



SARDAR VALLABHBHAI
NATIONAL INSTITUTE OF TECHNOLOGY
Surat (Gujarat)

The following details **MUST** be filled by the candidate:

Application ID	
Reservation category	
Candidate's name	
Post applied for	Executive Engineer (Civil/ Electrical)
Mobile number	
Date of written test	19.02.2021
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.

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- [1] To avoid gravity dam failure by crushing for the dam material of allowable stress f and specific gravity of concrete S_c and specific weight of water γ_w the limiting height is equal to
- a) $H_{\max} = f / (S_c + 1) \gamma_w$ b) $H_{\max} = f / (S_c - 1) \gamma_w$
c) $H_{\max} = f / (S_c + C) \gamma_w$ d) $H_{\max} = f / (S_c - C) \gamma_w$
- [2] The property of a mineral by virtue of which it can be cut with a knife is _____
- a) Parting
b) Sectile
c) Malleable
d) Ductile
- [3] What is the slope of virgin compression curve?
- a) Coefficient of consolidation

- b) Compressive index
 - c) Flow index
 - d) Slope index
- [4] IS 456 restricts the deflection to prevent cracking of brittle partitions to-----
- a) Span/350
 - b) Span/250
 - c) Either (span/350) or 20mm
 - d) None of these
- [5] The following are the commonly found minerals in igneous rocks.
- a) Mica, Olivine and serpentine.
 - b) Glauconite, Anhydrate and Dolomite.
 - c) Mica, Calcite and Magnesite.
 - d) All the above.
- [6] If the time base of t-hour unit hydrograph is T hours, the number of unit hydrographs necessary to produce S-curve and develop constant outflow is equal to
- a) t/T
 - b) T/t
 - c) $T-t$
 - d) $T/2t$
- [7] What is the principal method of stream erosion and involves wearing away of the bedrocks?
- a) Hydraulic action
 - b) Abrasion
 - c) Attrition
 - d) Corrosion
- [8] An unconfined compression test is a special case of the following test
- a) Tri-axial test
 - b) Vane shear test
 - c) Direct shear test
 - d) None of these
- [9] Chromium oxide is used to impart
- a) Red color
 - b) Brown color
 - c) Green color
 - d) Gray color
- [10] The construction of structure under water, the type of lime used is
- a) Hydraulic lime
 - b) Fat lime
 - c) Quick lime
 - d) Pure lime
- [11] The relationship between the solids retention time and the hydraulic retention time in a completely mixed suspended growth process reactor without recycle used for sewage treatment.
- (a) $SRT > HRT$
 - (b) $SRT = HRT$
 - (c) $SRT < HRT$
 - (d) $SRT/HRT = 0.5$
- [12] The safe speed limit under existing conditions of a road way is _____ percentile speed
- a) 50th
 - b) 98th
 - c) 15th
 - d) 85th

- [13] A combined footing will be rectangular in plan if
- Column loads are unequal and column carrying heavier load is interior.
 - Column loads are unequal and exterior column carries heavier load and there is restriction of space.
 - Column loads are such that the resultant of line of action from exterior column (with space restriction) is at distance less than one-third the spacing between the columns.
 - If soil has high bearing capacity and column loads are light.
- [14] If TL is the latest allowable event occurrence time, slack(s), is equal to
- Latest allowable event occurrence time – EFT
 - LST-Earliest Start Time
 - Latest Finish Time – Earliest Finish Time
 - All the above
- [15] Moisture content of the air dry aggregate compared to the SSD state is
- Equal
 - Low
 - High
 - Medium
- [16] If a sewer carrying a discharge of 2 cumecs with no dissolved Oxygen outfalls into a river carrying a discharge of 10 cumecs and having a dissolved Oxygen equal to 8.4 mg/l the resultant DO of the mix will be equal to
- 5mg/l
 - 7mg/l
 - 10.5mg/l
 - 25mg/l
- [17] The design speed of a road is 65kmph, the friction coefficient is 0.36. The head light sight distance is equal to
- 71.62m
 - 182.76
 - 91.38m
 - 45.69
- [18] A strip footing is installed in saturated clay with un-drained cohesion of 40 kN/m^3 and submerged unit weight of soil is 10 kN/m^3 at a depth of 1.5m below ground surface with water table at ground surface. The safe bearing capacity of soil for the footing for a factor of safety of 2.5 from Terzahi's theory is _____.
- 70.1 kN/m^2
 - 106.2 kN/m^2
 - 76.0 kN/m^2
 - 97.2 kN/m^2
- [19] Find the cost time slope from the below data:
- | Type | Cost (Rs.) | Time (Days) |
|----------|------------|-------------|
| Normal | 4000 | 10 |
| Crashing | 14000 | 5 |
- 2000
 - 500
 - 1000
 - 2500

- [20] A bar of steel 2 cm diameter was subjected to a tensile load of 25kN and the measured extension on 20 cm gauge length was 7.8×10^{-3} cm and the change in diameter was 2.32×10^{-4} cm. The Poisson's ratio is
a) 0.25 b) 0.3 c) 0.298 d) 0.32
- [21] Disinfection efficiency of chlorine when used as disinfectant in water treatment is
(a) Decreases with increase in pH values of water
(b) Increases at higher pH values of water
(c) Unaffected at higher pH values of water
(d) Highest at neutral pH (equal to 7) of water
- [22] Platform for ships to come close enough to the shore embankment and dis-embankment that are built into or on to the water along and parallel to the shore are known as
a) Quay b) Pier c) Jelly d) None of the above
- [23] Which of the following method is more appropriate for stability analysis of slopes of high embankments.
a) Swedish circle method b) Friction circle method
c) Bishop's method d) Coulomb's wedge theory
- [24] If an activity has its optimistic, most likely and pessimistic times as 2, 4 and 8 respectively, then the standard deviation and variance are respectively
a) 1 and 1 b) 2 and 1 c) 4 and 1 d) 8 and 1
- [25] The modulus of rigidity for a material is 0.51×10^5 N/mm². A 10mm diameter rod of the material was subjected to an axial pull of 10kN and the change in diameter was observed to be 3×10^{-3} mm. The Poisson's ratio is
a) 0.33 b) 0.25 c) 0.316 d) 0.44
- [26] If P represents the pressure of sound wave and P_{ref} represents the reference pressure, then sound pressure level, SPL, in dB, is equal to
(a) $(20) \log_{10} (P/P_{ref})$ (b) $(1/20) \log_{10} (P/P_{ref})$
(c) $(20) \log_{10} (P_{ref}/P)$ (d) $(1/20) \log_{10} (P_{ref}/P)$
- [27] The standard axle load for the design of flexible pavement overlay over existing flexible pavement in India using Benkelman beam rebound deflection method (as per IRC: 81-1981) is taken as
a) 4085kg b) 8170kg c) 10200kg d) 5100kg
- [28] Lime stabilization is most suitable for stabilization of
a) Clays of high plasticity b) Fine to medium sand
c) Well graded gravel d) Coulomb's wedge theory.
- [29] The pressure at Vena contracta in a mouth piece with fully flowing condition is generally _____.

- a) atmospheric
- b) less than atmospheric
- c) more than atmospheric
- d) vapour pressure of the fluid at ambient temperature

[30] Two shafts made of the same material have the same length and are joined in series. If the ratio of their diameters is 2, than the ratio of their angles of twist is ____ .

- a) 16
- b) 8
- c) 4
- d) 2

[31] During temperature inversion in atmosphere, air pollution tends to

- (a) Accumulate above and just below the inversion layer
- (b) Accumulate below inversion layer
- (c) Disperse laterally and vertically over infinite depth
- (d) Disperse vertically but to a limited extent laterally

[32] Match the list I with list II and select the correct answer using the codes given below the lists

List I

List II

A Moment of inertia

(i) Tensile stress

B Elongation

(ii) Modulus of rupture

C Neutral Axis

(iii) Zero shear stress

B Top fibre

(iv) Zero longitudinal

Codes:

- a) A B C D
- (ii) (i) (iii) (iv)
- c) A B C D
- (iii) (iv) (i) (ii)

- b) A B C D
- (i) (ii) (iv) (iii)
- d) A B C D
- (ii) (i) (iv) (iii)

[33] Geodetic survey

- a) plane angle
- b) bench mark
- c) spherical angle
- d) spirit level

[34] The choking condition in a canal transition with the flow in the subcritical condition is indicated by _____.

- a) change in the depth at the upstream of the transition
- b) change in the depth at the downstream of the transition
- c) change in the bed elevation from upstream to downstream
- d) change in the width of the canal from upstream to downstream

[35] A steel column in a multi-storeyed structure carries a load of 125 kN. It is built up of 2 ISMC 350 channels connected by lacing. The lacing carries a load of

- a) 125 kN
- b) 12.5 kN
- c) 3.125 kN
- d) Zero

[36] While determining the yield of open wells by pumping test

- (a) Velocity of recharging water increases with depression head
- (b) Maximum safe yield of an open well is expected at critical depression head
- (c) Depression head is generally limited to $(1/3)^{rd}$ of the critical depression head
- (d) Depression head resulting at critical velocity is called critical depression head

- [37] Which of the following gives the correct expressions for strain energy stored in a beam of length L and of uniform cross-section having moment of inertia I and subjected to constant bending moment
- a) $\frac{ML}{EI}$ b) $\frac{ML}{2EI}$ c) $\frac{M^2L}{EI}$ d) $\frac{M^2L}{2EI}$
- [38] The representative fraction of the scale $1\text{ cm} = 25\text{ m}$ is
- a) $1/2500$ b) $1/25000$ c) $1/250$ d) $1/25$
- [39] The cavitation in hydraulic machines may be observed when the fluid has its _____.
- a) pressure head greater than velocity head
b) pressure less than the vapour pressure
c) pressure less than the atmospheric pressure
d) pressure head greater than piezometric head
- [40] Minimum thickness of web in a plate girder, when the plate is accessible and also exposed to weather, is
- a) 12 b) 6 c) 3 d) 20
- [41] What will happen to coefficient of active and passive earth pressures when the angle of shearing resistance increases?
- a) Both coefficients are increasing
b) Both coefficients are decreasing
c) Coefficient of active pressure increases and coefficient of passive pressure decreases
d) Coefficient of active pressure decreases and coefficient of passive pressure increases
- [42] If failure by shear along 45° planes is to be avoided, then a material subjected to uniaxial tension should have its shear strength equal to at least
- a) tensile strength
b) compressive strength
c) half the difference between the tensile and compressive strengths
d) half the tensile strength
- [43] Magnetic bearing of a line with true bearing of $54^\circ 02'$ is _____ if declination is $5^\circ 35'$ east.
- a) $59^\circ 37'$ b) $54^\circ 02'$ c) $48^\circ 24'$ d) $234^\circ 02'$
- [44] The shock free entry implies that the
- a) absolute velocity vector should be tangential to the inlet tip of the runner vane
b) relative velocity vector should be tangential to the inlet tip of the runner vane
c) peripheral velocity vector should be tangential to the inlet tip of the runner vane
d) flow velocity vector should be tangential to the inlet tip of the runner vane
- [45] The response reduction factor R for special reinforced concrete moment resistant frames is ---
- a) 3 b) 4 c) 8 d) 5
- [46] Which of the following method is suitable for high permeable soils?
- a) Constant head permeameter method
b) Variable head permeameter method

- c) Falling head permeameter method
- d) Both constant head and variable head permeameter methods

[47] A beam cross-section is used in two different orientations as shown in Figure 1

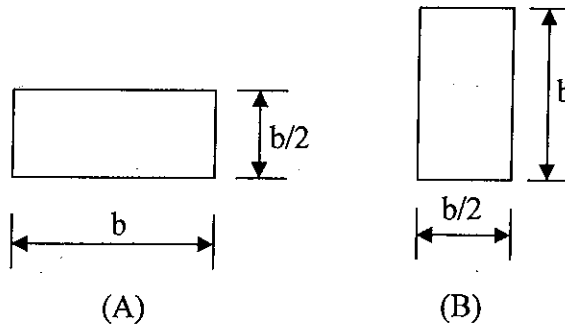


Figure 1

Bending moments applied to the beam in both cases are same. The maximum Bending stresses induced in cases (A) and (B) are related as

- a) $\sigma_A = \sigma_B$
- b) $\sigma_A = 2\sigma_B$
- c) $\sigma_A = \frac{\sigma_B}{2}$
- d) $\sigma_A = \frac{\sigma_B}{4}$

[48] The tangent length of sample circular curve with radius 600m and deflection angle 45° is

- a) 600m
- b) 346.4m
- c) 248.5m
- d) ∞

[49] If the coefficient of variation of the rainfall of the 4 (four) existing rain-gauge stations in a basin is 33.1, the percentage accuracy in the estimation of average depth of rainfall over the basin is

- a) 8.28%
- b) 91.72%
- c) 16.55%
- d) 83.45%

[50] The maximum strain in the tension reinforcement in the section at failure should be (f_y = yield stress in steel, E_s = Young's modulus of steel)

- a) More than $\frac{f_y}{1.15E_s} + 0.002$
- b) Equal to 0.0035
- c) More than $\frac{f_y}{E_s} + 0.002$
- d) Less than $\frac{f_y}{1.15E_s} + 0.002$

Executive Engineer (Civil)

ANSWERS

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

