Kerala Public Enterprises (Selection and Recruitment) Board

Version: **B**	Question Booklet No:**81025**
Name of Examination: **Civil Engineering**	**Date: 10/08/2025**

Common written examination for:

1) Junior Manager (Technical – Civil), KINFRA (Category No. 079/2024)
2) Engineer Civil, SILK (Category No. 096/2024)
3) Engineer (Civil), KEL (Category No. 008/2024)

Instructions to Candidates:

1. Candidate should not start writing answers until the indication is given to start answering.
2. The question paper contains **50 questions.** Each question is provided with four choices (A), (B), (C) and (D) having one correct answer. Choose the correct answer and darken the bubble corresponding to the question number using **Blue or Black ball point pen** in the **OMR Sheet**.
3. Each correct answer carries **2 marks.** There will be **no negative mark** for wrong or unattended questions.
4. Do not write anything else on the question paper. Sheet for rough work is appended to the question paper in the end.
5. No candidate will be allowed to leave the examination hall till the end of the session and without handing over his/her Answer Sheet to the Invigilator. Candidates should ensure that the Invigilator has verified all the entries in the 'Basic Data' portion and that the Invigilator has affixed his/her signature in the space provided in the OMR sheet.

Total number of questions: 50 Maximum marks: 100 Time: 90 Minutes

1. Which strain measuring technique is best suited for high temperature environments?

   A) Electrical Resistance strain gauge B) Photoelastic coating

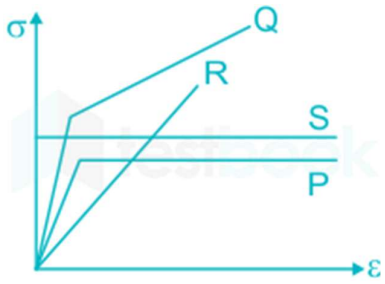
   C) Optical fiber strain sensors D) Brittle lacquer

2. A tensile test is performed on a round bar. After fracture, it has been found that the diameter remains approximately the same at fracture. The material under test was:

   A) Mild steel B) Copper

   C) Cast iron D) Aluminium

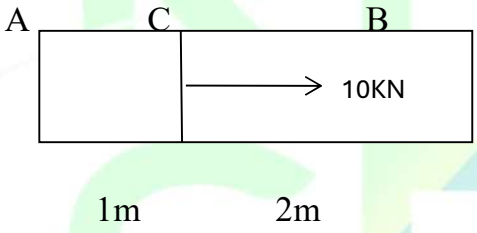
3. The room temperature stress (σ) and strain (ε) curves of four materials P, Q, R and S are shown in the figure below. The material that behaves as a rigid perfectly plastic material is:



A) P B) Q

C) R D) S

4. The reactions at the rigid supports at A and B for the bar loaded as shown in the figure are respectively:



A) 20/3 KN, 10/3 KN B) 10/3 KN, 20/3 KN

C) 5 KN, 5 KN D) None of these.

5. The number of independent elastic constants for a linear elastic isotropic and homogeneous material is:

A) 3 B) 4

C) 1 D) 2

6. The ratio of the theoretical critical buckling load for a column with fixed ends to that of another column with the same dimensions and material and is having pinned ends is equal to:

A) 4.0 B) 0.5

C) 1.0 D) 2.0

7. The maximum bending stress induced in a steel wire of modulus of elasticity 200kN/mm^2 and diameter 2mm when bound on a drum of diameter 2m is approximately equal to:

A) 100 N/mm^2 B) 400 N/mm^2

C) 300 N/mm^2 D) 200 N/mm^2

8. Which point on the stress-strain curve occurs after the lower yield point?

A) Yield plateau B) Upper yield point

C) Ultimate point D) None of the above

9. In an undamped system, the amplitude:

A) Increases over time B) Decreases over time

C) Remains constant D) Oscillates irregularly

10. In influence line for shear, a sudden change in value indicates:

A) Support settlement B) Concentrated load

C) Location of the section D) Hinged support

11. Which of the following has the highest coefficient of static friction?

A) Steel on steel B) Rubber on concrete

C) Wood on wood D) Teflon on steel

12. The quantity of cement for 1 m^3 of M20 concrete is approximately:

A) 250 kg B) 320 kg

C) 400 kg D) 500 kg

13. A beam fixed at the ends and subjected to lateral loads only is statically indeterminate and the degree of indeterminacy is:

A) 1 B) 2

C) 3 D) 4

14. Bill of Quantities (BOQ) is used for

A) Designing foundations B) Tracking project delay

C) Detailed cost estimation D) Supervising construction quality

15. A plate girder is preferred when:

A) Span is less than 10 m B) Loads are light

C) Span is large and loads are heavy D) Concrete is used

16. The method of superposition is applicable only if the structure

A) is statically determinate B) has rigid joints

C) is subjected to axial loading only D) obeys linear elastic behaviour

17. Laminar sub-layer thickness decreases with;

A) Increasing Reynolds number B) Decreasing Reynolds number

C) Increasing fluid viscosity D) Increasing pipe roughness.

18. In an incompressible flow, the velocity potential function satisfies:

A) Laplace's equation B) Poisson's equation

C) Navier-Stokes equation D) Euler's equation

19. In turbulent boundary layer, the velocity profile near the wall is:

A) Linear B) Parabolic

C) Logarithmic D) Exponential

20. The difference in pressure head, measured by a mercury water differential manometer for a 10 cm difference of mercury head will be:

A) 1.36 m B) 1.26 m

C) 1.46 m D) 2.52 m

21. The total pressure on the surface of a vertical sluice gate 3m x 1m with its top 3m side being 0.5m below the water (specific weight 10kN/m^3) level will be

A) 30 kN B) 45 kN

C) 15 kN D) 25 kN

22. The Moody chart is used to find;

A) Reynolds number B) Friction factor in pipes

C) Head loss in channels D) Velocity distribution

23. In sand replacement method, if the mass of sand filling the calibrating container is 1450g and volume of calibrating container is 1000 cm^3, then its bulk density is _____ g/cm^3.

A) 1450 B) 1.45

C) 45 D) 17

24. In a constant head permeameter with cross section area of 10 cm^2, when the flow was taking place under a hydraulic gradient of 0.5, the amount of water collected in 120 seconds is 1200 cc. The permeability of the soil is:

A) 0.002 cm/s B) 2.0 cm/s

C) 0.02 cm/s D) 0.2 cm/s

25. Superfluous water is also called _____

A) Capillary water B) Gravitational water

C) Hydroscopic water D) Saturation capacity

26. If the coefficient of permeability of soil is $9*10^{-7}$ cm/s and porosity is 0.33, then its of percolation is _____

A) $8*10^{-7}$ cm/s B) $27*10^{-7}$ cm/s

C) $26*10^{-7}$ cm/s D) $13*10^{-7}$ cm/s

27. The time for a clay layer to achieve 90% consolidation is 20 years. The time required to achieve 90% consolidation, if the layer were twice as thick, 2 times more permeable and 4 times more compressible would be:

A) 80 years B) 40 years

C) 160 years D) 120 years

28. A fluid in which the viscosity does not change with the rate of deformation or shear strain is known as:

A) Real fluid B) Ideal fluid

C) Non-Newtonian fluid D) Newtonian fluid

29. The inner diameter of the core cutter is _____ cm.

A) 5 B) 10

C) 13 D) 15

30. Calculate the height of water table rise in soil mass from a sand stratum of 12m deep from ground level, at which the effective pressure is zero. The water percolates through a soil mass of thickness 5m. The $\gamma sat=18.6\ kN/m^3$ and $\gamma w=9.81\ kN/m^3$.

A) 7.68 m B) 9.48 m

C) 5.24 m D) 10 m

31. The auxiliary plane in the hydrostatic axis can also be called as _____

A) Failure plane B) Octahedral plane

C) Deviatoric plane D) Principal plane

32. In the Indian Standard Soil Classification System (IS:1498), a soil with high liquid limit and high plasticity index is classified as:

A) Gravel B) Silt

C) Clay D) Sand

33. Which of the following is responsible for the separation of boundary layer?

A) Negative pressure gradient B) Positive pressure gradient

C) Zero pressure gradient D) Minimum value of pressure

34. What is the capacity value by which storage structures are divided into separate categories for selecting the design flood, as per CWC?

A) 1 Mm^3 B) 30 Mm^3

C) 60 Mm^3 D) 100 Mm^3

35. The thickness of boundary layer increases:

A) Along the flow direction B) Against the flow direction

C) With decrease in fluid velocity D) Remains constant

36. Which of the following waste -to-energy technologies is best suited for low-moisture high-calorific-value municipal solid waste?

A) Landfilling B) Incineration

C) Anaerobic digestion D) Composting

37. In a sewage treatment plant, which of the following units facilitates both sedimentation and digestion of sludge simultaneously?

A) Aeration tank B) Trickling filter

C) Imhoff tank D) Digestion tank

38. The flowing through velocity in an Imhoff tank should not exceed

A) 0.1 m/minute B) 0.3 m/minute

C) 0.7 m/minute D) 1.0 m/minute

39. In water distribution system, at consumers end, the minimum residual gauge pressure should be

A) 0.7 kg/cm^2 B) 1.0 kg/cm^2

C) 1.4 kg/cm^2 D) 5.0 kg/cm^2

40. The rate of sludge accumulated in a septic tank is of the order of

A) 10 litres/person/per year B) 20 litres/person/per year

C) 30 litres/person/per year D) 100 litres/person/per year

41. The graph between the amount of organic matter left in sewage and the time elapsed in days is:

A) Linear B) Parallel to time axis

C) Exponential D) None of these

42. The minimum vertical distance between the bottom of the privy pit and the ground water table is:

A) 0.3 m B) 1.0 m

C) 3 m D) None of these

43. The design speed of NH on a cross slope of up to 10% is _____

A) 100 kmph B) 80 kmph

C) 60 kmph D) 50 kmph

44. Presence of fluoride in water greater than permissible level of 1.5 mg/L causes

A) Cardiovascular disease B) Methemoglobinemia

C) Hepatitis D) Dental fluorosis

45. In a water treatment plant, a clariflocculator is a unit used primarily for which of the following processes;

A) Aeration and pH adjustment B) Sedimentation and disinfection

C) Flocculation followed by sedimentation D) Filtration and chlorination

46. While designing a hill road with a ruling gradient of 6%, if a sharp horizontal curve of 50 m radius is encountered, the compensated gradient at the curve, as per Indian Roads Congress (IRC) specifications, should be

A) 5.5% B) 5.0%

C) 4.5% D) 4.0%

47. The ideal shape of curve for the summit curve is

A) Spiral B) Parabolic

C) Circular D) Lemniscate

48. A broad gauge railway track is designed for a maximum speed of 120 km/h. If the calculated equilibrium cant is 100 mm, what is the maximum cant that can be provided on the track as per Indian Railways standards?

A) 100 mm B) 165 mm

C) 150 mm D) 125 mm

49. The minimum design speed adopted where hair-pin bends are provided at the hill roads:

A) 40 kmph B) 20 kmph

C) 50 kmph D) 30 kmph

50. The legal axle load of the design vehicle used in India is:

A) 1.6 tonne B) 8.2 tonne

C) 16.2 tonne D) 32.4 tonne