JUNIOR ENGINEER CIVIL ENGINEERING EXAMINATION 2024 MEMORY BASED QUESTIONS (PAPER-I)

EXAM DATE	**05/06/2024**
EXAM TIME	**9:00 PM – 11:00 PM**
SUBJECT	**Junior Engineer 2024 Civil Engineering (Paper-I)**

SECTION A & B : CIVIL ENGINEERING (NON-TECH)

Q.1. Founder of Chola Dynasty-
Ans. Vijayalaya

Q.2. Hemant Chauhan is from which music gharana
Ans. Gujrati, Padmashri 2023

Q.3. Tehri Dam situated in which river
Ans. Satulaj river, Uttrakhand

Q.4. Ozone Layer protects against
Ans. Harmful UV radiations from sun rays

Q.5. 2001 Nobel Prize in physics
Ans. Eric Cornell, Carl Wieman

Q.6. CEO of Railway
Ans. Jaya Verma Sinha

Q.7. Appointment of Attorney General of India
Ans. Article 76

Q.8. 3rd Largest Ocean
Ans. Indian Ocean

Q.9. Which Article deals with the manner of election of President?
Ans. Article - 55
Electoral College
Elected member of LS & RS
Elected member of Leg assembly of state & UTs.
54 – Election
55 – Manner
56 – Term of office
57 – Reclection
58 - Qualification

Q.10. Jhijhiya dance
Ans. Folke dance of Mithila Bihar Goddess Durga. India Nepal.
It is celebrated during Ghatt sthapna to Vijay Dashmi

Q.11. Largest island in Lakshyadweep
Ans. Androtт island, (36 Coral island)

Q.12. 103th CAA, 2019
Ans. 10% reservation to EWS Government and Private education.

Q.13. 61st CAA, 1988
Ans. Reducting the Voting age from 21 – 18 years for Lok Sabha & State Legislative Assembly.

Q.14. Article - 124
Ans. Supreme Court

Q.15. Article - 78
Ans. It says that the Prime Minister should inform the President regarding important policy decision of the government.

Q.16. Article - 76
Ans. Attorney General of India

Q.17. What is the meaning of the term Fraternity in Preamble of the constitutions?
Ans. Fraternity means brotherhood

Q.18. COP 28 was conducted
Ans. Dubai, 2023

Q.19. What was the population of India as per 1901 Census
Ans. 23,8,396,327 (238.4 million)

Q.20. Which committee recommended the fundamental duties in Indian constitution
Ans. Swaran Singh Committee

Q.21. As per Koppen's classification Indian Peninsula climate is
Ans. Am

Q.22. Types of dam
Ans. Gravity
Arch
Buttress
Earth or rock

Q.23. Cripps mission
Ans. 1942

Q.24. As per Census 2011 which is the second most literate state?
Ans. Kerala, Lakshyadweep, Mizoram, Goa, Tripura

Q.25. Which mineral is used for Saffron cultivation?
Ans. Calcium 9%, Iron 61%, Potassium 37%.
Pallasium, manganese magnesium, zinc, sodium, copper.

Q.26. Who suggested the Preamble in the drafting committee of the constitution?
Ans. J. L. Nehru

Q.27. Chloroform formula
Ans. $CHCl_3$

Q.28. Har Ghar Jal under Jal Jeewan Mission was launched in
Ans. 2019. It aimed 55 litres of top water to every rural house hold per capita per day upto 2024.

Q.29. 52nd CAA, 1989
Ans. Anti-defection, 10th schedule

Q.30. 2nd Railway Minister
Ans. N-Gopaleswamy Ayyangar (Ashwini Vaishnav is the current Railway Minister)
John Matthai Ist (Min of Transport)

Q.31. Which State had the least literacy rate as per 2011 census
Ans. Bihar 47%

Q.32. Jyotiba Phule
Ans. Satyashodhak Samaj 24 September, 1873 Pune

Q.33. Number of players in sports
Ans. Cricket – 11
Football – 11
Hockey – 11
Kabaddi - 7

Q.34. Hirakund dam is situated on which river?
Ans. Mahanadi, Odisha

Q.35. Which decade has the lowest population rate from 1901 to 1981?

Ans. 1911-1921 (–0.31%)
Demographic divide.

SECTION C : CIVIL ENGINEERING

Q.1. Match the following dams with their respective Rivers

Dam	River
A. Tehri Dam	1. Kaveri
B. Kallanai Dam	2. Bhagirath
C. Bilaspur Dam	3. Krishna
D. Nagarjuna Sagar	4. Banas

Which of the below-mentioned option is the correct match?

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

Ans. **(a)** A – 2, B – 1, C – 4, D – 3

- **Tehri Dam :** It is located on the Bhagirathi River and is the tallest dam in India. It is located in Uttarakhand. It is an embankment earth rockfill kind of dam, Its installed capacity is 1000MW and the maximum planned is 240MW. Environmental activist Sunderlal Bahuguna led the Anti-Tehri Dam movement from the 1980s till 2004.
- **Kallanai Dam :** It is built across the Kaveri river flowing from Tiruchirappalli District to Thanjavur district. It is an ancient dam. It is constructed in the Chola reign. It is located at a distance of 45 km from Thanjavur, 15 km from Tiruchirappalli.
- **Bilaspur Dam :** In the Tonk district of Rajasthan, there is a gravity dam called the Bilaspur dam. The dam was completed in 1999 for the purpose of water supply and irrigation. The dam was build in the 1990s by Govt. Of Rajasthan. It supplies drinking water to Jaipur, Ajmer, and Tonk Districts.
- **Nagarjuna Sagar :** The Dam was constructed between 1955 and 1967. Nagarjuna Sagar Dam is a masonry dam across the Krishna River at Nagarjuna Sagar which straddles the border between Guntur district, Andhra Pradesh, and Nalgonda district, Telangana. The dam created a water reservoir with a storage capacity of 11.47 billion cubic meters.

Q.2. The unit of coefficient of permeability is same as _____

(a) Velocity (b) force
(c) density (d)

Ans. **(a)**
The unit of coefficient of permeability is same as Velocity i.e. mm/sec or cm/sec.

Q.3. 3 mm diameter of soil threads that are crumbled during_____ determination?

Ans. plastic limit : The plastic limit of a soil is the moisture content, expressed as a percentage of the weight of the oven-dry soil, at the boundary between the plastic and semi-solid states of consistency.

It is the moisture content at which a soil will just begin to crumble when rolled into a thread ⅛ inch (3 mm) in diameter using a ground glass plate or other acceptable surface.

Q.4. Timber can be made reasonably fire-resistant by:

(a) Soaking it in Ammonium Sulphate

(b) Coating with Tar paint

(c) Pumping creosote oil into timber under high pressure

(d) Seasoning process

Ans. **(a)**

The fire resistance of timber can be enhanced by phosphates of ammonia, a mixture of ammonium phosphates and ammonium sulphate, borax and boric acid, sodium arsenate etc.

Sir Abel's Process

In this process, the timber surface is cleaned and it is coated with a dilute solution of sodium silicate, A cream-like paste of slaked fat lime is then applied and finally, a concentrated solution of silicate of soda is applied on the timber surface. This process is quite satisfactory in making the timber fire-resistant.

Q.5. As per Eular's theory largest effective length will occur in case of

Ans.

Effectively held in position and restrained against rotation at one end and at other end neither restrained against rotation nor held in position.	2.00L	2.00L

Q.6. Calculate the cost of construction using the plinth area method when the plinth area and plinth area rate of a plot are 15 m^2 and Rs. 2,000 per m^2.

Ans. Approximate cost = 15 × 2000 = 30,000 Rs

Q.7. What type of mode of failure is seen if footing is resting on loose sand?

Ans. Punching shear failure

Q.8. E= 2G is given, find out the value of μ

Ans. Relationship between various elastic constants is :

$E = 2G (1 + \mu)$

Using this formula you can get the value of μ

where μ is Poisson's ratio.

Q.9 On Indian Railways, the standard length of rails in a Broad Gauge track is _____.

Ans. The distance between the inner faces of a pair of wheels is called the wheel gauge.

The following table gives the length of the rail for different types of gauges.

Type of gauge	**Length of Rail**
B.G	12.8 m
M.G	11.89 m

Q.10. As per IS 456 : 2000, in reinforced and plain concrete footings the thickness at the edge shall NOT be less than _____ for footings.

Ans. **(c)** 15 cm

According to IS 456 : 1978, the thickness of reinforced concrete footing on piles at its edges is kept less than 15 cm.

However, from the updated IS Module of 456 : 2000.

As per IS 456 : 2000, Clause 34.1.2,

Thickness at the Edge of Footing

In reinforced and plain concrete footings, the thickness at the edge shall be not less than 150 mm for footings on soils.

Q.11. A short column of rectangular section carries a vertical piont load W axially, the stress on the section of the column will be:

(a) Zero at the axis
(b) Tensile on one end and compressive on the other
(c) Zero at the end
(d) Uniform compressive stress

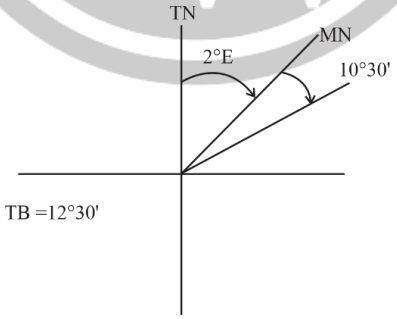
Ans. **(d)** Uniform comressive stress

Q.12. Plywood is specified by

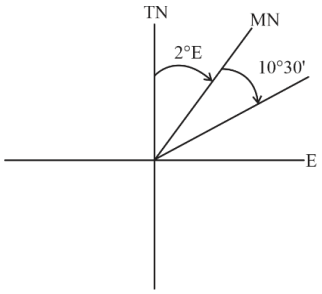
(a) Weight
(b) Volume
(c) Thickness
(d) Number of layers

Ans. **(d)** Number of layers

Q.13. If magnetic bearing of a line was 10°30 and eastern declination was 2°. Calculate present magnetic bearing of line in Quadrantal bearing system if present declination is 2°W.



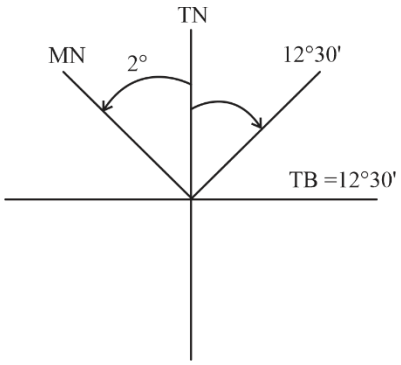
Ans.



Past MB = 10°30' 2'E declination

Present 2°W

QB = Now = ?



MB = 14°30'

MB = N14°30'E

Q.14. What will be the effect if cement becomes lumpy?

Ans. Reduced Strength

Q.15. _____ pressure is measured with the help of a pressure measuring instrument in which the atmospheric pressure is taken as datum.

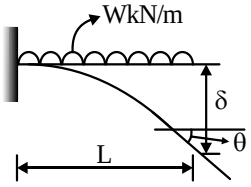
Ans. Gauge

Q.16. What is the deflection at the free end for a cantilever beam subjected to UDL?

Ans. Where, L = Length of beam

W = UDL applied

EI = Flexural rigidity of the beam



$$\delta = \frac{WL^4}{8EI}$$

$$\theta = \frac{WL^3}{6EI}$$

Q.17. In a falling head permeability test

$a = 20\ cm^2$

$A = 100\ cm^2$

L = 100 cm

t = 100 sec

h_1 = 100 cm

h_2 = 10 cm

Ans. **0.4606 cm/sec**

Formula:

For falling head permeability test

CIVIL ENGINEERING

$$k = 2.303\frac{a}{A} \times \frac{L}{t} 10g_{10}\left(\frac{h_1}{h_2}\right)$$

Where, k = permeability, a = Area of tube in m^2, A = Area of sample in m^2, t = time in sec, L = length in m, h_1 = Level of time t = 0, and h_2 = Level of time t

Q.18. Choose the most efficient generator for wind power generation.

(a) Doubly-fed induction generator
(b) Permanent magnet synchronous generator
(c) Induction generators
(d) Squirrel cage induction generators

Ans. **(a)**

Most efficient generator for wind power generation is doubly-fed induction generator.

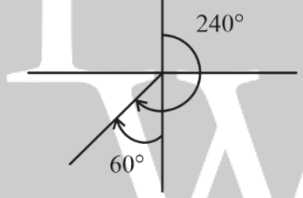
Q.19. Calculate latitude of line if length of line is 300 m and bearing is 240°

Ans. Lattitude of line = $- l \cos\theta$

$= - 300 \cos\theta$

$= - 300 \cos 60°$

$= - 150$m



Departure of line = $- l \sin\theta$

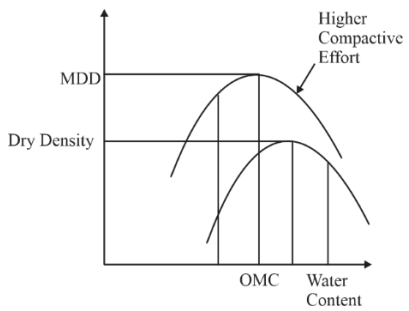
$= - 300 \sin 60°$

$= - 259.8$ m

Q.20. In a compaction test if the compacting effort is increased, it will result in

(a) Increase inmaximum dry density and OMC
(b) Increase in maximum dry density but OMC remains unchanged
(c) Increase in maximum dry density and decrease in OMC
(d) no change in maximum dry density but decrease in OMC

Ans. **(c)** Increase in maximum dry density and decrease in OMC



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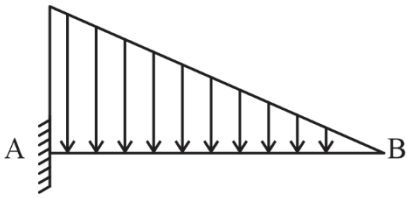
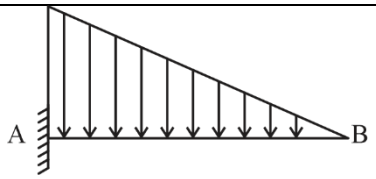
Q.21. The maximum deflection of a cantilever beam of length (L) with UVL (w) at the the entire span as shown in figure.



Ans.

	$y_B = \frac{wL^4}{30EI}$	$\theta_B = \frac{wL^3}{24EI}$

Q.22. The reading obtained in liquid limit test is plotted on a diagram in which water content is shown on y – axis and _____ are shown on x – axis.

Ans. **(number of drops)**

In can be expressed as:

$$I_f = \frac{w_1 - w_2}{\log \frac{n_2}{n_1}}$$

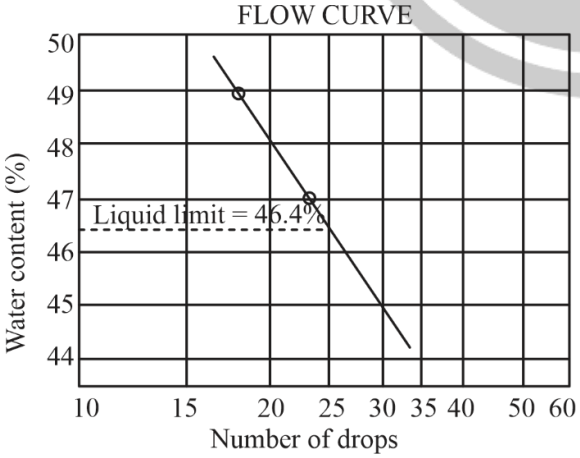
w_1 - Initial water content

w_2 = water content at later stage

n_1 = Initial number of blows

n_2 = number of blows at a later stag

I_f = Flow index



Q.23. Rapid hardening cement attains early strength due to

Ans. **(C_3S)**

Q.24. Workdone by a mason par day for 8 hours is called as

Ans. **Outturn:** The capacity of doing work by an artisan or skilled labour in the form of quantity of work per day is known as the task work or out turn of the labour.

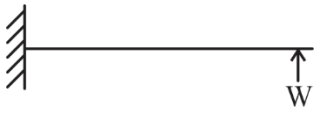
Q.25. How will flow of water in home supply from low level to high level.

Ans. **(**Due to pressure and gravity**)**

Q.26. An ordinary Portland cement when tested for its fineness, should not leave any residue on I.S. Sieve No.9, more than _____.

Ans. **(10%)**

Q.27. A Cantilever beam subjected to upward load (W) at free end. Then,



Ans. Compression in top fibre & tension in bottom fibre from NA.

Q.28. The slenderness ratio of a column is defined as the ratio of its length to :

(a) Maximum radius of gyration
(b) Maximum lateral dimension
(c) Least radius of gyration
(d) Least lateral dimension

Ans. **(c)**

Slenderness ratio :

Slenderness ratio is the ratio of the length of a column and the least radius of gyration of its cross- section. It is used extensively for finding out the design load as well as in classifying various columns in short/intermediate/long.

$$\lambda = \frac{l_e}{r_{min}}$$

Q.29. Which paint is can't be used on smooth surface but can be used on rough surface

Ans. Cement paint

Q.30. Width of septic tank for '5' users is

Ans. **(0.75 m)**

User	Width
5	0.75 m
10	0.9 m
15	0.9 m
20	1.1 m

Q.31. Which of the following Readings were taken on change point

Ans. BS and FS

Q.32. Maximum spacing of Contraction Joint for Reinforced slab is

Ans. For Reinforce

Slab (cm)	Max. Spacing
15	13 m
20	14 m

Q.33. Match the following type question from traffic sign with given shape.

Ans.

Mandatory Sign	Circular Shape
Warning Sign	Triangular Shape
Informatory Sign	Rectangular Shape

Q.34. Which of the following is correct definition of Skidding.

Ans. When rotational movement of wheel is less than translational movement it is called Skidding.

Q.35. Which of the following formula represent hypotenusal allowance.

(a) $l(\sec\theta - 1)$ (b) $l(1 - \cos\theta)$

Ans. **(a)** $l(\sec\theta - 1)$

Q.36. Which of the following statement is true.

S1 : Overtaking sight distance depend on reaction time of driver.

S2 : Overtaking sight distance depend on gradient of road.

Ans. Statement '1' is true, '2' is false. OSD do not depend on gradient of road.

Q.37.

'A'	'B'
Screening	Remove floating object
Detritustank	Remove finer particles
	Remove oil & dirt

Ans. Screening: Remove floating object

Detritustank: Remove finer particles

Q.38. '3R' in environment engineering represent ?

Ans. Reduce, Reuse & Recycle

Q.39. EDM instrument Tellurometer uses which radiation/waves

Ans. Microwave

Q.40. **Assertion :** Radius of transition curve increases along the curve.
Reason : Superelevation is minimum at start of transition curve and maximum at end.

Ans. 'A' is wrong & Reason is true.

- Length of transition curve decrease from infinity to 'R'
- Superelevation is minimum at start of curve and maximum at end of it.

Q.41. If soil is 800 kg/m^3 and head is 30 m than what will be the head for water column?

Ans. $(\rho gh)_{oil} = (\rho gh)_{water}$

$800 \times 9.81 \times 30 = 100 \times 9.81 \times h$

$$h = \frac{800 \times 30}{1000} = 24 \text{ m}$$

Q.42. Find out the kinetic head?

Ans. Kinetic head $= \frac{v^2}{2g}$

Q.43. Optimum water content for brick ?

Ans. 3%

Q.44. Find out the effective depth of cantilever beam having 2.5m span.

Ans. For Cantilever beam/slab –

$$\frac{L}{d} < 7$$

$$\frac{2500}{7} < d$$

$d = 357$ mm $= 0.35$ m

Q.45. What is the size of Seive used for fineness of cement.

Ans. 90 micron.

Q.46. Reason of priming in pump.

Ans. To remove the air

Q.47. What is the expression for shear in reinforced design for varying depth.

Ans. $$\tau_v = \frac{V \pm \frac{M_u \tan\beta}{d}}{bd}$$

Q.48. In concrete, if the strength of concrete is inversly proportional to w/c ratio. This statement is related to

Ans. Abram's law

Q.49. Los Angeles testing machine used to find out?

Ans. Abrasion.

Q.50. The unit of measurement for earthwork in

Ans. m^3