NATIONAL INSTITUTE OF TECHNICAL TEACHERS TRAINING AND RESEARCH

(DEEMED TO BE UNIVERSITY UNDER DISTINCT CATEGORY)

CHANDIGARH

Ph.D. Entrance Examination - December 2025 Session

Subject / Branch / Department	:	**Civil Engineering**
Roll No.	:	
Candidate Name	:	
Date of Examination	:	

Maximum Marks: 25 (There is no negative marking)

Notes: (a) Only one option to be tick-marked out of the four options given as answer

(b) The Candidate must put his/her signature with date at the bottom of each page

(c) For any rough work, please use ONLY back-sides of pages which are left blank

Q1.	The matrix $B = A^T$, where A is any matrix is	
(a)	Skew symmetric	
(b)	symmetric about the secondary diagonal	
(c)	always symmetric	
(d)	another general matrix	
Q2.	Two people weighing W each are sitting on a plank of length L floating on water at L/4 from either end. Neglecting the weight of the plank, the bending moment at the centre of the plank is;	
(a)	WL/8	
(b)	WL/16	
(c)	WL/32	
(d)	Zero	
Q3.	Which of the following statements is correct?	
(a)	Combustion is an exothermic process, which takes place in the absence of oxygen	
(b)	Pyrolysis is an exothermic process, which takes place in the absence of oxygen	
(c)	Pyrolysis is an endothermic process, which takes place in the absence of oxygen	
(d)	Combustion is an endothermic process, which takes place in the abundance of oxygen	
Q4.	The point within the cross sectional plane of a beam through which the resultant of the external loading on the beam has to pass through to ensure pure bending without twisting of the cross section of the beam is called;	
(a)	Moment centre	

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(b)	Centroid
(c)	Shear centre
(d)	Elastic center

Q5. The contact pressure for a rigid footing resting on clay at the center and the edges are respectively

(a)	Maximum and zero
(b)	Maximum and minimum
(c)	Zero and maximum
(d)	Minimum and maximum

Q6. The number of simultaneous equations to be solved in the slope deflection method is equal to;

(a)	The degree of static indeterminacy
(b)	The degree of kinematic indeterminacy
(c)	The number of joints in the structure
(d)	(The number of joints in the structure – 1)

Q7. The appropriate field test to determine the undrained shear strength of soft clay is;

(a)	Plate load test
(b)	Static cone penetration test
(c)	Standard penetration test
(d)	Vane shear test

Q8. For the following statements:
P – The lateral stress in the soil while being tested in an oedometer is always at-rest.
Q – For a perfectly rigid strip footing at deeper depths in a sand deposit, the vertical normal contact stress at the footing edge is greater than that at its centre.
R – The corrections for overburden pressure and dilatancy are not applied to measured SPTN values in case of clay deposits.
The correct combination of the statements is;

(a)	P – TRUE; Q – TRUE; R – FALSE
(b)	P – FALSE; Q – FALSE; R – TRUE
(c)	P – FALSE; Q – FALSE; R – FALSE
(d)	P – TRUE; Q – TRUE; R – TRUE

Q9. The unit of dynamic viscosity of a fluid is;

(a)	m^2/s
(b)	Ns/m^2
(c)	$Pa\ s/m^2$

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(d)	kg s^2/m^2

Q10. A hydraulic structure has four gates which operate independently. The probability of failure of each gate is 0.2. Given that gate 1 has failed, the probability that both gates 2 and 3 will fail is;

(a)	0.240
(b)	0.200
(c)	0.040
(d)	0.008

Q11. The system that uses the Sun as a source of electromagnetic energy and records the naturally radiated and reflected energy from the object is called;

(a)	Geographical Information System
(b)	Global Positioning System
(c)	Passive Remote Sensing
(d)	Active Remote Sensing

Q12. Which of the following statements is TRUE for the relation between discharge velocity and seepage velocity?

(a)	Seepage velocity is always smaller than discharge velocity
(b)	Seepage velocity can never be smaller than discharge velocity
(c)	Seepage velocity is equal to the discharge velocity
(d)	No relation between Seepage velocity and discharge velocity can be established

Q13. Which of the following statements is FALSE?

(a)	Plumb line is along the direction of gravity
(b)	Mean Sea Level (MSL) is used as a reference surface for establishing the horizontal control
(c)	Mean Sea Level (MSL) is a simplification of Geoid
(d)	Geoid is an equi–potential surface of gravity

Q14. The values of abscissa (x) and ordinate (y) of a curve are as follows;

x	y
2.0	5.00
2.5	7.25
3.0	10.00
3.5	13.25
4.0	17.00

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(a)	20.67 unit^2
(b)	15.85 unit^2
(c)	22.56 unit^2
(d)	18.55 unit^2

Q15. Consider the following statements:
P: Walls of one brick thick are measured in square meters
Q: Walls of one brick thick are measured in cubic meters
R: No deduction in the brickwork quantity is made for openings in walls up to 0.1m^2 area.
S: For the measurement of excavation from the borrow pit in a fairly uniform ground, deadman are left at suitable intervals.
For the above statements, the correct option is;

(a)	P – False, Q – True, R – False, S – True
(b)	P – False, Q – True, R – False, S – False
(c)	P – True, Q – False, R – True, S – False
(d)	P – True, Q – False, R – True, S – True

Q16. Delta (Δ) in cm, Duty (D) in hectare/cumec and base period (B) in days are related as;

(a)	$\Delta = 864 \frac{B}{D}$
(b)	$B = 864 \frac{D}{\Delta}$
(c)	$B = 864 \frac{\Delta}{D}$
(d)	$D = 8.64 \frac{B}{\Delta}$

Q17. The minimum value of 15 minute peak hour factor on a section of a road is ;

(a)	0.10
(b)	0.20
(c)	0.33
(d)	0.25

Q18. Total Kjeldahl Nitrogen (TKN) concentration (mg/L as N) in domestic sewage is the sum of the concentration of;

(a)	Organic and inorganic nitrogen in sewage
(b)	Organic nitrogen and nitrate in sewage
(c)	Organic nitrogen and ammonia in sewage
(d)	Ammonia and nitrate in sewage

Q19. The Le Chatelier apparatus is used to determine;

(a)	Soundness of cement
(b)	Fineness of cement

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(c)	Setting Time of cement
(d)	Compressive Strength of cement

Q20. A device in which the dust in a gas is removed by electrostatic attraction is called;

(a)	Cyclone scrubber
(b)	Fabric filter
(c)	Electrostatic precipitator
(d)	Packed scrubber

Q21. The traffic conflicts that may occur in a rotary intersection are;

(a)	Merging and diverging
(b)	Crossing and merging
(c)	Crossing and diverging
(d)	Crossing, merging and diverging

Q22. The purpose of providing a balancing reservoir in a water supply distribution system is to;

(a)	Equalize pressure in the distribution system
(b)	Store adequate quantity of water to meet requirement in case of breakdown of inflow
(c)	Store adequate fire-fighting reserve
(d)	Take care of fluctuations in the rate of consumption

Q23. For a broad gauge railway track on a horizontal curve of radius R (in m), the equilibrium cant e required for a train moving at a speed V (in kmph) is;

(a)	$e = 1.676\ V^2/R$
(b)	$e = 1.315\ V^2/R$
(c)	$e = 0.80\ V^2/R$
(d)	$e = 0.60\ V^2/R$

Q24. The penetration value of a bitumen sample tested at 25°C is 80. When this sample is heated to 60°C and tested again, the needle of the penetration test apparatus penetrates the bitumen sample by d mm. The value of d CANNOT be less than _____ mm.

(a)	16
(b)	8
(c)	32
(d)	4

Q25. A steel column of ISHB 350 @ 72.4 kg/m is subjected to a factored axial compressive load of 2000 kN. The load is transferred to a concrete pedestal of grade M20 through a square base plate. Consider bearing of concrete as 0.45 fck where fck is the characteristic strength of concrete. Using limit state method and neglecting the self weight of

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base plate and steel column, the length of a side of the base plate to be provided is:	
(a)	45 cm
(b)	40 cm
(c)	48 cm
(d)	39 cm

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Answer Key

Civil Engineering

1.	d
2.	d
3.	c
4.	c
5.	d
6.	b
7.	d
8.	d
9.	b
10.	c
11.	c
12.	b
13.	b
14.	a
15.	d

16.	a
17.	d
18.	c
19.	a
20.	c
21.	a
22.	d
23.	b
24.	b
25.	c

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Dr. Himmi Gupta
25/8/25