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The following details MUST be filled by the candidate:

Application ID	
Candidate's name	
Post applied for	Senior Executive Engineer (Civil/ Electrical)
Mobile number	
Date of written test	20.02.2021
Signature of candidate	
Signature of invigilator	

Instructions:

1. Candidate is required to return this question booklet to the invigilator before leaving the hall.
2. This question paper contains 50 questions related to Civil Engineering. Each question carries 1 mark. There is no negative marking.
3. The written test duration is 2 hours.
4. Candidate is required to write his/her choice (e.g., a or b or c or d) in the answer sheet given separately. Inappropriate actions such as writing more than one choice, writing the choice in an ambiguous manner, overwriting, cutting, etc. will be awarded 0 mark corresponding to that question.

- [1] Which of the following are elements of the activated sludge process?
(a) Primary sedimentation unit, aeration unit, secondary sedimentation unit
(b) Reaction unit, secondary sedimentation unit, mixing tank
(c) Reactor (aeration unit), secondary sedimentation unit, recycle line
(d) Primary sedimentation unit, aeration unit, secondary sedimentation unit, recycles line
- [2] Lacey's regime width (W) for a channel having flood discharge of Q is given by
a) $W = 1.35(Q)^{1/2}$ b) $W = 4.75(Q)^{1/2}$ c) $W = 1.35(Q)^{1/3}$ d) $W = 4.75(Q)^{1/3}$
- [3] The positive bending moment coefficient at the middle of the end span of a continuous one-way slab is (W_l = live load , W_d = dead load , L = effective span)
a) $(W_l L^2/10) + (W_d L^2/12)$ b) $(W_l L^2/9) + (W_d L^2/10)$
c) $(W_l L^2/12) + (W_d L^2/16)$ d) None of these

- [4] Kyanite shows which form?
 a) Columnar
 b) Elongated
 c) Bladed
 d) Tabular
- [5] A beam of overall length 'l' with equal overhangs on both sides carries a u.d.l. over entire length, to have economical bending moment the distance between the supports is
 a) $0.293 l$ b) $0.586 l$ c) $0.207 l$ d) $0.70 l$
- [6] Which of the following change in the gradient of bed slope conditions leads to formation of hydraulic jump?
 a) Mild to Steep b) Mild to Milder Mild
 c) Steep to Mild d) Steep to Steeper Steep
- [7] Which of the following soils are effectively compacted by sheep foot rollers?
 a) Sandy soils b) Clayey soils c) Gravel soils d) All the above
- [8] In which of the following methods of stabilization, stabilization achieved without chemical additives?
 a) Lime stabilization b) Cement stabilization
 c) Fly ash stabilization d) Mechanical stabilization.
- [9] Indian railways adopts _____ transition curve as it is easy to lay by offset method.
 a) Spiral b) Cubic parabola
 c) Bernoulli's lemniscates d) All the above
- [10] The bricks are found very hard, dense and less water absorption are called as
 a) Blue bricks b) Coloured bricks c) Fire bricks d) Refractory bricks.
- [11] The temperature at ground level is 28°C and at 300 m height is 32°C . the most likely Environmental Lapse Rate (ELR) will be
 (a) Unstable (b) super adiabatic (c) Inversion (d) Sub adiabatic
- [12] One of the basic assumptions made in unit hydrograph theory is
 a) Rainfall is uniform all over the catchment
 b) Base flow varies with time
 c) Rainfall varies with time
 d) All the above
- [13] Minimum spacing of end bearing piles as per IS 2911 is -----
 a) 2.0 times the shaft diameter b) 2.5 times the shaft diameter

- c) 3.0 times the shaft diameter d) None of these

[14] The joints that are strike parallel to the dip of the beds are known as
a) Shear joints b) Deep joints c) Dip joints d) Strike joints

[15] A 2m long bar of uniform section 50mm^2 extends 2mm under a limiting axial stress of 200N/mm^2 . What is the modulus of resistance for the bar
a) 0.10 units b) 0.20 units c) 1000 units d) 200000 units

[16] The governing Model law for flow over a spillway is _____.
a) Euler model law b) Reynolds model law
c) Mach model law d) Froude model law

[17] If the mass specific gravity of a saturated soil is 2.0. What is its saturated unit weight?
a) 10kN/m^3 b) 30kN/m^3 c) $5\ 10\text{kN/m}^3$ d) $20\ \text{kN/m}^3$

[18] What is the magnetic declination if the magnetic bearing of the sun at noon is $351^\circ 20'$
a) $8^\circ 40'E$ b) $8^\circ 40'N$ c) $9^\circ 40'W$ d) $9^\circ 40'E$

[19] If the Poisson's ratio for a material is 0.50, then the elastic modulus for the material is
a) Three times its shear modulus b) Four times its shear modulus
c) Equal to its shear modulus d) Indeterminate

[20] The Vee-Bee test is used for
a) Dry concrete b) Moderately stiff concrete
c) Dry and Moderately stiff concrete d) Flowing concrete

[21] The most significant pollutant responsible for metallic corrosion is
(a) SO_2 (b) CO and NO_2 (c) CFC and Ozone (d) CFC and CO_2

[22] The empirical formula given by Lea to determine the economical diameter of a pipe, D , in a pumping main is equal to (Q is the pump discharge in cumecs)
(a) 0.969 to $1.222\ (Q)^{1/2}$ (b) 0.969 to $1.222\ (Q)^{1/3}$
(c) 0.969 to $1.222\ (Q)^{2/3}$ (d) 0.969 to $1.222\ (Q)^{3/2}$

[23] The money to be deposited by the contractor after accepting the tender is _____ % of the cost of the work as security deposit.
a) 20 b) 10 c) 40 d) 30

- [24] Presence of a narrow bridge a head of the roadway is an example of
a) Regulatory sign b) Informatory sign
c) Warning sign d) Direction control sign
- [25] Load on connection is not eccentric for
a) Lap joint b) Single cover butt joint c) Double cover butt joint d) All the above
- [26] Which one of the following statements is correct?
a) The diameter of the suction pipe is greater than that of the delivery pipe.
b) The velocity in the suction pipe is greater than that in the delivery pipe.
c) The discharge in the suction pipe is greater than that in the delivery pipe.
d) The pressure in the suction pipe is greater than that in the delivery pipe.
- [27] A combined footing will be trapezoidal in plan if
a) Column loads are equal and there is no space restriction.
b) Column loads are unequal and the column carrying heavier load is near property line.
c) Column loads are unequal and interior column heavier load.
d) Column spacing is very large such that distance of lie of action of resultant is less than the spacing between the columns.
- [28] Correction for temperature for a measured length of 890m if the 20m chain standardised at 80°F and used at 65°F is the $\alpha = 65 \times 10^{-7}/^{\circ}\text{F}$.
a) 0.09 (+ve) b) 0.09(-ve) c) 0.9 (+ve) d) 0.9 (-ve)
- [29] If a simply supported beam of uniform cross section is subjected to a clockwise moment at the left support and an equal anticlockwise moment at the right support, then the
(i) BMD will be is the shape of the rectangle
(ii) SFD will be a straight line coinciding with base
(iii) Deflection curve will be in the shape of circular arc of these statements
a) (i), (ii) and (iii) are correct b) (i) and (ii) are correct
c) (i) and (iii) are correct d) (ii) and (iii) are correct
- [30] The maximum concentration of total chlorides (as Cl) for plain concrete should be
a) 200mg/l b) 400mg/l c) 500mg/l d) 2000mg/l
- [31] Choose the appropriate value of area ratio for setting a good quality of undisturbed sample
a) 8% b) 20% c) 16% d) 12%
- [32] If first order reaction rate constant is 0.23/day at 20°C, the standard 5 day BOD at 20°C when compared to ultimate first stage BOD is about
(a) 58% (b) 68% (c) 78% (d) 98%
- [33] _____ contract is an integrated contract in which all works related to various disciplines are awarded to a single contractor.
a) Package contract b) Continuing contract

c) Turn-Key contract

d) Negotiated contract

- [34] While aligning a hill road with a ruling gradient of 6 percent, a horizontal curve of radius 60m is encountered. The compensated gradient at the curve is equal to
a) 1.25% b) 4.75% c) 1.5% d) 2.5%
- [35] The maximum slenderness ratio of compression members carrying loads resulting from dead loads and superimposed loads is
a) 100 b) 180 c) 150 d) 200
- [36] In a hydroplant, 300 cumecs of water is allowed through a turbine with an effective head of water acting on the turbine as 50 m. The efficiency of the hydroplant is 0.8. Taking specific weight of water as $10,000 \text{ N/m}^3$, the effective power generated by the plant is _____.
a) 120.0 kW b) 187.5 kW c) 120.0 MW d) 187.5 MW
- [37] Safe load capacity of a bored cast-in-situ pile of 450mm diameter and 8m length installed in a clay deposit with average un-drained cohesion of 50 kN/m^2 the pile and un-drained cohesion of 75 kN/m^2 below the tip of the pile, for adhesion factor (α) of 0.5 and a factor of safety of 2.5 is
a) 156 kN b) 141.7 kN c) 382.2 kN d) 390 kN
- [38] Photogrammetry is science with uses
a) Photograph b) Tachometer c) Theodolite d) Plane table
- [39] The state of stress in two dimensions at a point in a loaded component can be completely specified by indicating the normal and shear stresses on
(i) A plane containing the point
(ii) Any two planes passing through the point
(iii) two mutually perpendicular planes passing through the point of these statements
a) 1 and 3 are correct b) 2 alone is correct
c) 1 alone is correct d) 3 alone is correct
- [40] The calcium silicate hydration decompose at
a) 40°C b) 150°C c) 300°C d) 550°C
- [41] Which of the following soil is likely to subject liquefaction.
a) Saturated loose sand b) Medium stiff clay
c) Dense sand d) stiff clay
- [42] The settling velocity of inorganic particles in a sedimentation tank of a water treatment plant, is governed by :
(a) Darcy's law (b) Dupuit's law (c) Stoke's law (d) Fick's law.

- [43] A dummy activity
 a) Is artificially introduced to show dependence of activities
 b) Is represented by a dotted line
 c) Neither consume time nor resources
 d) All the above
- [44] According to ICAO classification of airports, the runway length of 'D' type ranges between
 a) 1280-1500mts b) 2150-2500mts c) 1500-1800mts d) 1800-2150mts
- [45] When the beam starts to crack, the neutral axis -----
 a) Shifts downwards b) Remains in the same position
 c) Shifts upwards d) At the centre
- [46] The probability of occurrence of a 20 year storm in the next 10 years is
 a) 40% b) 60% c) 50% d) 25%
- [47] If a retaining wall with smooth vertical back, 5m high is retaining cohesion less backfill ($F=31^0$ and $U = 20 \text{ kN/m}^3$) and carrying surcharge of intensity 10 kN/m^2 , the active thrust acting on back of the wall per meter length is _____.
 a) 35.2 kN b) 96 kN c) 83.2 kN d) 120 kN
- [48] Formula for super elevation for road is
 a) $h = \frac{BV^2}{gR}$ b) $h = \frac{2bv}{gR}$ c) $h = \frac{BV^2}{2gR}$ d) $h = \frac{2bv}{gR^2}$
- [49] Influence line for deflection at free end of a cantilever is
 a) constant line
 b) triangle with zero ordinate at fixed end maximum ordinate at free end
 c) cubic parabola with zero ordinate at fixed end maximum ordinate at free end
 d) None of the above
- [50] The ratio of bulk modulus to young's modulus ____
 a) is always greater than 1.0 b) is always less than 1.0
 c) varies from 1.0 - 3.0 d) depends upon the Poisson's ratio

Senior Executive Engineer (Civil)

ANSWERS

1	2	3	4	5	6	7	8	9	10
c	b	a	c	b	c	b	d	b	a
11	12	13	14	15	16	17	18	19	20
c	a	b	c	a	d	d	a	a	c
21	22	23	24	25	26	27	28	29	30
a	a	b	c	c	a	b	a	b	d
31	32	33	34	35	36	37	38	39	40
a	b	d	b	b	c	a	a	d	b
41	42	43	44	45	46	47	48	49	50
a	c	d	c	c	a	b	a	c	d

