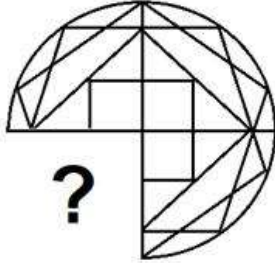


## Junior Engineer Civil Mechanical and Electrical Examination 2023 Paper I

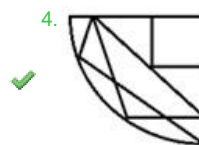
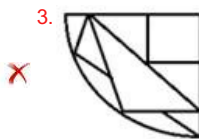
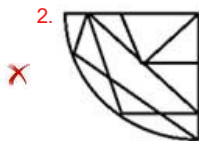
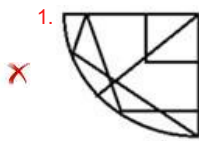
Exam Date	11/10/2023
Exam Time	9:00 AM - 11:00 AM
Subject	Junior Engineer 2023 Civil Paper I

### Section : General Intelligence and Reasoning

**Q.1** Select the option figure that will replace the question mark (?) in the figure given below to complete the pattern.



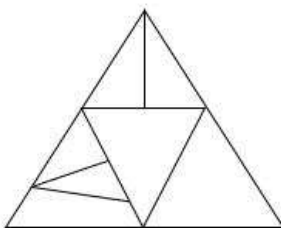
Ans



**Q.2** Which of the following numbers will replace the question mark(?) in the given series?  
73, 68, 70, 65, ?, 62, 64

- Ans
- ☒ 1. 71
  - ☒ 2. 63
  - ☒ 3. 67
  - ☒ 4. 69

**Q.3** How many triangles are there in the given figure?



- Ans
- ☒ 1. 8
  - ☒ 2. 7
  - ☒ 3. 9
  - ☒ 4. 10

Q.4 A # B means 'A is the sister of B'  
 A @ B means 'A is the brother of B'  
 A & B means 'A is the wife of B'  
 A % B means 'A is the daughter of B'  
 If R # P @ Q % Z & X, then how is P related to X?

- Ans ☒ 1. Son  
☒ 2. Father  
☒ 3. Sister  
☒ 4. Brother

Q.5 Select the correct mirror image of the given combination when the mirror is placed at line MN as shown.



- Ans ☒ 1. 9A4EK3IA  
☒ 2. 6V4EK3IA  
☒ 3. 9A4EK3IA  
☒ 4. 6V4EK3IA

Q.6 Select the option that is related to the sixth letter-cluster in the same way as the first letter-cluster is related to the second letter-cluster and the third letter-cluster is related to the fourth letter-cluster.

JOS : GMR :: YHL : VFK :: ? : PMD

- Ans ☒ 1. SOE  
☒ 2. SOF  
☒ 3. TPE  
☒ 4. TSE

Q.7 Select the option that is related to the fifth term in the same way as the second term is related to the first term and the fourth term is related to the third term.  
 26 : 375 :: 41 : 600 :: 53 : ?

- Ans ☒ 1. 790  
☒ 2. 780  
☒ 3. 765  
☒ 4. 785

Q.8 Three statements are followed by three conclusions numbered I, II and III. You have to consider these statements to be true, even if they seem to be at variance with commonly known facts. Decide which of the given conclusions logically follow/s from the given statements.

Statements:

No pumpkin is a guava.

No guava is a pea.

Some peas are potatoes.

Conclusions:

(I) Some pumpkins are potatoes.

(II) Some peas are pumpkins.

(III) Some pumpkins are not potatoes.

- Ans ☒ 1. Only conclusion II follows  
☒ 2. None of the conclusions follow  
☒ 3. Only conclusion I follows  
☒ 4. Either conclusion I or conclusion III follows

Q.9 Which of the following numbers will replace the question mark (?) in the given series?  
 573, 562, 549, 532, 513, 490, ?, 430

- Ans ☒ 1. 431  
☒ 2. 451  
☒ 3. 441  
☒ 4. 461

Q.10 Select the letter-cluster from among the given options that can replace the question mark (?) in the following series.

BOMP, DPOQ, ?, HRSS,

- Ans
- ☐ 1. FQQS
  - ☐ 2. FQRR
  - ☐ 3. FPQR
  - ☒ 4. FQQR

Q.11 In a certain code language, 'ALMOND' is coded as 4-48-52-60-56-16 and 'SHEEP' is coded as 76-32-20-20-64. How will 'CASHEW' be coded in the same language?

- Ans
- ☒ 1. 12-4-76-32-20-92
  - ☐ 2. 30-12-74-24-12-92
  - ☐ 3. 12-4-76-32-12-92
  - ☐ 4. 14-4-76-32-20-84

Q.12 Ram departs from his home at 5:00 a.m. and starts running towards the north for 50 km, then turns right and runs again for 50 km. He takes a right turn again and runs for 30 km. Lastly, he turns right and runs for 50 km. How far is he from his home?

- Ans
- ☐ 1. 50 km
  - ☒ 2. 20 km
  - ☐ 3. 40 km
  - ☐ 4. 30 km

Q.13 Select the option that is related to the third word in the same way as the second word is related to the first word. (The words must be considered as meaningful English words and must not be related to each other based on the number of letters/number of consonants/vowels in the word)

Robbers : Gang :: Players : ?

- Ans
- ☐ 1. Group
  - ☐ 2. Game
  - ☐ 3. Field
  - ☒ 4. Team

Q.14 If '+' means '-', '-' means 'x', 'x' means '÷', '÷' means '+', what will come in place of the question mark?

$$50 - 6 \div 8 + 24 \times 6 = ?$$

- Ans
- ☐ 1. 104
  - ☐ 2. 404
  - ☒ 3. 304
  - ☐ 4. 604

Q.15 Select the set in which the numbers are related in the same way as are the numbers of the following set.

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into its constituent digits. Eg., 13 -Operations on 13 such as adding/subtraction/multiplying etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed)

(9, 162, 6)

(12, 72, 2)

- Ans
- ☐ 1. (4, 94, 5)
  - ☐ 2. (19, 562, 8)
  - ☒ 3. (21, 189, 3)
  - ☐ 4. (13, 126, 14)

Q.16 Select the option that is related to the third term in the same way as the second term is related to the first term and the sixth term is related to the fifth term.  
12 : 137 :: 8 : ? :: 5 : 18

- Ans
- ☐ 1. 43
  - ☐ 2. 49
  - ☒ 3. 57
  - ☐ 4. 61

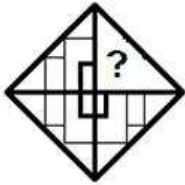
Q.17 If '+' means '-', '-' means 'x', 'x' means '÷', '÷' means '+', then what will come in place of the question mark (?) in the following equation?  
 $114 \div 85 \times 5 - 4 + 33 = ?$

- Ans
- ☒ 1. 158
  - ☒ 2. 136
  - ☒ 3. 161
  - ☒ 4. 149

Q.18 Which of the following terms will replace the question mark (?) in the given series?  
 ABDE, FGJ, KLNO, PQST, ?

- Ans
- ☒ 1. U VWZ
  - ☒ 2. WXY
  - ☒ 3. WWX
  - ☒ 4. UVXY

Q.19 Select the figure from the options that can replace the question mark (?) and complete the given pattern.



- Ans
- ☒ 1.
  - ☒ 2.
  - ☒ 3.
  - ☒ 4.

Q.20 Select the option that represents the letters that, when placed from left to right in the blanks below, will complete the letter series.

\_ J H H \_ H H \_ H H J \_

- Ans
- ☒ 1. H J J H
  - ☒ 2. H J H H
  - ☒ 3. H J H J
  - ☒ 4. H H J J

Q.21 In a college debate, six friends divided into 2 equal teams from Savita, Kavita, Namita, Diya, Piya, and Riya compete with each other and are sitting in two rows, facing each other. Piya is not at the end of any rows. Kavita is the neighbour of Riya. Diya is second to the left of Riya. Namita the neighbour of Piya is sitting diagonally opposite Diya. Which of the following are sitting diagonally opposite to each other?

- Ans
- ☒ 1. Piya and Kavita
  - ☒ 2. Diya and Piya
  - ☒ 3. Savita and Piya
  - ☒ 4. Riya and Savita

Q.22 Select the option that indicates the correct arrangement of the given words in a logical and meaningful order.

1. Grasshopper
2. Whale
3. Beetle
4. Crocodile
5. Frog

Ans ☒ 1. 2, 3, 5, 4, 1  
☒ 2. 4, 2, 5, 1, 3  
☒ 3. 3, 5, 4, 2, 1  
☒ 4. 3, 1, 5, 4, 2

---

Q.23 Select the number from among the given options that can replace the question mark (?) in the following series.  
2, 3, 6, 18, ?, 1944

Ans ☒ 1. 118  
☒ 2. 112  
☒ 3. 108  
☒ 4. 126

---

Q.24 Select the letter-cluster from among the given options that can replace the question mark (?) in the following series.

WARD, WERD, ?, WORD, WURD

Ans ☒ 1. WJRD  
☒ 2. WRD  
☒ 3. WKRD  
☒ 4. VLRD

---

Q.25 Which letter-cluster will replace the question mark (?) to complete the given series?

JPWL, MGAF, PXEZ, ?, VRMN

Ans ☒ 1. RPIT  
☒ 2. SPIT  
☒ 3. SOIT  
☒ 4. ROIT

---

Q.26 Select the option that represents the correct order of the given words as they would appear in an English dictionary.

1. Crumble
2. Character
3. Crevice
4. Crunchy
5. Cushion
6. Charlatan

Ans ☒ 1. 6, 2, 3, 4, 1, 5  
☒ 2. 6, 3, 2, 1, 4, 5  
☒ 3. 2, 6, 3, 1, 4, 5  
☒ 4. 2, 6, 1, 3, 4, 5

---

Q.27 In a certain code language, "KTG" is written as "38" and "MAY" is written as "39". How will "DBC" be written in that language?

Ans ☒ 1. 8  
☒ 2. 11  
☒ 3. 12  
☒ 4. 9

---

Q.28 If A denotes '+', B denotes 'x', C denotes '-', and D denotes '÷', then what will come in place of '?' in the following equation?  
(81 D 9) B 3 A 3 = 3 B ?

- Ans ☒ 1. 10  
☒ 2. 15  
☒ 3. 30  
☒ 4. 20

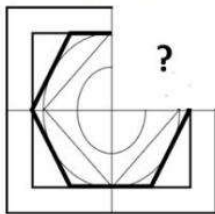
Q.29 Select the word-pair in which the two words are related in the same way as are the two words in the given pair.  
(The words must be considered as meaningful English words and must not be related to each other based on the number of letters/number of consonants/vowels in the word.)  
Sweet Potato : Root

- Ans ☒ 1. Butter : Milk  
☒ 2. Milk : Protein  
☒ 3. Pepper : Spice  
☒ 4. Wheat : Pulse

Q.30 'R + S' means 'R is the mother of S',  
'R \* S' means 'R is the father of S',  
'R - S' means 'R is the husband of S', and  
'R \$ S' means 'R is the daughter of S'.  
If E \$ F - G + H, how is E related to H?

- Ans ☒ 1. Son  
☒ 2. Daughter  
☒ 3. Sister's daughter  
☒ 4. Sister

Q.31 Select the option figure that will replace the question mark (?) in the given figure to complete the pattern.



- Ans ☒ 1.
- ☒ 2.
- ☒ 3.
- ☒ 4.

Q.32 Two statements are given followed by two conclusions numbered I and II. Assuming the statements to be true, even if they seem to be at variance with commonly known facts, decide which of the conclusions logically follow(s) from the statements.

Statements:

All birds are cows.

Some cows are dogs.

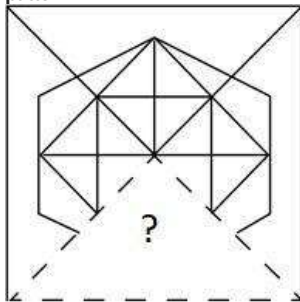
Conclusions:

I. Some dogs are birds.

II. Some cows are birds.

- Ans
- ☒ 1. Neither conclusion I nor II follows
  - ☒ 2. Only conclusion I follows
  - ☒ 3. Both conclusions I and II follow
  - ☒ 4. Only conclusion II follows

Q.33 Select the figure from the options that can replace the question mark (?) and complete the pattern.



Ans

- ☒ 1.
- ☒ 2.
- ☒ 3.
- ☒ 4.

Q.34 Seven friends M, N, O, P, Q, R and S, each has scored different marks in the first semester examination. Only two people scored more than Q. P scored more than Q but less than O. M scored more than R but less than S. Only 3 students scored more than S. N scored the least among all. The scores of how many students are between the scores of P and R?

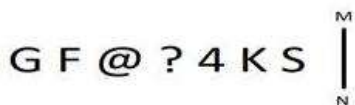
- Ans
- ☒ 1. 1
  - ☒ 2. 2
  - ☒ 3. 3
  - ☒ 4. 4

Q.35 Select the option that is related to the third word in the same way as the second word is related to the first word. (The words must be considered as meaningful English words and must not be related to each other based on the number of letters/number of consonants/vowels in the word)

Clay : Pottery :: Sand : ?

- Ans
- ☒ 1. Shore
  - ☒ 2. Glass
  - ☒ 3. Crystals
  - ☒ 4. Paper

Q.36 Select the correct mirror image of the given combination when the mirror is placed at MN as shown below.



- Ans
- ☒ 1. 2 X 4 ? @ F G
  - ☒ 2. 2 X 4 ? @ E G
  - ☒ 3. 2 X 4 3 @ F G
  - ☒ 4. 2 X 4 ? @ F G

Q.37 Select the option that is related to the third word in the same way as the second word is related to the first word.  
(The words must be considered as meaningful English words and must not be related to each other based on the number of letters/number of consonants/vowels in the word)  
Attraction : Repulsion :: Vertical : ?

- Ans
- ☒ 1. Line
  - ☒ 2. Diagonal
  - ☒ 3. Horizontal
  - ☒ 4. Circle

Q.38 Eight people are sitting in two parallel rows containing four people each in such a way that there is equal distance between adjacent persons.

In the first row, A, B, C and D are seated and all of them are facing the south.

In the second row, W, X, Y and Z are seated and all of them are facing the north.

Thus, each person faces another person from the other row.

The person facing Z is sitting third to the left of A. W is sitting second to the left of Z. B is the only neighbour of C and sits at extreme end. D is facing the one who is the immediate neighbour of Y and X.

Who amongst the following faces Z?

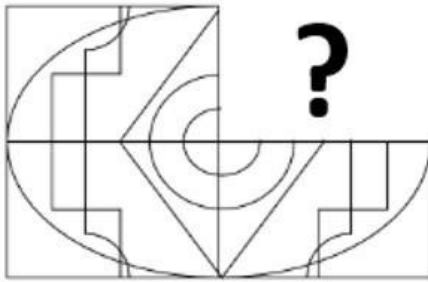
- Ans
- ☒ 1. B
  - ☒ 2. A
  - ☒ 3. C
  - ☒ 4. D

Q.39 In a certain code language, 'WALK' is written as '77' and 'DRIVE' is written as '102'. How will 'SWIM' be written in that language?

- Ans
- ☒ 1. 60
  - ☒ 2. 54
  - ☒ 3. 69
  - ☒ 4. 25



Q40 Select the figure from the options that can replace the question mark (?) and complete the pattern.



Ans

1. ☒
2. ☐
3. ☐
4. ☐

Q41 Select the pair that follows the same pattern as that followed by the given two sets of pairs. Both pairs follow the same pattern.

GK : TRP  
NPR : MKI

Ans

1. EGI : UWY ☐
2. NPQ : CEG ☐
3. DFH : WUS ☒
4. VTR : PNL ☐

Q42 Select the option that is related to the third term in the same way as the second term is related to the first term and the sixth term is related to the fifth term.

21 : 152 :: 19 : ? :: 11 : 82

Ans

1. 128 ☐
2. 182 ☐
3. 183 ☐
4. 138 ☒

Q43 Select the set in which the numbers are related in the same way as are the numbers of the following set.

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into its constituent digits. Eg. 13 - Operations on 13 such as adding /subtracting/multiplying etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

(6, 5, 25)

(8, 3, 37)

Ans

1. (8, 7, 32) ☐
2. (9, 1, 44) ☒
3. (6, 4, 75) ☐
4. (2, 6, 45) ☐

Q44 In the following statements A, B, C, D and E denotes  $+$ ,  $\times$ ,  $\div$  and  $=$ , respectively. Which of the statement is correct?

- Ans ☒ 1.  $8A6C5D15E14B4$   
☐ 2.  $8A6C5D15B14E4$   
☐ 3.  $8A6C3D15E14B4$   
☐ 4.  $8A6C5D15E24B4$

Q45 In a certain code language, 'MADRAS' is written as '112' and 'JAMMU' is written as '82'. How will 'PUNJAB' be written in that language?

- Ans ☐ 1. 109  
☒ 2. 104  
☐ 3. 115  
☐ 4. 112

Q46 Select the option that represents the correct order of the given words as they would appear in an English dictionary.

1. Forty
2. Fortify
3. Forum
4. Forte
5. Fortitude

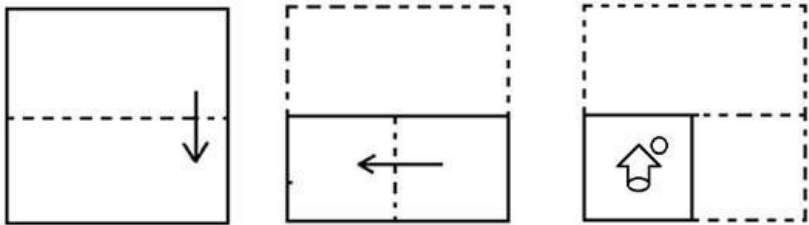
- Ans ☒ 1. 42513  
☐ 2. 45231  
☐ 3. 34521  
☐ 4. 35421

Q47 Select the option that represents the correct order of the given words as they would appear in an English dictionary.

1. Frighten
2. Filigree
3. Festive
4. Familiar
5. Filibuster
6. Freight

- Ans ☐ 1. 4, 3, 5, 2, 1, 6  
☒ 2. 4, 3, 5, 2, 6, 1  
☐ 3. 4, 5, 3, 2, 1, 6  
☐ 4. 4, 3, 2, 5, 6, 1

Q48 The sequence of folding a piece of paper and the manner in which the folded paper has been cut is shown below. Choose a figure which would most closely resemble the unfolded form of the paper.



Ans

1.

✗
2.

✗
3.

✓
4.

✗

Q49 A girl starts from her house and drives 10 km south. Then turns left and drives 20 km. She then takes a left and drives 20 km. Then, turning to her left and she drives 5 km. She takes a final left turn, drives 10 km and stops at her final destination. How far and towards which direction should she drive in order to reach her home?

- Ans

✗ 1. 15 km, south

✓ 2. 15 km, west

✗ 3. 15 km, north

✗ 4. 15 km, east

Q.50 Select the correct mirror image of the given combination when the mirror is placed at 'PQ' as shown.

et6ryQpup |  
P  
Q

Ans

1. ☐ q u q O y i d f e
2. ☐ b u q O y i d f e
3. ☐ q u q O y i d f e
4. ☒ q u q O y i d f e

#### Section : General Awareness

Q.1 The interspecies interaction that has a favourable influence on the participating species' per capita reproduction and/or survivability is called:

- Ans
1. ☐ adaptation
  2. ☒ mutualism
  3. ☐ parasitism
  4. ☐ symbiosis

Q.2 Osmosis is a diffusion movement of \_\_\_\_\_ .

- Ans
1. ☒ water
  2. ☐ air
  3. ☐ sugar
  4. ☐ alloys

Q.3 Select the correct combination of Indian classical dance and their respective dancer.

- Ans
1. ☒ Anita Ratnam – Bharatanatyam
  2. ☐ Sharodi Saikia – Kathakali
  3. ☐ Pallavi Krishnan – Manipuri
  4. ☐ Kelucharan Mohapatra – Mohiniyattam

Q.4 Which of the following is the riverine port in India that has also been a witness to India's struggle for independence, World Wars I and II and socio-cultural changes taking place in the country?

- Ans
1. ☐ Mundra Port
  2. ☐ Paradip Port
  3. ☐ Jawaharlal Nehru Port
  4. ☒ Syama Prasad Mookerjee Trust

Q.5 Match the column-A with column-B.

Column-A (Elements)	Column-B (Group in Periodic Table)
a. Hydrogen	i. Group-13
b. Helium	ii. Group-2
c. Beryllium	iii. Group-1
d. Boron	iv. Group-18

- Ans
1. ☒ a-iii, b-iv, c-ii, d-i
  2. ☐ a-i, b-ii, c-iii, d-iv
  3. ☐ a-iv, b-iii, c-ii, d-i
  4. ☐ a-i, b-iii, c-ii, d-iv

**Q.6** In November 2022, who among the following was appointed as the brand ambassador of Uttarakhand government?

- Ans**
- ☐ 1. Abhinav Bindra
  - ☒ 2. Prasoon Joshi
  - ☐ 3. Jubin Nautiyal
  - ☐ 4. Rishabh Pant

**Q.7** Which of the following measures of money supply is considered least liquid?

- Ans**
- ☐ 1. M1
  - ☒ 2. M4
  - ☐ 3. M2
  - ☐ 4. M3

**Q.8** Who among the following was appointed as the new Economic Affairs Secretary in April 2021?

- Ans**
- ☐ 1. Chintan Vaishnav
  - ☐ 2. Anantha Nageswaran
  - ☐ 3. Chetan Vaidya
  - ☒ 4. Ajay Seth

**Q.9** Prabha Atre is commonly associated with which Gharana?

- Ans**
- ☐ 1. Bhindi bazar Gharana
  - ☐ 2. Agra Gharana
  - ☐ 3. Gwalior Gharana
  - ☒ 4. Kirana Gharana

**Q.10** Which of the following crops is an example of a Rabi crop?

- Ans**
- ☐ 1. Groundnut
  - ☐ 2. Rice
  - ☐ 3. Maize
  - ☒ 4. Mustard

**Q.11** Who among the following was conferred a Lifetime Achievement Honour in the year 2023 by the India-UK Achievers Honours in London for his contribution to economic and political life?

- Ans**
- ☐ 1. Urjit Patel
  - ☐ 2. Narendra Modi
  - ☐ 3. Raghuram Rajan
  - ☒ 4. Manmohan Singh

**Q.12** What does air drainage do in cold climate?

- Ans**
- ☒ 1. It protects plants from frost damages.
  - ☐ 2. It keeps the soil warm.
  - ☐ 3. It filters out better quality air.
  - ☐ 4. It keeps dust particles elevated.

**Q.13** Which of the following is a genetically modified plant?

- Ans**
- ☐ 1. Wild banana
  - ☐ 2. Native potato
  - ☐ 3. Sugarcane
  - ☒ 4. Bt cotton

**Q.14** Syyed Ahmed Barelvi was the founder of which Muslim Reform Movement?

- Ans**
- ☐ 1. Deoband movement
  - ☐ 2. Ahmediya movement
  - ☒ 3. Wahabi movement
  - ☐ 4. Aligarh movement

Q.15 How many children in total were conferred the Pradhan Mantri Rashtriya Bal Puraskar, 2023 by the President of India, Droupadi Murmu on 23 January 2023?

- Ans
- ☐ 1. 12
  - ☒ 2. 11
  - ☐ 3. 10
  - ☐ 4. 13

Q.16 \_\_\_\_\_ built the town of Thanjavur and a temple for goddess Nishumbhasudini there.

- Ans
- ☒ 1. Vijayalaya
  - ☐ 2. Athirajendra Chola
  - ☐ 3. Virarajendra Chola
  - ☐ 4. Rajendra I

Q.17 The parliamentary elections, Presidential and Vice Presidential elections and the office of the Election Commission come under which list of the Constitution of India?

- Ans
- ☐ 1. Concurrent list
  - ☐ 2. State list
  - ☒ 3. Union list
  - ☐ 4. Residual List

Q.18 How many shrines exist in the Panchayatana style of architecture?

- Ans
- ☒ 1. 5
  - ☐ 2. 3
  - ☐ 3. 7
  - ☐ 4. 9

Q.19 Match the animals with the forests in which they are found.

Forests	Animals
1. Montane forests	a. Camel
2. Thorn forest and scrubs	b. Yak
3. Mangrove Forests	c. Crocodile

- Ans
- ☐ 1. 1-b, 2-c, 3-a
  - ☒ 2. 1-b, 2-a, 3-c
  - ☐ 3. 1-a, 2-b, 3-c
  - ☐ 4. 1-c, 2-a, 3-b

Q.20 Which of the following amendments made the Fundamental Duty of parents to provide education to their children between the age of 6 and 14 years?

- Ans
- ☐ 1. 85th Amendment Act, 2002
  - ☒ 2. 86th Amendment Act, 2002
  - ☐ 3. 84th Amendment Act, 2001
  - ☐ 4. 83rd Amendment Act, 2000

Q.21 Which of the following is a non-benzenoid compound?

- Ans
- ☐ 1. Aniline
  - ☒ 2. Tropone
  - ☐ 3. Benzene
  - ☐ 4. Naphthalene

Q.22 In 1910, who applied the newly developed method of radioactive dating to minerals in the first attempt to quantitatively estimate the age of the Earth?

- Ans
- ☒ 1. Arthur Holmes
  - ☐ 2. Friedrich Mohs
  - ☐ 3. Clair C Patterson
  - ☐ 4. Alfred Wegener

Q.23 Which of the following Magadha Emperors annexed Anga into his Empire?

- Ans
- ☐ 1. Udayin
  - ☐ 2. Mahapadma Nanda
  - ☒ 3. Bimbisara
  - ☐ 4. Ajatashatru

Q.24 As per Finance Bill 2023 receipts arising from life insurance policies issued on or after 1 April 2023 shall be considered as income from other sources if the premium paid exceeds \_\_\_\_\_ each year.

- Ans
- ☐ 1. ₹2,50,000
  - ☐ 2. ₹10,00,000
  - ☐ 3. ₹15,00,000
  - ☒ 4. ₹5,00,000

Q.25 What is the rate of the heating and cooling of the oceanic water compared to land?

- Ans
- ☐ 1. Moderate
  - ☐ 2. Similar
  - ☐ 3. Faster
  - ☒ 4. Slower

Q.26 Which is the most common type of budding yeast, capable of fermenting sugar into carbon dioxide and alcohol and commonly used in baking and brewing?

- Ans
- ☐ 1. *Candida albicans*
  - ☒ 2. *Saccharomyces cerevisiae*
  - ☐ 3. *Schizosaccharomyces pombe*
  - ☐ 4. *Saccharomyces boulardii*

Q.27 Which of the following is a capital goods industry?

- Ans
- ☐ 1. Manufacturing of television
  - ☒ 2. Manufacturing of plants and machineries
  - ☐ 3. Manufacturing of dyes
  - ☐ 4. Manufacturing of tools

Q.28 Which of the following is a mathematical expression of Dalton's partial pressure law? (Where P = Pressure, T = Temperature, V = Volume, n = number of moles)

- Ans
- ☐ 1.  $P_{Total} = p_1 + p_2 + p_3 + \dots$  (at constant T, n)
  - ☒ 2.  $P_{Total} = p_1 + p_2 + p_3 + \dots$  (at constant T, V)
  - ☐ 3.  $P_{Total} = p_1 + p_2 + p_3 + \dots$  (at constant V, P)
  - ☐ 4.  $P_{Total} = p_1 + p_2 + p_3 + \dots$  (at constant T, P)

Q.29 The centralisation of the administration of India took place under which Act?

- Ans
- ☐ 1. Charter Act of 1853
  - ☐ 2. Charter Act of 1813
  - ☐ 3. Charter Act of 1793
  - ☒ 4. Charter Act of 1833

Q.30 The 7<sup>th</sup> Commonwealth youth games will be held in:

- Ans
- ☒ 1. 2023
  - ☐ 2. 2026
  - ☐ 3. 2028
  - ☐ 4. 2022

Q.31 Which of the following programmes was launched on 15 August 1983 with an objective to provide guarantee of employment to at least one member of the landless households for about 100 days in a year?

- Ans
- ☐ 1. Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)
  - ☐ 2. Jawahar Rozgar Yojana (JRY)
  - ☒ 3. Rural-Landless Employment Guarantee Programme (RLEGP)
  - ☐ 4. Training to Rural Youth for Self Employment (TRYSEM)

Q.32 Perennial snow is a characteristic of the cold climate group which is denoted as \_\_\_\_\_ letter code according to the Köppen classification of climate types.

- Ans
- ☐ 1. Cfb
  - ☐ 2. Aw
  - ☐ 3. BSk
  - ☒ 4. EF

Q.33 Who accidentally discovered the synthesis of ether in 1850, by reacting alcohols with alkyl iodides in the presence of sulphuric acid?

- Ans
- ☒ 1. Alexander William Williamson
  - ☐ 2. Jabir Ibn Hayyan
  - ☐ 3. Leopold Gmelin
  - ☐ 4. Carl Wilhelm Scheele

Q.34 According to the Census 2011, arrange the following states/union territories on the basis of literacy rates, in ascending order.

- A) Mizoram  
B) Lakshadweep  
C) Kerala

- Ans
- ☐ 1. (B), (A), (C)
  - ☒ 2. (A), (B), (C)
  - ☐ 3. (A), (C), (B)
  - ☐ 4. (C), (B), (A)

Q.35 When replying to or forwarding an email, what should you check before sending to ensure accuracy?

- Ans
- ☐ 1. The email font style
  - ☐ 2. The email sender's name
  - ☐ 3. The email attachment
  - ☒ 4. The email subject line

Q.36 What does the 'Print Range' option allow you to specify when printing slides in PowerPoint?

- Ans
- ☐ 1. The orientation of the slides to be printed
  - ☐ 2. The number of copies to be printed
  - ☒ 3. The range of slides to be printed
  - ☐ 4. The order of the slides to be printed

Q.37 Kongampattu AV Murugaiyan, was conferred the Padma Shri Award in 2022 for his relentless pursuit in playing the:

- Ans
- ☐ 1. violin
  - ☒ 2. thavil
  - ☐ 3. bulbultara
  - ☐ 4. kinnera

Q.38 Under which Amendment Act has the electorate been widened by lowering the age to 18 years?

- Ans
- ☒ 1. 61<sup>st</sup>
  - ☐ 2. 76<sup>th</sup>
  - ☐ 3. 72<sup>nd</sup>
  - ☐ 4. 42<sup>nd</sup>

Q.39 The Abhinandan Saroja National Award 2021 was conferred on which of the following dancers?

- Ans
- ☐ 1. Surupa Ganguly
  - ☐ 2. Rama Vaidyanathan
  - ☒ 3. Apama Satheesan
  - ☐ 4. Yamini Reddy



Q40 Match the following columns.

**Column-A (Enzyme)**

- i. Ptyalin
- ii. Pepsin
- iii. Alkaline phosphatase
- iv. Maltase

**Column-B (Secreted from)**

- a. Small intestine
- b. Salivary glands
- c. Stomach
- d. Liver

- Ans
- ☐ 1. i-d, ii-c, iii-b, iv-a
  - ☒ 2. i-b, ii-c, iii-d, iv-a
  - ☐ 3. i-a, ii-c, iii-b, iv-d
  - ☐ 4. i-a, ii-b, iii-c, iv-d

Q41 Which of the following is a dynamic function of money?

- Ans
- ☐ 1. Measure of value
  - ☐ 2. Medium of exchange
  - ☒ 3. Basis of credit and liquidity
  - ☐ 4. Standard of deferred payments

Q42 Prior to the 1991 Census of India, the concept of literacy was defined as essentially illiterate children below the age of \_\_\_\_\_ years.

- Ans
- ☐ 1. 8
  - ☒ 2. 5
  - ☐ 3. 7
  - ☐ 4. 6

Q43 Which of the following developed India's first gender-neutral Human Papillomavirus (HPV) vaccine GARDASIL-9, in September 2021?

- Ans
- ☐ 1. Cadila Healthcare Limited
  - ☐ 2. Cipla Limited
  - ☐ 3. Sun Pharmaceutical Industries Limited
  - ☒ 4. MSD Pharmaceuticals Pvt Ltd

Q44 As per Amendment of article 51A clause (k) said, "who is a parent or guardian to provide opportunities for education to his child or, as the case may be, ward between the age of \_\_\_\_\_ years."

- Ans
- ☐ 1. 1 to 15 years
  - ☐ 2. 5 to 15 years
  - ☐ 3. 7 to 18 years
  - ☒ 4. 6 to 14 years

Q45 The weather in India, during winter months, is impacted by the distribution of surface pressure from \_\_\_\_\_.

- Ans
- ☐ 1. central and northern Asia
  - ☐ 2. western and eastern Asia
  - ☐ 3. central and southern Asia
  - ☒ 4. central and western Asia

Q46 Who decided to go ahead with his plans of invasion of Afghanistan resulting in the first Anglo-Afghan War?

- Ans
- ☐ 1. Lord Lytton
  - ☐ 2. Lord Dalhousie
  - ☒ 3. Lord Auckland
  - ☐ 4. Lord Ellenborough

Q47 Select the INCORRECT statement about HDL.

- Ans
- ☐ 1. It absorbs cholesterol in the blood and carries it back to the liver.
  - ☒ 2. High levels of HDL cholesterol raise the risk for heart diseases and stroke.
  - ☐ 3. It is considered as good cholesterol.
  - ☐ 4. 'HDL' stands for High-Density Lipoprotein.

Q.48 Where was the 44th Chess Olympiad held?

- Ans
- ☐ 1. Moscow
  - ☐ 2. London
  - ☐ 3. Bengaluru
  - ☒ 4. Chennai

Q.49 According to the 2011 census, Daman and Diu has the lowest sex ratio among all union territories of India with only \_\_\_\_\_ females per 1000 males.

- Ans
- ☐ 1. 534
  - ☐ 2. 777
  - ☐ 3. 818
  - ☒ 4. 618

Q.50 Who among the following mentioned that 'Collective Responsibility can be achieved only through the instrumentality of the Prime Minister'?

- Ans
- ☒ 1. Dr BR Ambedkar
  - ☐ 2. Jawaharlal Nehru
  - ☐ 3. C Rajagopalachari
  - ☐ 4. Lal Bahadur Shastri

Section : General Engineering Civil and Structural

Q.1 For a railway track, the width of the formation depends upon which of the following?

- i. Type of sleepers
- ii. Type of ballast
- iii. Type of gauge
- iv. Number of tracks, i.e. single or double track

- Ans
- ☒ 1. Both iii and iv
  - ☐ 2. Both i and iv
  - ☐ 3. Both i and ii
  - ☐ 4. Both ii and iii

Q.2 Which of the following is NOT a property of coir fibres?

- Ans
- ☒ 1. Resistance to dynamic loading
  - ☐ 2. Ease to carry
  - ☐ 3. Elasticity
  - ☐ 4. Long service span

Q.3 A magnetic compass can be used to measure \_\_\_\_\_.

- Ans
- ☐ 1. magnetic meridian, magnetic bearing and arbitrary bearing
  - ☐ 2. magnetic bearing only
  - ☐ 3. magnetic meridian only
  - ☒ 4. both magnetic meridian and magnetic bearing

Q.4 The value of slope at fixed support of a cantilever beam of length- L, flexural rigidity- EI, subjected to a point load 'P' at its mid span, and another point load 'P' at its free end, is:

- Ans
- ☒ 1. zero
  - ☐ 2.  $\frac{PL}{2EI}$
  - ☐ 3.  $\frac{3PL}{4EI}$
  - ☐ 4.  $\frac{PL}{4EI}$

Q.5 Which of the following is NOT a way by which traffic volume data is presented?

- Ans
- ☐ 1. Traffic Variation charts
  - ☒ 2. Modal average
  - ☐ 3. The pattern of traffic
  - ☐ 4. AADT in traffic engineering

Q.6 The following observations were made in an open-traverse compass survey. Bearing of Line AB is S 35° 30' E, whereas the included angles measured clockwise at stations B, C, D and E are 105° 20', 265° 50', 20° 10' and 325° 40', respectively. The bearing of Line CD is \_\_\_\_\_.

- Ans
- ☒ 1. S 24° 20' E
  - ☐ 2. S 65° 40' W
  - ☐ 3. S 24° 20' W
  - ☐ 4. S 65° 40' E

Q.7 Which of the following scales may NOT give accurate measurements of a plan drawn on a paper, due to shrinkage after few years?

- Ans
- ☒ 1. Engineer's scale and representative fraction
  - ☐ 2. Representative fraction and graphical scale
  - ☐ 3. Engineer's scale and graphical scale
  - ☐ 4. Graphical scale

Q.8 The type of signal in which the timings of the phase and cycle are changed according to traffic demand is called \_\_\_\_\_.

- Ans
- ☐ 1. fixed time signal
  - ☐ 2. pedestrian signal
  - ☐ 3. manually operated signal
  - ☒ 4. actuated traffic signal

Q.9 As per Indian Standard code (IS-456), what should be the minimum clear cover provided during the design of a water tank during moderate exposure conditions?

- Ans
- ☐ 1. 75 mm
  - ☐ 2. 10 mm
  - ☒ 3. 30 mm
  - ☐ 4. 45 mm

Q.10 Which of the following terms describes the location, type, mark, length and bending details of each bar in a structure's reinforcing drawing?

- Ans
- ☒ 1. Bar bending schedule
  - ☐ 2. Material statement
  - ☐ 3. Work charged establishment
  - ☐ 4. Sundries

Q.11 In plane table surveys, the orientation of the table only by back sighting is preferred when \_\_\_\_\_.

- Ans
- ☐ 1. the traverse is too long
  - ☐ 2. there is no second point for orientation
  - ☐ 3. speed is more important than accuracy
  - ☒ 4. the plane table can be set on a point already plotted on the sheet

Q.12 Which of the following statements is INCORRECT?

- Ans
- ☒ 1. Incomplete combustion of carbonaceous fuels releases carbon dioxide as the major pollutant.
  - ☐ 2. Municipal drainage systems emit H<sub>2</sub>S gas.
  - ☐ 3. Thermal power houses are the main contributors to SO<sub>2</sub> emissions.
  - ☐ 4. Welding operations may release nitrogen oxide.

Q.13 As per IS 456-2000, the flexural strength of a rectangular section of a singly reinforced RCC beam does NOT depend on which of the given options?

- Ans
- ☐ 1. Grade of steel
  - ☐ 2. Grade of concrete
  - ☐ 3. Depth of beam
  - ☒ 4. Temperature

Q.14 A trapezoidal canal carries a discharge of 40 cumec and has the permissible mean velocity of 0.95 m/s. The bed width of the canal is \_\_\_\_\_. Take the side slope of the canal as 1 : 1 and the width/depth ratio as 6.5.

- Ans
- ☐ 1. 17.40 m
  - ☐ 2. 14.50 m
  - ☐ 3. 16.40 m
  - ☒ 4. 15.40 m

Q.15 Consider the following distances:

$d_1$  = distance travelled by the vehicle after applying the breaks.  
 $d_2$  = distance travelled by overtaking vehicle, during reaction time for overtaking.  
 $d_3$  = distance travelled by overtaking vehicle, during total overtaking time.  
 $d_4$  = distance travelled by overtaken vehicle, during total overtaking time.

The Overtaking Sight Distance, on a road with one-way traffic will be equal to:

- Ans
- ☐ 1.  $d_3 + d_4$
  - ☐ 2.  $d_1 + d_2 + d_3$
  - ☐ 3.  $d_1 + d_2 + d_3 + d_4$
  - ☒ 4.  $d_2 + d_3$

Q.16 Which of the following compounds is responsible for slow hardening, less heat of hydration, and greater resistance to the chemical attack in OPC Cement?

- Ans
- ☐ 1.  $C_4AF$
  - ☐ 2.  $C_3S$
  - ☐ 3.  $C_3A$
  - ☒ 4.  $C_2S$

Q.17 The maximum value of the radius of gyration is obtained if a material \_\_\_\_\_.

- Ans
- ☒ 1. is placed farthest from the centroid
  - ☐ 2. is placed nearest the centroid
  - ☐ 3. is placed at the centroid
  - ☐ 4. has the maximum area

Q.18 Select the correct option for the given statements.

Statement 1: Due to their low strength, particle boards are less durable than plywood or solid wood. However, using laminates or veneers on the surface can aid to improve durability.  
Statement 2: A layer of melamine can be applied to the top surface of particle boards to make them fire-resistant.

- Ans
- ☐ 1. Statement 1 is true and statement 2 is false
  - ☒ 2. Both statement 1 and statement 2 are true
  - ☐ 3. Both statement 1 and statement 2 are false
  - ☐ 4. Statement 1 is false and statement 2 is true

Q.19 The number of days for which a crop remains in a field is known as crop period. The crop period is also defined as the number of days between \_\_\_\_\_.

- Ans
- ☐ 1. preparation of land and sowing
  - ☒ 2. sowing and harvesting of a crop
  - ☐ 3. sowing and the last watering before harvesting a crop
  - ☐ 4. preparation of land and last watering before harvesting a crop

Q.20 Which term indicates the stages in which the total predetermined cost of construction of the project is to be spread over?

- Ans
- ☐ 1. Cost determination
  - ☐ 2. Budget planning
  - ☒ 3. Cost planning
  - ☐ 4. Financial planning

Q21 Which of the following traffic sources will cause noise of the highest level during operation?

- Ans
- ☒ 1. Inland water traffic
  - ☒ 2. Jet aircraft at the take-off stage
  - ☐ 3. Road traffic
  - ☐ 4. Rail traffic

Q22 Hollow pre-cast concrete blocks possess good thermal insulation because of the:

- Ans
- ☐ 1. outside air near the block
  - ☒ 2. air entrapped within the block
  - ☐ 3. resistance to efflorescence
  - ☐ 4. seepage resistance

Q23 If the pipes are connected in parallel, the total loss of head is:

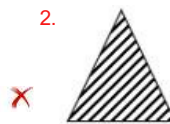
- Ans
- ☒ 1. the same in each pipe
  - ☐ 2. equal to the reciprocal of the sum of head losses in each pipe
  - ☐ 3. equal to the sum of head losses in each pipe
  - ☐ 4. equal to the sum of the squares of head losses in each pipe

Q24 A beam cross section has shape of an angle section as given below. Which of the following cross sections has the same nature of shear stress distribution as that of the below angle section?

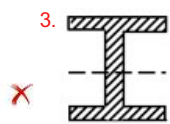


- Ans
- ☒ 1.

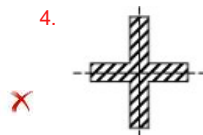
T-Section



Triangular



I-Section



Cross-Section

Q25 Which of the following types of soil have excellent workability as a construction material?

- Ans
- ☒ 1. Well graded gravel
  - ☐ 2. Clayey sand
  - ☐ 3. Silty sand
  - ☐ 4. Silty gravel

Q.26 Minimum shear reinforcement is provided in an RCC beam under which of the following conditions?

- Ans
- ☐ 1. Nominal shear stress is greater than design shear strength of concrete but less than maximum shear stress
  - ☒ 2. Nominal shear stress is less than design shear strength of concrete
  - ☐ 3. Nominal shear stress is greater than maximum shear stress
  - ☐ 4. Nominal shear stress is greater than design shear strength of concrete

Q.27 If the actual velocity of jet at the vena contracta in an orifice meter is 'V', the depth of the centre of orifice below the free surface is 'h' and 'g' is the gravitational acceleration, then the coefficient of velocity 'C<sub>v</sub>' is:

- Ans
- ☐ 1.  $4V / (2gh)^{3/2}$
  - ☒ 2.  $V / (2gh)^{1/2}$
  - ☐ 3.  $2Vgh / 300$
  - ☐ 4.  $2gh / (V)^{1/2}$

Q.28 A new system of sanitation is needed over the old conservancy system because:

- Ans
- ☐ 1. the new system pollutes the city's water supplies
  - ☐ 2. the system of sanitation has no relation with the city's water supplies
  - ☒ 3. the old system may pollute the city's water supplies
  - ☐ 4. both the systems of sanitation have an equal chance of polluting water supplies

Q.29 A vehicle was stopped by fully jamming the breaks in 1.8 s and the skid marks measured 9 m. Determine the average skid resistance. Take  $g = 10 \text{ m/s}^2$ .

- Ans
- ☐ 1. 0.278
  - ☒ 2. 0.556
  - ☐ 3. 0.15
  - ☐ 4. 2.78

Q.30 Which of the following test apparatus is used to determine initial setting time and final setting time?

- Ans
- ☐ 1. Air permeability test
  - ☐ 2. Soundness test
  - ☐ 3. Sieve test
  - ☒ 4. Vicat's apparatus

Q.31 The carbon credit system helps \_\_\_\_\_.

- Ans
- ☐ 1. reduce noise pollution
  - ☐ 2. reduce soil pollution caused by agricultural wastes
  - ☒ 3. reduce greenhouse gas emissions
  - ☐ 4. reduce water pollution caused by chemicals

Q.32 Punching shear may occur in loose sand with density less than \_\_\_\_.

- Ans
- ☐ 1. 55%
  - ☐ 2. 45%
  - ☒ 3. 35%
  - ☐ 4. 65%

Q.33 During a cement mortar plastering of a brick wall, the ratio of 1 : 4 corresponds to \_\_\_\_\_.

- Ans
- ☒ 1. Cement : Sand
  - ☐ 2. Cement : Water
  - ☐ 3. Cement : Coarse aggregate
  - ☐ 4. Lime : Cement

Q.34 Arrange the following steps for painting of surfaces in a sequential manner.

1. First coat
2. Final coat
3. Prime coat
4. Surface preparation

Ans ☒ 1. 4, 1, 3, 2  
☒ 2. 4, 3, 1, 2  
☒ 3. 3, 2, 1, 4  
☒ 4. 3, 1, 2, 4

Q.35 For cast in situ lining, identify the false statement.

Ans ☒ 1. It is most resistant to erosion.  
☒ 2. The recurring maintenance charges are high.  
☒ 3. It has a higher initial cost.  
☒ 4. It has a longer life than that of any other type.

Q.36 Sprinkler irrigation is the best method of irrigation for standing crops in \_\_\_\_\_ in fields.

Ans ☒ 1. heavy soil with low infiltration rate  
☒ 2. alluvial soil  
☒ 3. level surface  
☒ 4. undulating sandy soil

Q.37 Which of the following statements about carbon footprint is INCORRECT?

Ans ☒ 1. Manufacturing and transportation of consumer goods form a part of the secondary carbon footprint.  
☒ 2. Carbon footprint is of the following three types: primary, secondary and tertiary.  
☒ 3. If you choose to walk or cycle, you lessen your carbon footprint.  
☒ 4. If you prefer to drive all the time, your carbon footprint will be higher.

Q.38 The air vessel in a reciprocating pump is:

Ans ☒ 1. fitted in the delivery pipe  
☒ 2. fitted ahead of the pump  
☒ 3. not fitted  
☒ 4. fitted outside the system

Q.39 Which of the following materials is a sustainable and green building material that can be used in construction?

Ans ☒ 1. Concrete  
☒ 2. Brick  
☒ 3. Bamboo  
☒ 4. Mortar

Q.40 In case of a turbulent flow in a pipe, the shear stress is:

Ans ☒ 1. maximum at the centre and decreases linearly towards the wall  
☒ 2. maximum at the centre and decreases logarithmically towards the wall  
☒ 3. maximum at the midway between the centre line and the wall  
☒ 4. maximum at the wall and decreases linearly to zero at the centre

Q.41 What is the relation between the delivery head of the centrifugal pump and the shaft speed (N)?

Ans ☒ 1. The delivery head is inversely proportional to  $N^2$ .  
☒ 2. The delivery head is inversely proportional to  $N$ .  
☒ 3. The delivery head is directly proportional to  $N^2$ .  
☒ 4. The delivery head is directly proportional to  $N$ .

Q.42 Select the correct option for the given statements.

Statement 1: Direction of the movement of a storm over the catchment area has a definite effect on the runoff.

Statement 2: If the storm moves against the flow direction, then the base period will be comparatively more and less peak flow may be expected.

- Ans ☒ 1. Statement 1 is true and statement 2 is false  
☒ 2. Both statement 1 and statement 2 are true, and statement 2 is the correct explanation of statement 1  
☒ 3. Statement 1 is false and statement 2 is true  
☒ 4. Both statement 1 and statement 2 are true, but statement 2 is not the correct explanation of statement 1

Q.43 Formation of \_\_\_\_\_ type(s) of rocks involves biological activity in addition to complex mechanical or chemical processes.

- Ans ☒ 1. sedimentary and metamorphic  
☒ 2. metamorphic  
☒ 3. sedimentary  
☒ 4. igneous

Q.44 In the design of T beam, If  $M_u > M_{u,lim}$  then the section is designed as a \_\_\_\_\_,  
Where

$M_u$  = Ultimate flexural strength of beam

$M_{u,lim}$  = limiting moment of resistance of a beam

- Ans ☒ 1. Over reinforced section  
☒ 2. Doubly reinforced section  
☒ 3. under reinforced section  
☒ 4. Singly reinforced section

Q.45 Based on the slenderness ratio, a steel column is found to be an intermediate column. The failure of such a column is visible as:

- Ans ☒ 1. only buckling  
☒ 2. The steel column will not fail but remain unstable.  
☒ 3. a mixed mode of buckling and crushing  
☒ 4. only crushing

Q.46 In expansion joints, the loads are transferred through:

- Ans ☒ 1. tie bars  
☒ 2. longitudinal bars  
☒ 3. dowel bars  
☒ 4. aggregates

Q.47 The maximum shear stress (in N/mm<sup>2</sup>) in a reinforced concrete beam of M-25 grade as per IS 456-2000 is given as:

- Ans ☒ 1. 3.4  
☒ 2. 3.1  
☒ 3. 3.5  
☒ 4. 2.8

Q.48 Which of the following is a purpose served by lintel?

- Ans ☒ 1. To support the wall above the opening  
☒ 2. To join the column at sill level  
☒ 3. To join the foundation  
☒ 4. To support the slab

Q.49 For field compaction of soil, in cohesive soil the combination of tamping action and kneading action on soil is achieved by:

- Ans ☒ 1. pneumatic-tired rollers  
☒ 2. vibroflotation  
☒ 3. sheep foot rollers  
☒ 4. frog rammers



Q.50 When designing steel structures, the effective length of battened compression members should be \_\_\_\_\_.

- Ans
- ☐ 1. decreased by 20%
  - ☒ 2. increased by 10%
  - ☐ 3. decreased by 10%
  - ☐ 4. increased by 20%

Q.51 A BG track is laid with a sleeper density of  $N+3$ . The width of the sleeper is 20.25 cm. Find the minimum depth of the ballast cushion.

- Ans
- ☐ 1. 10.125 cm
  - ☒ 2. 30.5 cm
  - ☐ 3. 61 cm
  - ☐ 4. 20.375 cm

Q.52 Which of the given options does NOT include solid waste?

- Ans
- ☐ 1. Garbage
  - ☒ 2. Sewage
  - ☐ 3. Street sweepings
  - ☐ 4. Plastic waste

Q.53 Determine the total pressure on a circular plate of diameter 2 m, which is placed vertically in water in such a way that the Centre of the plate is 2.5 m below the free surface of the water.

- Ans
- ☒ 1. 77048 N
  - ☐ 2. 72058 N
  - ☐ 3. 70058 N
  - ☐ 4. 71058 N

Q.54 In the double integration method for a simply supported beam subjected to UDL over its entire span, the slope and deflection calculation will require:

- Ans
- ☐ 1. only the symmetry condition
  - ☐ 2. only the boundary condition
  - ☒ 3. the boundary condition as well as the symmetry condition
  - ☐ 4. the boundary condition as well as the continuity condition

Q.55 Which of the following is NOT a disadvantage of using rods and bars as a tension member of steel structures?

- Ans
- ☐ 1. Inadequate stiffness
  - ☒ 2. Tensile strength
  - ☐ 3. Sag under own weight
  - ☐ 4. High slenderness ratio

Q.56 Which of the following statements regarding Portland Pozzolana Cement (PPC) is INCORRECT?

- Ans
- ☐ 1. The long-term strength of PPC beyond a couple of months is higher than that of ordinary Portland cement if enough moisture is available for continued pozzolanic action.
  - ☐ 2. Fly ash is a pozzolanic material used for the manufacture of PPC.
  - ☐ 3. PPC is useful in marine and hydraulic structures.
  - ☒ 4. PPC produces more heat of hydration than ordinary Portland cement.

Q.57 When the precipitation of a storm reaches the ground, it must fill up a basin, which is lower than its surroundings, before it can flow over the surface. The volume of water trapped in the basin, which is lower than its surroundings, is called \_\_\_\_\_.

- Ans
- ☐ 1. basin storage
  - ☒ 2. depression storage
  - ☐ 3. dead storage
  - ☐ 4. sub-surface storage

Q.58 Which of the following options represents an INCORRECT relation between the fundamental axes of a theodolite?

- Ans
- ☐ 1. The axis of the plate level must be perpendicular to the vertical axis.
  - ☐ 2. The axis of the altitude level must be parallel to the line of collimation.
  - ☒ 3. The axis of the striding level must be perpendicular to the transit axis.
  - ☐ 4. The trunnion axis must be perpendicular to the line of sight.

Q.59 If the normal and shear stress corresponding the failure are plotted, then a curve is obtained. The plot or curve is called the \_\_\_\_\_.

- Ans
- ☐ 1. phreatic line
  - ☒ 2. strength envelope
  - ☐ 3. parabolic curve
  - ☐ 4. failure line

Q.60 The ratio of the total length of streams of all orders within a basin to its area is called \_\_\_\_\_.

- Ans
- ☐ 1. stream order
  - ☐ 2. stream density
  - ☐ 3. catchment density
  - ☒ 4. drainage density

Q.61 A simple U-tube manometer connected to a pipe in which liquid is flowing with a uniform speed will give \_\_\_\_\_.

- Ans
- ☒ 1. gauge pressure
  - ☐ 2. absolute pressure
  - ☐ 3. vacuum pressure
  - ☐ 4. atmospheric pressure

Q.62 A tacheometer was set at a station and the readings were taken on two points, which were 100 m and 150 m apart and had staff intercepts of 3.98 m and 5.98 m, respectively. If an externally focusing tacheometer was used for the observation, then the values of focal length ( $f$ ), stadia interval ( $i$ ) and distance ( $d$ ) between the objective and the vertical axis of the instrument could be \_\_\_\_\_.

- Ans
- ☐ 1.  $f = 0.3$  m,  $i = 1.2$  mm,  $d = 20$  cm
  - ☐ 2.  $f = 0.3$  m,  $i = 0.12$  mm,  $d = 20$  cm
  - ☐ 3.  $f = 0.2$  m,  $i = 12$  mm,  $d = 30$  cm
  - ☒ 4.  $f = 0.3$  m,  $i = 12$  mm,  $d = 20$  cm

Q.63 An RCC beam of width 250 mm and effective depth 450 mm is subjected to a nominal shear stress of  $1.25 \text{ N/mm}^2$ . What is the value of shear force due to design load coming on the section?

- Ans
- ☐ 1. 1.40625 kN
  - ☒ 2. 140.625 kN
  - ☐ 3. 14.0625 kN
  - ☐ 4. 1406.25 kN

Q.64 In which process of manufacturing of cement are the raw materials ground, mixed and fed to the rotary kiln in the dry state?

- Ans
- ☒ 1. Dry process
  - ☐ 2. Mbist process
  - ☐ 3. Grinding process
  - ☐ 4. Wet process

Q.65 Select the correct statement regarding the 1<sup>st</sup> and 2<sup>nd</sup> moment of area of a circular lamina with radius 'R'.

- Ans
- ☒ 1. 1<sup>st</sup> moment of area is may be either -ve or +ve based on the chosen reference axes, but 2<sup>nd</sup> moment of area is always +ve.
  - ☐ 2. 1<sup>st</sup> moment of area is always +ve and 2<sup>nd</sup> moment of area is always -ve.
  - ☐ 3. 1<sup>st</sup> moment of area is always -ve and 2<sup>nd</sup> moment of area is always +ve.
  - ☐ 4. 1<sup>st</sup> moment of area and 2<sup>nd</sup> moment of area are always +ve.

Q.66 The mantle layer exists from the base of the crust layer to a depth of about \_\_\_\_\_.

- Ans
- ☒ 1. 2,900 km
  - ☐ 2. 2,800 km
  - ☐ 3. 2,600 km
  - ☐ 4. 2,700 km

Q.67 To measure vertical angles, the theodolite must be levelled with reference to \_\_\_\_\_.

- Ans
- ☐ 1. the altitude bubble on the telescope
  - ☒ 2. the altitude bubble on the index frame
  - ☐ 3. the altitude bubble on both the telescope and the index frame
  - ☐ 4. the bubble tube on the plate level

Q.68 Which of the following is NOT a type of municipal solid waste based on source?

- Ans
- ☐ 1. Trade refuse
  - ☐ 2. Street refuse
  - ☐ 3. House refuse
  - ☒ 4. Industrial refuse

Q.69 Identify the correct statements regarding theodolite.

- i. The axis of the plate level must lie in a plane parallel to the vertical axis.
- ii. The horizontal axis must be perpendicular to the vertical axis.
- iii. The vertical circle vernier must read zero when the line of collimation is horizontal.
- iv. The axis of the altitude level must be perpendicular to the line of collimation.

- Ans
- ☐ 1. Only i and iii
  - ☐ 2. Only i and iv
  - ☐ 3. i, ii, iii and iv
  - ☒ 4. Only ii and iii

Q.70 The distance travelled by an electromagnetic wave in one second is called \_\_\_\_\_.

- Ans
- ☐ 1. frequency
  - ☒ 2. wave velocity
  - ☐ 3. period
  - ☐ 4. wave length

Q.71 Consider the following statements with respect to long wall-short wall method. Which of the following statement is/are correct?

- I. The wall that is taken first is treated as the length, though the length may be lesser.
- II. The wall with longer length has to be taken as the long wall.

- Ans
- ☐ 1. Both statements I and II are false
  - ☐ 2. Only statement II is true
  - ☒ 3. Only statement I is true
  - ☐ 4. Both statements I and II are true

Q.72 As per IS 456, the stripping time of the soffit formwork to slabs (props to be refixed immediately after removal of formwork) is \_\_\_\_\_.

- Ans
- ☐ 1. 28 hours
  - ☒ 2. 3 days
  - ☐ 3. 1 day
  - ☐ 4. 2 days

Q.73 Miscellaneous expenses such as office expenses, stationery, postal expenses, etc., falls under \_\_\_\_\_.

- Ans
- ☐ 1. extra expenses
  - ☐ 2. additional expenses
  - ☐ 3. surcharge expenses
  - ☒ 4. overhead expenses

Q.74 As per IS 456:2000, which of the statement regarding longitudinal reinforcement in the RCC column is INCORRECT?

- Ans
- ☒ 1. Minimum 8 longitudinal bars is to be provided in a column having helical reinforcement within the helical region.
  - ☐ 2. Minimum 4 longitudinal bars is to be provided in a rectangular column.
  - ☐ 3. Minimum 6 longitudinal bars is to be provided in a circular column.
  - ☐ 4. Minimum diameter of longitudinal bars shall not be less than 12 mm.

Q.75 Which of the following accelerating admixtures is harmful for reinforced concrete and pre-stressed concrete?

- Ans
- ☐ 1. Silicates
  - ☐ 2. Fluorosilicates
  - ☒ 3. Calcium chloride
  - ☐ 4. Carbonates

Q.76 Register of arrears of wages due to work people is recorded in \_\_\_\_\_

- Ans
- ☐ 1. part III of the wage record
  - ☒ 2. part II of the muster roll
  - ☐ 3. part II of the wage record
  - ☐ 4. part III of the muster roll

Q.77 An underground water tank is to be designed. Which of the following cases is considered most appropriate for the analysis of its wall?

- Ans
- ☐ 1. The underground water tank is  $\frac{3}{4}$  full
  - ☐ 2. The underground water tank is full
  - ☒ 3. The underground water tank is empty
  - ☐ 4. The underground water tank is half full

Q.78 The least count of a theodolite is \_\_\_\_\_.

- Ans
- ☐ 1. 1 minute
  - ☒ 2. 1 second
  - ☐ 3. 1 hour
  - ☐ 4. 1 millisecond

Q.79 According to the Air (Prevention and Control of Pollution) Act, 1981, how is the term 'Emission' defined?

- Ans
- ☒ 1. Any solid or liquid or gaseous substance coming out of any chimney, duct or flue or any other outlet
  - ☐ 2. Only the solid particles coming out of an outlet
  - ☐ 3. Only the liquid substance coming out of an outlet
  - ☐ 4. Only the gaseous substance coming out of an outlet

Q.80 The painting of walls, doors and windows is measured in \_\_\_\_\_.

- Ans
- ☒ 1. square metre
  - ☐ 2. cubic metre
  - ☐ 3. gram
  - ☐ 4. pound

Q.81 The angle of the divergent portion of a Venturi meter is kept less than the angle of the converging portion to \_\_\_\_\_.

- Ans
- ☒ 1. minimise the loss of energy caused by flow separation
  - ☐ 2. avoid a situation wherein the flow may become compressible
  - ☐ 3. increase the velocity of the flow in the direction of the flow at the diverging part
  - ☐ 4. decrease the pressure in the direction of the flow at the diverging part

Q.82 Which of the following options represents the satellite-based positioning systems run by Russia?

- Ans
- ☒ 1. TSIKADA and GLONASS
  - ☐ 2. TRANSIT and GLONASS
  - ☐ 3. TSIKADA and GPS
  - ☐ 4. GPS and GLONASS

Q.83 For \_\_\_\_\_, measuring is required individually in order to provide extra rates of associated components.

- Ans
- ☐ 1. earthwork
  - ☒ 2. brickwork in arches
  - ☐ 3. honeycomb brickwork
  - ☐ 4. reinforced brickwork

Q.84 The geographical information system is capable of integrating \_\_\_\_\_ to capture, store, retrieve, analyse and display the spatial data.

- Ans
- ☐ 1. only multi-sector and multi-level database systems
  - ☐ 2. only multi-level and multi-period database systems
  - ☐ 3. only a multi-sector database system
  - ☒ 4. multi-sector, multi-level and multi-period database systems

Q.85 A current meter is a device used for measuring the:

- Ans
- ☐ 1. pressure of the fluid
  - ☐ 2. surface tension of the fluid
  - ☐ 3. viscosity of the fluid
  - ☒ 4. velocity of the flow of the fluid

Q.86 The type pavement marking which is used as a hazard marking and guide marking for safe driving during night is known as \_\_\_\_\_.

- Ans
- ☐ 1. pavement marking
  - ☐ 2. kerb marking
  - ☐ 3. object marking
  - ☒ 4. reflector unit marking

Q.87 Which of the following methods is most accurate for the determination of the water content of cohesionless soil?

- Ans
- ☐ 1. Torsion Balance moisture meter method
  - ☒ 2. Oven drying method
  - ☐ 3. Calcium carbide method
  - ☐ 4. Pycnometer method

Q.88 Proper experimental knowledge about the porosity and water absorption capacity of a coarse aggregate is required as its affects the durability of concrete because of:

- I. Freezing and thawing
- II. Reaction with chemically reactive fluids
- III. Increasing the workability of concrete

- Ans
- ☐ 1. Both (i) and (ii)
  - ☒ 2. (i), (ii), and (iii)
  - ☐ 3. Only (i)
  - ☐ 4. Only (ii)

Q.89 The gross command area for a distributary is 10,000 ha and 80% of this is culturable. The intensity of irrigation is 50% for wheat and 30% for rice. Determine the total area cultivated by wheat and rice.

- Ans
- ☐ 1. 4000 ha
  - ☐ 2. 2400 ha
  - ☒ 3. 6400 ha
  - ☐ 4. 8000 ha

Q.90 The  $C_d$  value of an orifice of  $d/D = 0.5$  ( $d$  = diameter of orifice and  $D$  = diameter of the pipe) lies in the range \_\_\_\_\_.

- Ans
- ☒ 1. 0.60 to 0.62
  - ☐ 2. 0.95 to 0.98
  - ☐ 3. 0.70 to 0.80
  - ☐ 4. 0.81 to 0.94

Q.91 As a precaution in cold weather concreting, cement containing \_\_\_\_\_ should be selected.

- Ans
- ☐ 1. higher C3S and higher C2S
  - ☒ 2. higher C3S and lower C2S
  - ☐ 3. lower C3S and lower C2S
  - ☐ 4. lower C3S and higher C2S

Q.92 Which of the following is manufactured from particles of wood or other lingo cellulose materials, which are agglomerated, formed and pressed together using an organic binder together in the presence of heat, pressure or moisture?

- Ans
- ☐ 1. Block board
  - ☒ 2. Particle board
  - ☐ 3. Plywood
  - ☐ 4. Fibre board

Q.93 Which of the following is NOT a retarding admixture?

- Ans
- ☐ 1. Sugar
  - ☐ 2. Calcium sulphate
  - ☒ 3. Calcium chloride
  - ☐ 4. Starch

Q.94 A 0.3 m diameter pipe carries oil of specific gravity 0.8 at flow velocity of 1.5 m/s and the pressure at a point A is 20 kN/m<sup>2</sup> (gauge). If the point A is 3 m above the datum line, calculate the approximate total energy at point A in meters of oil.

- Ans
- ☐ 1. 6.31 m
  - ☐ 2. 5.25 m
  - ☐ 3. 5.95 m
  - ☒ 4. 5.65 m

Q.95 If the cohesion value of soil is zero, the Mohr envelope will pass through:

- Ans
- ☐ 1. some distance on positive x-axis
  - ☐ 2. some distance on negative x-axis
  - ☐ 3. some distance on positive y-axis
  - ☒ 4. The origin

Q.96 A rectangular channel 3 m wide carries water at a depth of 1.2 m. The bed slope of the channel is 0.0025. Calculate the hydraulic radius of the channel.

- Ans
- ☐ 1. 0.627 m
  - ☒ 2. 0.667 m
  - ☐ 3. 0.637 m
  - ☐ 4. 0.617 m

Q.97 Defects due to fungi occur when the moisture content of timber is above \_\_\_\_\_.

- Ans
- ☐ 1. 25%
  - ☒ 2. 20%
  - ☐ 3. 15%
  - ☐ 4. 10%

Q.98 Trapezoidal sections with rounded corners for large canals or triangular sections with circular bottoms for small canals are the most suitable sections for \_\_\_\_\_ canals.

- Ans
- ☒ 1. lined
  - ☐ 2. semi-lined
  - ☐ 3. earthen
  - ☐ 4. unlined

Q.99 Consider the given statements.

I: Rate of material used for construction includes the cost of transport.

II: For material that is supplied departmentally, cost of carriage from godown to work rate shall be added.

Which of the statements is/are true?

- Ans
- ☐ 1. Only statement II is true
  - ☒ 2. Both statements I and II are true
  - ☐ 3. Both statements I and II are false
  - ☐ 4. Only statement I is true

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Q.100 Rankine theory considers the stress in a soil mass when it reaches in the state of \_\_\_\_\_.

- Ans
- ☐ 1. general state of equilibrium
  - ☐ 2. local state of equilibrium
  - ☐ 3. limited equilibrium
  - ☒ 4. plastic equilibrium
-