Answer Key :Civil Engg.

Type: Civil Engg.

1) In a sample of 100 heart patients, each patient has 80% chance of having a heart attack without medicine X. It clinically known that medicine X reduces the probability of having a heart attack by 50%. Medicine X is taken by 50 of these 100 patients. The probability that a randomly selected patient, out of the 100 patients, takes medicine X and has a heart attack is

Options:

- 1.0.4
- 2.0.6
- 3.0.2
- 4.0.3

Correct Option: 3

Type: Civil Engg.

2) What are the Eigen values of the matrix

$$\begin{bmatrix} 2 & 1 & 1 \\ 1 & 4 & 1 \\ 1 & 1 & 2 \end{bmatrix}$$

Options:

- 1. 1,2,5
- 2.1,3,4
- 3. -5,1,2
- 4. -5,-1,2

Correct Option: 1

Type: Civil Engg.

3) The smallest positive root of the equation x^5-5x^4-10x^3+50x^2+9x-45=0 lies in the range

Options:

- 1. $0 < X \leq 2$
- 2. $2 < X \leq 4$
- 3. $6 \leq X \leq 8$
- 4. $10 \leq X \leq 100$

Correct Option: 1

Type: Civil Engg.

4) which of the following statements is/are TRUE for the given function

$$f(x) = e^x |\sin x|;\ x \in R$$

Options:

- 1.The function is continuous at all x
- 2.The function is differentiable at all x
- 3.The function is periodic
- 4.The function is bounded

Correct Option: 1

Type: Civil Engg.

5) Sequence the following sentences in a coherent passage. P: This fortuitous geological event generated a colossal amount of energy and heat that resulted in the rocks rising to an average height of 4 km across the contact zone. Q: Thus, the geophysicists tend to think of the Himalayas as an active geological event rather than as a static geological feature. R: The natural process of the cooling of this massive edifice absorbed large quantities of atmospheric carbon dioxide, altering the earth's atmosphere and making it better suited for life. S: Many millennia ago, a breakaway chunk of bedrock from the Antarctic Plate collided with the massive Eurasian Plate.

Options:

- 1.QPSR
- 2.QSPR
- 3.SPRQ
- 4.SRPQ

Correct Option: 3

Type: Civil Engg.

6) Muller-Breslau principle is used in analysis of structures for

Options:

- 1.drawing an influence line diagram for any force response in a structure
- 2.writing the virtual work expression to get the equilibrium equation
- 3.superposing the load effects to get the total force response in the structure
- 4.relating the deflection between two points in a member with the curvature diagram in between

Correct Option: 1

Type: Civil Engg.

7) A plate load test was conducted in sand on a 300 mm diameter plate. If the plate settlement was 5 mm at a pressure of 100 KPa, the settlement (in mm) of a 5mx8m rectangular footing at the same pressure will be

Options:

- 1.9.4
- 2.18.6
- 3.12.7
- 4.17.8

Correct Option: 4

Type: Civil Engg.

8) Un-factored maximum bending moment at a section of a reinforced concrete beam resulting form a frame analysis are 50, 80, 120 and 180 kNm under dead, live, wind and earthquake loads respectively. The design moment (kNm) as per IS:456-2000 for the limit state of collapse (flexure) is

Options:

- 1.195
- 2.250
- 3.345
- 4.372

Correct Option: 4

Type: Civil Engg.

9) A reinforced concrete structure has to be constructed along a sea coast. The minimum grade of concrete to be used as per IS : 456-2000 is

Options:

- 1.M15
- 2.M20
- 3.M25
- 4.M30

Correct Option: 4

Type: Civil Engg.

10) Consider the following statements : 1. Modulus of elasticity of concrete increases with increase in compressive strength of concrete. 2. Brittleness of concrete increases with decrease in compressive strength of concrete. 3. Shear strength of concrete increase with increase in compressive strength of concrete. The true statement is

Options:

- 1.2 and 3
- 2.1, 2 and 3
- 3.1 and 2
- 4.1 and 3

Correct Option: 2

Type: Civil Engg.

11) The secondary air pollutant is

Options:

- 1.sulphur dioxide
- 2.carbon monoxide
- 3.ozone
- 4.nitrogen oxide

Correct Option: 3

Type: Civil Engg.

12) In the context of water and wastewater treatments, the correct statements are 1) particulate matter may shield microorganisms during disinfection 2) ammonia decreases chlorine demand 3) phosphorous stimulates algal and aquatic growth 4) calcium and magnesium increase hardness and total dissolved solids

Options:

- 1.1 & 2
- 2.2 &3
- 3.3&4
- 4.1, 2 & 3

Correct Option: 4

Type: Civil Engg.

13) In general, the outer edge is raised above the inner edge in horizontal curves for

Options:

- 1.Highways, Railways, and Taxiways
- 2.b) Highways and Railways only
- 3.Railways and Taxiways only
- 4.Highways only

Correct Option: 2

Type: Civil Engg.

14) The free mean speed is 60 km/hr on a given road. The average space headway at jam density on the road is 8 m. For a linear speed density relationship the maximum flow (in veh/hr/lane) expected on the road is

Options:

- 1.1875
- 2.938
- 3.2075
- 4.1038

Correct Option: 1

Type: Civil Engg.

15) A map is prepared with a scale of 1: 1000 and a contour interval of 1 m. If the distance between two adjacent contours on the map is 10 mm, the slope of the ground between the adjacent contours is

Options:

- 1.0.3
- 2.0.1
- 3.0.35
- 4.0.4

Correct Option: 2

Type: Civil Engg.

16) When designing steel structures, one must ensure that local buckling in webs does not take place. This check may not be very critical when using rolled steel sections because.

Options:

- 1.Quality control at the time of manufacture of rolled section is very good
- 2.Web depth available are small
- 3.Web stiffeners are in–built in rolled sections
- 4.Depth to thickness ratios (of the web) are appropriately adjusted

Correct Option: 4

Type: Civil Engg.

17) In the design of a reinforced concrete beam the requirement for bond is not getting satisfied. The economical option to satisfy the requirement for bond is by

Options:

- 1.bounding of bars
- 2.providing smaller diameter bars more in number
- 3.providing larger diameter bar less in number
- 4.providing same diameter bars more in number

Correct Option: 2

Type: Civil Engg.

18) A 15 cm length of steel rod with relative density of 7.4 is submerged in a two layer fluid. The bottom layer is mercury and the top layer is water. The height of top surface of the rod above the liquid interface in 'cm' is

Options:

- 1.8.24
- 2.7.82
- 3.7.64
- 4.7.38

Correct Option: 4

Type: Civil Engg.

19) In a Bernoulli equation, used in pipe flow, each term represents

Options:

- 1.Energy per unit weight
- 2.Energy per unit mass
- 3.Energy per unit volume
- 4.Energy per unit flow length

Correct Option: 1

Type: Civil Engg.

20) An inert tracer is injected continuously from a point in an unsteady flow field. The locus of locations of all tracer particles at an instance of time represents

Options:

- 1.Streamline
- 2.Pathline
- 3.Streamtube
- 4.Streakline

Correct Option: 4

Type: Civil Engg.

21) The height of a hydraulic jump in the stilling pool of 1:25 scale model was observed to be 10 cm. The corresponding prototype height of the jump is

Options:

- 1.Not determinable from the data given
- 2.2.5m
- 3.0.5m
- 4.0.1m

Correct Option: 2

Type: Civil Engg.

22) The average surface area of a reservoir in the month of June is 20km2. In the same month, the average rate of inflow is 10 m3/s, outflow rate is 15 m3/s, monthly rainfall is 10 cm, monthly seepage loss is 1.8 cm and the storage change is 16 million m3. The evaporation (in cm) in that month is

Options:

- 1.46.8
- 2.136
- 3.13.6
- 4.23.4

Correct Option: 4

Type: Civil Engg.

23) An isolated 3-h rainfall event on a small catchment produces a hydrograph peak and point of inflection on the falling limb of the hydrograph at 7 hours and 8.5 hours respectively, after the start of the rainfall. Assuming, no losses and no base flow contribution, the time of concentration (in hours) for this catchment is approximately

Options:

- 1.8.5
- 2.7
- 3.6.5
- 4.5.5

Correct Option: 4

Type: Civil Engg.

24) Identify the waterborne diseases caused by viral pathogens:

Options:

- 1. Acute anterior poliomyelitis and Cholera
- 2. Acute anterior poliomyelitis and Infection hepatitis
- 3.Infection hepatitis and Cholera
- 4.Cholera and Typhoid fever

Correct Option: 1

Type: Civil Engg.

25) As per the Indian Roads Congress guidelines (IRC 86: 2018), extra widening depends on which of the following parameters?

Options:

- 1.Horizontal curve radius
- 2.Superelevation
- 3.Number of lanes
- 4.Longitudinal gradient

Correct Option: 1

Type: Civil Engg.

26) The design speed on a highway is 60kmph; calculate the super elevation if radius of curve is 150m and coefficient of friction is 0.15.

Options:

- 1.0.15
- 2.0.04
- 3.0.038
- 4.3

Correct Option: 3

Type: Civil Engg.

27) What is the width of a pavement of 2 lane national highway?

Options:

- 1.8.80 m
- 2.3.00 m
- 3.3.75 m
- 4.7.0 m

Correct Option: 4

Type: Civil Engg.

28) Impulse Turbine have

Options:

- 1.High Head, High Discharge
- 2.High Head, Low Discharge
- 3.Low Head, Low Discharge
- 4.Low Head, High Discharge

Correct Option: 2

Type: Civil Engg.

29) Acidity in water is caused by

Options:

- 1.CO_2
- 2.NH_3
- 3.H_2
- 4.N_2

Correct Option: 1

Type: Civil Engg.

30) Angle between two plane mirrors of an optical square is

Options:

- 1.60°
- 2.45°
- 3.90°
- 4.180°

Correct Option: 2

Type: Common

31) Which one of the following belongs to the category of homogeneous data

Options:

- 1.Multi-storeyed houses in a colony
- 2.Trees in a garden
- 3.Vehicular traffic on a highway
- 4.Student population in a class

Correct Option: 1

Type: Common

32) Following incomplete series is presented. Find out the number which should come at the place of question mark which will complete the series 4, 16, 36, 64,?

Options:

- 1.200
- 2.300
- 3.100
- 4.150

Correct Option: 3

Type: Common

33) In the absence of covariance among securities in the portfolio, if each security has an average standard deviation of 20%, the portfolio of 100 securities would have a standard deviation of

Options:

- 1.0.02
- 2.0.2
- 3.0.05
- 4.Zero

Correct Option: 1

Type: Common

34) In a certain code, ‘bi nie pie’ means ‘some good jokes’, ‘nie bat lik’ means ‘some real stories’, and ‘pie lik tol’

means ‘many good stories’. Which word in that code means ‘jokes’?

Options:

- 1.bi
- 2.nie
- 3.pie
- 4.None of the above

Correct Option: 1

Type: Common

35) ‘Demonstrator’ is related to ‘Laboratory’ in the same way as ‘Leader’ is related to

Options:

- 1.Podium
- 2.Assembly
- 3.Country
- 4.State

Correct Option: 2

Type: Common

36) A variable that is presumed to cause a change in another variable is called

Options:

- 1.A categorical variable
- 2.A dependent variable
- 3.An independent variable
- 4.An intervening variable

Correct Option: 3

Type: Common

37) The research design is

Options:

- 1.A common method adopted by all researchers to carry out research
- 2.The final choice between using qualitative or quantitative methods.
- 3.Presentation of research findings

- 4.A framework for every stage of the data collection and its analysis

Correct Option: 4

Type: Common

38) A technique of building up a list or a sample of a special population by using an initial set of members as informants is called

Options:

- 1.Quota sampling
- 2.Convenience sampling
- 3.Snowball sampling,
- 4.Purposive sampling

Correct Option: 3

Type: Common

39) In the context of Data Mining, which one of the following is a method of Data Reduction?

Options:

- 1.Data Compression
- 2.Multiple Regression
- 3.Normalization
- 4.Outlier Analysis

Correct Option: 1

Type: Common

40) A hypothesis can be described as

Options:

- 1.Just as a hunch
- 2.A wild guess
- 3.A type of statement made by researchers when they are attempting to get funding for their research
- 4. A prediction of some sort regarding the possible outcomes of a study

Correct Option: 4

Type: Common

41) Which scheme on performance and credit rating has been launched by Union MSME Ministry to assess the credit worthiness and capabilities of industries in the sector?

Options:

- 1.Zero Defect Scheme
- 2.Certification Performance and Economy Rating Scheme
- 3.Performance and Credit Rating Scheme
- 4.Industrial Incentive Scheme

Correct Option: 3

Type: Common

42) Interlocking of two or more types of food chains at different trophic levels is called

Options:

- 1.Food chain
- 2.Food web
- 3.Succession
- 4.Ecological pyramid

Correct Option: 2

Type: Common

43) A by-product of fossil fuel combustion is carbon dioxide. Which of the following is the cleanest with respect to the release of carbon dioxide?

Options:

- 1.Coal
- 2.Oil
- 3.Wood
- 4.Natural gas

Correct Option: 4

Type: Common

44) Maintaining balance between fulfilment of human needs and protection of environment is termed as

Options:

- 1.Environmental development
- 2.Sustainable development
- 3.Economic development
- 4.None of the above

Correct Option: 2

Type: Common

45) Identify the main Principle on which the Parliamentary System operates.

Options:

- 1.Responsibility of Executive to Legislature
- 2.Supremacy of Parliament
- 3.Supremacy of Judiciary
- 4.Theory of Separation of Power

Correct Option: 1

Type: Common

46) A 280 m train is moving at a speed of 80 kmph. How much time will it take to pass a bridge that is 120 m long?

Options:

- 1.30 s
- 2.32 s
- 3.18 s
- 4.40 s

Correct Option: 3

Type: Common

47) A, B, C, D and E are sitting on a bench. A is sitting next to B; C is sitting next to D, and D is not sitting with E who is on the left end of the bench. C is on the second position from the right. A is to the right of B and E. A and C are sitting together. In which position A is sitting?

Options:

- 1.Between B and D
- 2.Between B and C
- 3.Between E and D
- 4.Between C and E

Correct Option: 2

Type: Common

48) If all the letters in the word 'ARGUMENT' are rearranged in alphabetical order and substituted by the letter immediately following it in English alphabet, then what will be the new arrangement of letters?

Options:

- 1.BFHNOSUV
- 2.BFHONSWV
- 3.BFHNOUSV
- 4.BFHNOQUV

Correct Option: 1

Type: Common

49) Find the odd pair of words

Options:

- 1.Room : House
- 2.Atom : Electron
- 3.Car : Engine
- 4.Milk : Water

Correct Option: 1

Type: Common

50) Vinita, who is the sister-in-law of Amit, is the daughter-in-law of Kamni. Deepak is the father of Sandy who is the only brother of Amit. How is Kalyani related to Ashok?

Options:

- 1.Mother-in-law
- 2.Aunt
- 3.Wife
- 4.None of the above

Correct Option: 4