi)^2$

(C) $P/2\gamma\,(1-\text{Sin}\Phi/1+\text{Sin}\Phi)^2$ (D) $P/\gamma\,(1-\text{Sin}\Phi/1+\text{Sin}\Phi)$

14) What is the Poisson's ratio (μ) of concrete under uniaxial load

(A) 0.1 to 0.2 (B) 0.5

(C) 0.286 (D) 0

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24/5/2021

15) As per I.S 456 -2000, the minimum grade of concrete for reinforced concrete work shall NOT be less than:

(A) M 15 (B) M 20

(C) M 5 (D) M 10

16) Initial setting time of cement for asbestos cement products should be not less than

(A) 30 minutes (B) 50 minutes

(C) 75 minutes (D) 90 minutes

17) For a rectangular foundation of width b, eccentricity of load should not exceed

(A) b/3 (B) b/4

(C) b/5 (D) b/6

18) The foundation which of consist of a thick reinforcement cement slab covering whole area to support heavy concentrated structural load, is known as

(A) combined footing (B) strap footing

(C) raft footing (D) strip footing

19) The steel pile which is generally sunk in soft clay or loose sand of low bearing capacity, is

(A) H-pile (B) pipe pile

(C) screw pile (D) disc pile

20) The brick laid with its length parallel to the face of a wall, is a known as

(A) header (B) stretcher

(C) closer (D) bat

21) The window which is projects on a sloping roof of a building, is called

(A) lantern window (B) dormer window

(C) louvered window (D) rash window

Rupa Sreedhar
24/5/2024

22) Dado is usually provided in

(A) dining halls (B) bath rooms

(B) living rooms (D) verandah

23) The form work from side of beams can be removed only after

(A) 1 day (B) 3 days

(C) 7 days (D) 14 days

24) Pick up the **INCORRECT** statement from the following :

(A) the width of the wall is constructed thicker at the base in a stepped fashion

(B) a long vertical load transferring concrete structure is called a concrete pile

(C) in pile which transfers the load to the soil by the friction between the pile and the surrounding soil is called friction pile

(D) the pile which transfers the load to a hard rock bed at certain depth is called load bearing

25) Invar tape used for measuring base lines, is made of nickel-iron alloy containing nickel

(A) 24% (B) 36%

(C) 40% (D) 60%

26) Surveys which are carried out to depict mountains, rivers, water bodies, wooded areas and other cultural details, are known as

(A) cadastral surveys (B) city surveys

(C) topographical surveys (D) guide map surveys

27) For a well-conditioned triangle, no angle should be less than

(A) 20° (B) 30°

(C) 45° (D) 60°

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24/5/2023

28) The back staff reading on B.M. of R.L. 100.000 m is 2.685 m. if foresight reading on a point is 1.345 m, the reduced level of the point, is

(A) 102.685 (B) 101.345

(C) 101.340 (D) 104.030

29) Closed contours of decreasing values toward their centre, represent

(A) a hill (B) a depression
(C) a saddle or pass (D) a river bed

30) The vertical angle between longitudinal axis of a freely suspended magnetic needle and a horizontal line at its pivot, is known as

(A) declination (B) azimuth

(C) dip (D) bearing

31) If whole circle bearing of a line is 120°, it is reduced bearing is

(A) S 20° E (B) S 60° E

(C) N 120° E (D) N 60° E

32) If i is the stadia distance, f is the focal length and d is the distance between the objective and vertical axis of the tacheometer, the multiplying constant, is

(A) f/i (B) i/f

(C) $(f+d)$ (D) f/d

33) The slope correction for a 3° slope for a length of 100 m, is

(A) - 0.11 m (B) - 0.12 m

(C) - 1.87 m (D) - 0.137 m

34) For keeping the stress wholly compressive the load may be applied on circular column anywhere within a concentric circle of diameter

(A) d/2 (B) d/3

(C) d/4 (D) d/8

Rupa Sreedhar
24/5/2023

35) The C.G. of a hemisphere from its base measured along the vertical radius is at a distance of

(A) $4R/3\pi$ (B) $3R/8$

(C) $3\pi R/4$ (D) $8R/3$

36) The motion of a moving car is given by the equation $a = t^3 + 3t^2 + 5$ where a is the acceleration in m/sec^2 and t is time in second. The velocity of the car after 2 sec, will be

(A) 4 m/sec (B) 8 m/sec

(C) 12 m/sec (D) 22 m/sec

37) The liner velocity $(v)$of a moving particle along the circumference of a circle of radius r, with a uniform angular velocity ω radians/sec^2 will be given by

(A) $v = r\omega^2$ (B)$v = r\omega^3$

(C)$v = r\omega$ (D) $v = r/\omega$

38) Superelevation for a broad gauge railway track of 500 m radius at an average speed of 50 km/hours, is equal to

(A) 66 mm (B) 55 mm

(C) 44 mm (D) 33 mm

39) According to kennedy's theorem, if three bodies have plane motion, their instantaneous centres lie on

(A) a point (B) a straight line

(C) two straight line (D) a triangle

40) According to Unwin's formula, the diameter d of a rivet of plate of thickness t is:

(A) $d = 6.05\sqrt{t}$ (B) $d = 15t + 4$

(C) $d = \sqrt{5t}$ (D) $d = \sqrt{t} + 1.5$

41) In a simply supported beam L with a triangular load W varying from zero at one end to the maximum value at the other end, the maximum bending moment is

(A) $WL/3$ (B) $WL/9\sqrt{3}$

(C) $WL/4$ (D) $WL^3/9\sqrt{3}$

Rupa Sreedhar
24/5/2023

42) A cantilever beam rectangular in cross- section is subject to an isolated load at its free end. If the width of the beam is doubled, the deflection of the free end will be changed in ratio of

(A) 8 (B) 1/8

(C) 1/2 (D) 2

43) A column is said to be of medium size if its slenderness ratio is between

(A) 20 and 32 (B) 32 and 120

(C) 120 and 160 (D) 160 and 180

44) For a given material Young's modulus is 200 GN/m^2 and modulus of rigidity is 80 GN/m^2. The value of Poisson's ratio is

(A) 0.55 (B) 0.45

(C) 0.35 (D) 0.25

45) On a flow net diagram, the distance between two consecutive steam lines at two successive section are 1 cm and 0.5 cm respectively. If velocity at the first section is 1 m/sec, the velocity at the second is

(A) 1.0 m/sec (B) 0.5 m/sec

(C) 2.0 m/sec (D) 2.5 m/sec

46) Barometres are used to measure

(A) pressure in water channels, pipes etc.
(B) difference in pressure at two points
(C) atmospheric pressure
(D) very low pressure

47) The depth of the centre of pressure on vertical rectangular gate (4 m wide, 3 m high) with water upto top surface, is

(A) 1.0 m (B) 1.5 m

(C) 2.0 m (D) 2.5 m

48) In a certain month, the reference crop evapotranspiration at a location is 6 mm/day. If the crop coefficient and soil coefficient are 1.2 and 0.8, respectively, the actual evapotranspiration in mm/day is

(A) 5.76 (B) 7.20

(C) 6.80 (D) 8.00

Rupa Sreedhar
24/5/2023

49) The dimension of dynamic viscosity is:

(A) $M L^{-1}T^{-1}$ (B) $M L^{-1}T^{-2}$

(C) $M L^{-2}T^{-2}$ (D) $M L^{0}T^{-1}$

50) To design an optimum municipal solid waste collection route, which of the following is/are **NOT** desired:

(A) Collection vehicle should not travel twice down the same street in a day.
(B) Waste collection on congested roads should not occur during rush hours in morning or evening.
(C) Collection should occur in the uphill direction.
(D) The last collection point on a route should be as close as possible to the waste disposal facility.

51) In the context of elastic theory of reinforced concrete, the modular ratio is defined as the ratio of

(A) Young's modulus of elasticity of reinforcement material to Young's modulus of elasticity of concrete.
(B) Young's modulus of elasticity of concrete to Young's modulus of elasticity of reinforcement material.
(C) shear modulus of reinforcement material to the shear modulus of concrete.
(D) Young's modulus of elasticity of reinforcement material to the shear modulus of concrete.

52) Which of the following equations is correct for the Pozzolanic reaction?

(A) $Ca(OH)_2$ + Reactive Superplasticizer + $H_2O \rightarrow$ C-S-H
(B) $Ca(OH)_2$ + Reactive Silicon dioxide + $H_2O \rightarrow$ C-S-H
(C) $Ca(OH)_2$ + Reactive Sulphates + $H_2O \rightarrow$ C-S-H
(D) $Ca(OH)_2$ + Reactive Sulphur + $H_2O \rightarrow$ C-S-H

53) Let ψ represent soil suction head and K represent hydraulic conductivity of the soil. If the soil moisture content θ increases, which one of the following statements is **TRUE**?

(A) ψ decreases and K increases (B) ψ increases and K decreases

(C) Both ψ and K decrease (D) Both ψ and K increase

54) An aerial photograph is taken from a flight at a height of 3.5 km above mean sea level, using a camera of focal length 152 mm. If the average ground elevation is 460 m above mean sea level, then the scale of the photograph is

(A) 1 : 20000 (B) 1 : 20

Rupa Sreedhar
24/5/2023

(C) 1 : 100000 (D) 1 : 2800

55) The direct and indirect costs estimated by a contractor for bidding a project is ₹ 160000 and ₹ 20000 respectively, If the mark up applied is 10% of the bid price, the quoted price (in ₹.) of the contactor is

(A) 182000 (B) 196000

(C) 198000 (D) 200000

56) Gypsum is typically added in cement to

(A) Increase workability (B) prevent quick setting

(C) enhance hardening (D) decrease heat of hydration

57) The liquid forms of particulate air pollutants are

(A) fly ash and fumes (B) dust and mist

(C) mist and spray (D) smoke and spray

58) The shape of the most commonly designed highway vertical curve is

(A) spiral (B) circular (single radius)

(C) parabolic (D) circular (multiple radii)

59) A highway designed for 80 km/h speed has a horizontal curve section with radius 250m. If the design lateral friction is assumed to develop fully, the required super elevation is

(A) 0.07 (B) 0.05

(C) 0.02 (D) 0.09

60) The shape of the cumulative distribution function of Gaussian distribution is

(A) Straight line at 45 degree angle
(B) Bell-shaped
(C) S-shaped
(D) Horizontal line

61) The traffic starts discharging from an approach at an intersection with the signal turning green. The constant headway considered from the fourth or fifth headway position is referred to as

(A) saturation headway (B) effective headway

(C) discharge headway (D) intersection headway

Rupa Sreedhar
24/5/2023

62) As per IS 456:2000, the pH value of water for concrete mix shall **NOT** be less than

(A) 6.0 (B) 5.0

(C) 4.5 (D) 5.5

63) Soil deposit formed due to transportation by wind is termed as

(A) lacustrine deposit (B) alluvial deposit

(C) estuarine deposit (D) aeolian deposit

64) Muskingum method is used in

(A) hydrologic channel routing (B) hydraulic channel routing

(C) hydrologic reservoir routing (D) hydraulic reservoir routing

65) In Indian, rain fall is generally recorded at

(A) 8 A.M. (B) 12 Noon

(C) 4 P.M. (D) 8 P.M

66) The rainfall cycle period in India is taken as

(A) 20 years (B) 25 years

(C) 30 years (D) 35 years

67) If h is the loss due to friction in a pipe. Total losses in strainer and bends may be taken as

(A) 0.01 h (B) 0.45 h

(C) 0.20 h (D) 0.25 h

68) Phytometer method is generally used for the measurement of

(A) interception (B) evaporation

(C) transpiration (D) run off

69) In sewers the highest non-scouring velocity is achieved in

(A) glazed bricks sewers (B) cast iron sewers

Rupa Sreedhar
24/5/2023

(C) cement concrete sewers (D) stone ware sewers

70) The sewer which resists sulphide corrosion, is

(A) Brick sewer (B) Cast iron sewer

(C) R.C.C sewer (D) Lead sewer

71) The standard B.O.D. of water is taken for

(A) 1 day (B) 2 days

(C) 3 days (D) 5 days

72) The bed slope in slow sand filter, is generally kept

(A) 1 in 50 (B) 1 in 75

(C) 1 in 100 (D) 1 in 200

73) In rapid sand filters the ratio of length and diameter of the lateral, should not be greater than

(A) 10 (B) 15

(C) 20 (D) 25

74) Cohesionless soil is

(A) sand (B) silt

(B) clay (D) clay and silt

75) Stoke's law does not hold good if the size of particle is smaller than

(A) 0.0002 mm (B) 0.002 mm

(C) 0.02 mm (D) 0.2 mm

76) The maximum shear stress occurs on the filament which makes an angle with the horizontal plane equal to
(A) 30° (B) 45°

(C) 60° (D) 90°

Rupa Sreedhar
24/5/2023

77) Failure of the stability of slopes, generally occurs along

(A) slip plane (B) a horizontal surface

(C) a curved surface (D) all the surface

78) According to I.S : 456, the number of grades of concrete mixes, is

(A) 4 (B) 5

(C) 6 (D) 7

79) The maximum thickness of concrete floor of a cement warehouse, is

(A) 10 cm (B) 15 cm

(C) 20 cm (D) 25cm

80) For a number of columns constructed in a row, the type of foundation provided, is

(A) footing (B) raft

(C) strap (D) strip

81) A raft foundation is provided if its area exceeds the plan area of the plan area of the building by

(A) 20% (B) 30%

(C) 40% (D) 50%

82) Design of R.C.C. cantilever beam, is based on the resultant force at

(A) fixed end (B) free end

(C) mid span (D) mid span and fixed support

83) The maximum area of tension reinforcement in beams shall not exceeds

(A) 0.15% (B) 1.5%

(C) 4% (D) 1%

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24/5/2023

84) The deflection of a structure designed by limit state method, due to all load including the effects temperature, creep and shrinkage below the as-cast level of the supports of roof, floors and all other horizontal members should not normally exceed the lesser value

(A) span/350 or 20 mm (B) span/250 or 20 mm

(C) span/200 or 15 mm (D) span/300 or 25 mm

85) The ratio of the strength of compression members with helical reinforcement to those having lateral lies, is

(A) 1.02 (B) 1.03

(C) 1.04 (D) 1.05

86) A compression member in a roof truss is called

(A) stanchion (B) post

(C) strut (D) column

87) Stiffeners are used in a plate girder

(A) to avoid buckling of web plate

(B) to reduced the compressive stress

(C) to reduce the shear stress

(D) to take the bearing stress

88) The kor depth for rice is 190 mm and kor period is 14 days. The outlet factor for this would be

(A) 1172 ha/cumecs (B) 972 ha/cumecs

(C) 837 ha/cumecs (D) 637 ha/cumecs

89) The cross drainage work where the bed level of the stream and the canal are more or less at the same level is called

(A) aqueduct (B) syphon-aqueduct

(C) level crossing (D) super passage

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24/5/2023

90) Super-elevation on roads in snow bound areas, should generally not exceed

(A) 7% (B) 10%

(C) 12% (D) 15%

91) The slope of adzing of sleepers is

(A) 1 in 25 (B) 1 in 30

(C) 1 in 15 (D) 1 in 20

92) Shunting signals are known as

(A) routing signals (B) Starter signals

(C) ground signals (D) warner signals

93) Bottom most component of pavement is known as

(A) sub grade (B) wearing course

(C) base course (D) sub-base course

94) Mud-Pumping is

(A) ejection of soil slurry (B) Failure of soil sub grade

(C) failure of R.C. slab (D) cracks in pavement

95) Name the type of contract when the contractor undertakes the specific work with all its contingencies for a fixed amount of money

(A) labour contract (B) lump sum contract

(C) item wise contract (D) sub contract

96) Which of following method of valuation will be adopted to value underdeveloped properties

(A) depreciation method of valuation (B) valuation based on cost

(C) rental method of valuation (D) development method of valuation

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24/5/2023

97) The earliest method used for planning of project was

(A) CPM (B) PERT

(C) Milestone chart (D) Bar chart

98) The range of alumina present in good brick earth by weight is

(A) 33 – 35% (B) 20 – 30%

(C) 10 – 15% (D) 15 – 20%

99) Soundness test for cement is conducted to find

(A) free lime (B) iron oxide

(C) silica (D) alumina

100) In plastic analysis, the shape factor for a circular section is

(A) 1.5 (B) 2.34

(C) 1.7 (D) 1.6

Rupa Sreedhar
24/5/2023

Question No.	Answer Ker	Question no.	Answer key	Question number	Answer key	Question No.	Answer key
1	B	26	C	51	A	76	B
2	B	27	B	52	B	77	C
3	A	28	C	53	A	78	D
4	A	29	B	54	A	79	D
5	B	30	C	55	C	80	D
6	B	31	B	56	B	81	D
7	A	32	A	57	C	82	A
8	B	33	D	58	C	83	C
9	B	34	C	59	B	84	B
10	C	35	B	60	C	85	D
11	A	36	D	61	A	86	C
12	D	37	C	62	A	87	A
13	B	38	A	63	D	88	D
14	A	39	B	64	B	89	C
15	B	40	A	65	A	90	A
16	D	41	D	66	D	91	D
17	D	42	C	67	D	92	C
18	C	43	B	68	C	93	A
19	C	44	D	69	A	94	A
20	B	45	C	70	D	95	B
21	B	46	C	71	D	96	D
22	B	47	C	72	C	97	D
23	A	48	A	73	C	98	B
24	D	49	A	74	A	99	A
25	B	50	C	75	A	100	C

Answer Key - Junior Engineer Civil 24/5/2023

Rupa Sreedhar
24/5/2023