GPSC
GWSSB

Previous Year Paper

Engineering Services (Civil)

Paper-II 05 Feb 2023

BEF-2

PROVISIONAL ANSWER KEY

Name of The Post	**Executive Engineer (Civil), Class-1 and Deputy Executive Engineer (Civil), Class-2, GWSSB**
Advertisement No	**24/2022-23**
Preliminary Test Held On	**05-02-2023**
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Last Date to Send Suggestion (S)	**14-02-2023**

Instructions / સૂચના (Physical Submission)

Candidate must ensure compliance to the instructions mentioned below, else objections shall not be considered: -

(1) All the suggestion should be submitted in prescribed format of suggestion sheet PHYSICALLY Only.

(2) Question wise suggestion to be submitted in the prescribed format (Suggestion Sheet) published on the website.

(3) All suggestions are to be submitted with reference to the Master Question Paper with provisional answer key (Master Question Paper), published herewith on the website. Objections should be sent referring to the Question, Question No. & options of the Master Question Paper.

(4) Suggestions regarding question nos. and options other than provisional answer key (Master Question Paper) shall not be considered.

(5) Objections and answers suggested by the candidate should be in compliance with the responses given by him in his answer sheet. Objections shall not be considered, in case, if responses given in the answer sheet /response sheet and submitted suggestions are differed.

(6) Objection for each question shall be made on separate sheet. Objection for more than one question in single sheet shall not be considered & treated as Cancelled.

(7) Candidate who is present in the exam entitled to submit the objection/(s).

(8) Candidate should attach copy of his/her OMR (Answer sheet) with objection/(s).

ઉમેદ્વારે નીચેની સૂચનાઓનું પાલન કરવાની તકેદારી રાખવી, અન્યથા વાંધા-સૂચન અંગે કરેલ રજૂઆતો ધ્યાને લેવાશે નહીં

(1) ઉમેદ્વારે વાંધા-સૂચનો નિયત કરવામાં આવેલ વાંધા-સૂચન પત્રકથી (માત્ર Offline માધ્યમથી) રજૂ કરવાના રહેશે.

(2) ઉમેદ્વારે પ્રશ્નપ્રમાણે વાંધા-સૂચનો રજૂ કરવા વેબસાઈટ પર પ્રસિધ્ધ થયેલ નિયત વાંધા-સૂચન પત્રકના નમૂનાનો જ ઉપયોગ કરવો.

(3) ઉમેદ્વારે પોતાને પરીક્ષામાં મળેલ પ્રશ્નપુસ્તિકામાં છપાયેલ પ્રશ્નક્રમાંક મુજબ વાંધા-સૂચનો રજૂ ન કરતા તમામ વાંધા-સૂચનો વેબસાઈટ પર પ્રસિધ્ધ થયેલ પ્રોવિઝનલ આન્સર કી (માસ્ટર પ્રશ્નપત્ર)ના પ્રશ્ન ક્રમાંક મુજબ અને તે સંદર્ભમાં રજૂ કરવા.

(4) માસ્ટર પ્રશ્નપત્ર માં નિર્દિષ્ટ માત્ર પ્રશ્ન અને વિકલ્પ સિવાયના વાંધા-સૂચન ધ્યાને લેવામાં આવશે નહીં.

(5) ઉમેદ્વારે જે પ્રશ્નના વિકલ્પ પર વાંધો રજૂ કરેલ છે અને વિકલ્પ રૂપે જે જવાબ સૂચવેલ છે એ જવાબ ઉમેદ્વારે પોતાની ઉત્તરવહીમાં આપેલ હોવો જોઈએ. ઉમેદ્વારે સૂચવેલ જવાબ અને ઉત્તરવહીનો જવાબ ભિન્ન હશે તો ઉમેદ્વારે રજૂ કરેલ વાંધા-સૂચન ધ્યાનમાં લેવાશે નહીં.

(6) એક પ્રશ્ન માટે એક જ વાંધા-સૂચન પત્રક વાપરવું. એક જ વાંધા-સૂચન પત્રકમાં એકથી વધારે પ્રશ્નોની રજૂઆત કરેલ હશે તો તે અંગેના વાંધા-સૂચનો ધ્યાને લેવાશે નહીં.

(7) પરીક્ષામાં હાજર રહેલ ઉમેદવાર જ વાંધા - સુચન રજુ કરી શકશે .

(8) ઉમેદવારે વાંધા-સુચન સાથે પોતાની જવાબવહીની નકલ બિડાણ કરવાની રહેશે.

001. Granite is an example of

(A) Sedimentary rock
(B) Metamorphic rock
(C) Igneous Rock
(D) Aqueous rock

002. The soil transported by wind is called

(A) Alluvial Soil
(B) Marine Soil
(C) Lacustrine Soil
(D) Aeolian Soil

003. The plasticity index is equal to

(A) Liquid limit minus shrinkage limit
(B) Plastic limit minus shrinkage limit
(C) Liquid limit minus plastic limit
(D) None of the above

004. The property of the soil mass which permits the seepage of water through its interconnecting voids, is called

(A) Capillarity
(B) Porosity
(C) Permeability
(D) None of the above

005. For a standard proctor test, the mass of hammer and the drop of hammer are as follows:

(A) 2.60 kg and 310 mm
(B) 2.60 kg and 450 mm
(C) 4.89 kg and 310 mm
(D) 4.8 kg and 450 mm

006. In the case of a counterfort retaining wall, the toe acts as a

(A) Simply supported slab
(B) Cantilever
(C) Continuous slab
(D) None of the above

007. According to I.S. Code, maximum permissible differential settlement on clayey soil is

(A) 50 mm
(B) 60 mm
(C) 65 mm
(D) 40 mm

008. Dynamic formulae cannot be used to obtain load carrying capacity in

(A) Uniform fine sand
(B) Free draining sand
(C) Hard clays
(D) None of the above

009. The ratio between the change in volume and original volume of the body is called _____ strain

(A) Tensile
(B) Volumetric
(C) Shear
(D) Compressive

010. Principal stresses at a point in plane stressed element are $\sigma_x = \sigma_y = 500$ kg /cm^2. Normal stress on the plane inclined at 45° to x-axis will be

(A) 0
(B) 500 kg/cm^2
(C) 707 kg/cm^2
(D) 1000 kg/cm^2

011. In case of a circular section the section modulus is given as

(A) Π d^2 / 16
(B) Π d^3 / 32
(C) Π d^3 / 16
(D) Π d^4/ 64

012. In the case of an I-section beam maximum shear stress is at

(A) The junction of the top flange and web
(B) Middle of the web
(C) Either (A) or (B)
(D) None of the above

013. Bending Moment M and Torque T is applied on a solid circular shaft. If the maximum bending stress is equal to maximum shear stress developed, the M is equal to

(A) T
(B) T/2
(C) 4T
(D) 2T

014. Strain energy theory was postulated by

(A) Haigh
(B) Rankine
(C) Tresca
(D) Mohr

015. If the ratio G/E (G = modulus of rigidity, E = Young's modulus of elasticity) is 0.4, then what is the value of the Poisson ratio?

(A) 0.25
(B) 0.20
(C) 0.66
(D) 0.33

016. The most important purpose of frog in a brick is to

(A) Form keyed joint between brick and mortar
(B) Reduce the weight of brick
(C) Emboss manufacturer's name
(D) Improve insulation by providing 'hollows'

017. Excess of silica makes brick

(A) brittle on burning
(B) to melt on burning
(C) to crack on drying
(D) to warp

018. Granite, after metamorphism transforms to

(A) quartzite
(B) slate
(C) schist
(D) gneiss

019. Which of the following is not an objective of seasoning timber?

(A) Reduction in shrinkage and warping

(B) Reduction of weight

(C) Increase in strength and durability

(D) Reduction of natural defects in timber

020. If P is the standard consistency of cement, the amount of water used in conducting the initial setting time test on cement is

(A) 0.6 P

(B) 0.8 P

(C) 0.65 P

(D) 0.85 P

021. Hardness of the stones can be tested by

(A) Impact Strength

(B) Abrasion strength

(C) Mohs Scale

(D) Crushing strength

022. Which of the following is not a test for measuring the workability of concrete?

(A) Slump test

(B) Flow test

(C) Le Chatelier's Test

(D) Compaction factor test

023. What causes bulking of sand?

(A) Clay Content

(B) Air Voids

(C) Viscosity

(D) Surface Moisture

024. The precipitation in the form of water drops of size larger than 0.5 mm is known as

(A) Drizzle

(B) Glaze

(C) Rain

(D) Snow

025. The word unit in the unit hydrograph refers to the

(A) Unit area of the basin

(B) Unit duration of the storm

(C) Unit base period of the hydrograph

(D) Unit depth of runoff

026. An isohyet is a line joining points having

(A) Equal evaporation value

(B) Equal barometric pressure

(C) Equal height above the MSL

(D) Equal rainfall depth in a given duration

027. Which of the following factors have to be considered in selecting a site for a stream gauging station?

(A) The section should be straight and uniform for a length of about 10 to 20 times the width of the stream.

(B) The bed and banks should be free from vegetal growth

(C) There should be no longer overflow section at flood stage.

(D) All of the above

028. The ratio of quantity of water stored in the root zone of the crops to the quantity of water actually delivered in the field is known as

(A) Water conveyance efficiency

(B) Water use efficiency

(C) Water application efficiency

(D) None of the above

M

029. Silt excluder is provided

(A) In the canal on the downstream of the head regulator

(B) In the river on the downstream of the weir

(C) In the river adjacent to the head regulator

(D) In the river far off from the weir on the upstream side

030. Syphon aqueduct is a cross drainage work provided to carry canal over a natural drain when

(A) Canal bed is well above the H.F.L. of the natural drain

(B) Canal bed is below the HFL of the natural drain

(C) Canal bed is at the same level as the bed of the natural drain

(D) None of the above

031. Which of the following methods of irrigation do not use open ditches for water delivery?

(A) Sub-irrigation

(B) Trickle irrigation

(C) Furrow irrigation

(D) Check irrigation

032. The watering done prior to the sowing of crop is called

(A) Kor Irrigation

(B) Paleo Irrigation

(C) Both (A) and (B)

(D) None of the above

033. In GPS, satellites are placed in orbits with orbital radius approximately of

(A) 1500 km

(B) 15200 km

(C) 18400 km

(D) 26600 km

034. Remote sensing is being used in land use analysis because

(A) Images of large areas can be acquired rapidly

(B) Problem of access is eliminated

(C) It is cheaper as compared to the ground surveys

(D) All of the above

035. Soil transported by gravitational force

(A) talus

(B) lacustrine

(C) alluvial

(D) muck

036. How always the warning signs are?

(A) in a circle

(B) in a triangle

(C) in a hexagon

(D) in the square

037. The uniformity coefficient of soil is

(A) D_{60}/D_{10}

(B) D_{30}/D_{10}

(C) D_{60}/D_{30}

(D) $D_{30}/D_{10}D_{60}$

038. Negative skin friction on a pile develops when

(A) the soil in which it is driven is sandy soil

(B) the soil so surrounding it settles more than the pile

(C) the groundwater table rises

(D) the soil near the tip is clay

039. Quick sand is

(A) a type of sand

(B) a condition in which a cohesion less soil loses its strength because of upward flow of water

(C) a condition in which a cohesive soil loses its strength

(D) none of the above

040. Manometer is used to measure

(A) low pressure

(B) moderate pressure

(C) high pressure

(D) atmospheric pressure

041. A Piezometer tube is used only for measuring

(A) low pressure

(B) moderate pressure

(C) high pressure

(D) vacuum pressure

042. The metacentric height is the distance between the

(A) center of gravity of the floating body and the center of buoyancy

(B) center of gravity of the floating body and metacenter

(C) metacenter and center of buoyancy

(D) original center of buoyancy and new center of buoyancy

043. Concept of boundary layer was first introduced by

(A) Von-Karman

(B) Nikuradse

(C) Bernoulli

(D) Prandtl

044. The maximum deflection of cantilever beam of length L with a point load W at the free end is

(A) $WL^3/3EI$

(B) $WL^3/8EI$

(C) $WL^3/16EI$

(D) $WL^3/48EI$

045. The sum of normal stress in a compound stress system is

(A) constant

(B) variable linearly

(C) variable parabolically

(D) none of the above

046. Excess of alumina in the clay

(A) Makes the brick brittle and weak

(B) Makes the brick wrap and crack on drying and burning.

(C) Changes the colour of the brick from red to yellow

(D) Improves impermeability and durability of the brick

047. Quick Lime is a

(A) Carbonate of lime

(B) Oxide of calcium

(C) Product left immediately after the calcination of pure limestone

(D) Lime quickly treated with water

048. To retard the initial setting time of cement, the compound responsible is

(A) Tricalcium silicate

(B) Gypsum

(C) Dicalcium silicate

(D) Tricalcium aluminate

049. The Central part of tree is called

(A) Heart Wood

(B) Pith

(C) Sap Wood

(D) Cambium Layer

050. Vicat's apparatus is used to determine the

(A) Initial setting time of cement

(B) Final setting time of cement

(C) Normal consistency of cement

(D) All of the above

051. The Aggregate Impact value of the aggregate used for _____

(A) Concrete for ordinary use should not be more than 45 %.

(B) Road Pavements Concrete is less than 30 %.

(C) Runway Concrete is less than 30 %.

(D) All the options are correct

052. If the fineness modulus of sand is 3, then the sand is graded as

(A) Very Fine Sand (B) Fine Sand

(C) Medium Sand (D) Coarse Sand

053. Workability of Concrete can be measured by

(A) Slump test (B) Compaction factor test

(C) Vee-Bee consistency test (D) All of the above

054. The grade of concrete corresponding to nominal mix proportions of 1:3:6 is

(A) M-35 (B) M-25

(C) M-15 (D) M-10

055. What is the relationship between elastic constants E, G and K?

(A) E = KG/9K + G (B) E = 9KG/K + G

(C) E = 9KG/K + 3G (D) E = 9KG/3K + G

056. Modulus of elasticity is defined as the ratio of

(A) Shear stress to Shear Strain

(B) Linear stress to linear strain

(C) Lateral strain/linear strain

(D) Linear strain/lateral strain

057. At a Point in a stressed body the principal stresses are 80 MN/m^2 (Tensile) and 40 MN/m^2 (Compressive). Calculate the maximum shear stress at the point.

(A) 40 MN/m^2 (B) 60 MN/m^2

(C) 80 MN/m^2 (D) 120 MN/m^2

058. When a shaft is subjected to pure twisting, the type of stress developed in the shaft is

(A) Bending Stress (B) Axial Stress

(C) Shear Stress (D) Normal Stress

059. A Steel rod of 2 cm^2 area and 1 m in height is subjected to a pull of 40,000 N. If Young's Modulus is 2×10^5 N/mm^2, the elongation of the rod in mm will be

(A) 10
(B) 100
(C) 1
(D) 0.1

060. Principal Stresses at a point in a plane stressed element are $\sigma x = \sigma y = 500$ N/mm^2· Normal stress on the plane inclined at 45° to the X-axis will be

(A) Zero
(B) 500 N/mm^2
(C) 1000 N/mm^2
(D) 707 N/mm^2

061. In a rectangular section, $\tau_{av} = 50$ MPa, what is the shear stress at neutral axis?

(A) 50 MPa
(B) 75 MPa
(C) 90 MPa
(D) None of the above

062. Which of the following theories is suitable for ductile material?

(A) Maximum principal stress theory
(B) Maximum Principal strain theory
(C) Maximum Shear stress theory
(D) Distortion energy theory

063. In case of circular section, with diameter 'd' the section modulus is given as

(A) Π $d^2/16$
(B) Π $d^3/16$
(C) Π $d^3/32$
(D) Π $d^4/64$

064. Which of the following statements is correct?

(A) The stress is the pressure per unit area
(B) The strain is expressed in mm
(C) Hook's law holds good up to the breaking point.
(D) Stress is directly proportional to strain within elastic limit.

065. When the depth of water is from 4.5 m to 6 m, the type of cofferdam used is

(A) Earthen cofferdam
(B) Rockfill cofferdam
(C) Single-walled cofferdam
(D) None of the above

066. The dampness in a building is caused due to

(A) Absorption of moisture by the building materials.
(B) Penetration of rainwater through unprotected tops of walls.
(C) Defective construction
(D) All of the above

067. The Cavity Wall is generally provided for

(A) Preventing Dampness
(B) Heat Insulation
(C) Sound Insulation
(D) All of the above

068. A type of bond in a brick masonry in which each course consists of alternate headers & stretchers, is called

(A) English Bond
(B) Flemish Bond
(C) Stretching bond
(D) Heading bond

069. The Window used with the object of providing light & air to the enclosed space below the roof, is called

(A) Dormer window
(B) Corner window
(C) Bay window
(D) None of the above

070. The outer projecting edge of a tread is termed as

(A) Landing
(B) Balusters
(C) Nosing
(D) Flight

071. The type of Roof truss commonly used for spans varying from 5 m to 9 m is

(A) Queen Post truss
(B) King Post Roof truss
(C) Both (A) and (B)
(D) None of the above

072. In a residential building, kitchen should have_____ aspect.

(A) Eastern
(B) Southern
(C) Northern
(D) None of the above

073. The bricks flooring is used in

(A) Dancing Halls
(B) Godowns
(C) Verandahs
(D) None of the above

074. Period for Removal of formwork of props to slabs: For slabs spanning up to 4.5 m is _____

(A) 7 days
(B) 14 days
(C) 21 days
(D) 28 days

075. The perfect pin Jointed frame should satisfy the equation (Where m = number of members and j = number of joints)

(A) $m = 2j - 4$
(B) $m = 3j - 3$
(C) $m = 3j - 2$
(D) $m = 2j - 3$

076. Influence line diagram is drawn for:

(A) Given loading on structure
(B) Static Unit Load
(C) Moving Unit Load
(D) None of the above

077. Which of the following are the statically indeterminate beams?

(A) Fixed Beams
(B) Continuous beams
(C) Both (A) and (B)
(D) None of the above

078. A Fixed beam of span L is loaded with uniformly distributed load of intensity w/unit length, all through the span. Bending moment at fixed end is

(A) $wL^2/8$
(B) $wL^2/2$
(C) $wL^2/12$
(D) $wL^2/24$

079. The Point of contra flexure is a point where:

(A) Shear force changes sign
(B) Bending moment changes sign
(C) Shear force is maximum
(D) Bending moment is maximum

080. If the far end of the member is fixed, the stiffness of the beam with usual notation is

(A) $2EI/l$
(B) $3EI/l$
(C) $4EI/l$
(D) $5EI/l$

081. In a moment distribution method, the sum of distribution factors for all the members meeting at a joint is always

(A) Equal to Zero
(B) Equal to one
(C) Greater than one
(D) Lesser than one

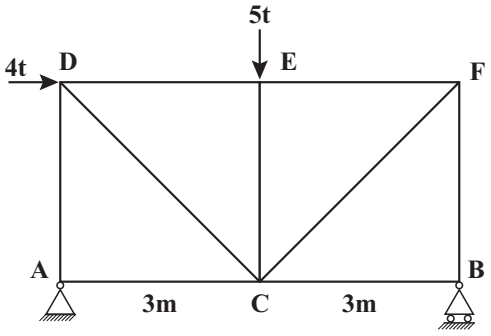
082. A cable is supported at both ends at the same level and is subjected to U.D.L. of intensity w/unit length over the entire span. If y_c is the central dip and 'l' is the span of cable, then horizontal thrust developed at the support is

(A) $wl^3/8y_c$
(B) $wl^2/3y_c$
(C) $wl^2/8y_c$
(D) $wl^2/4y_c$

083. The Flexibility method is also known as the

(A) Energy method
(B) Equilibrium method
(C) Displacement Method
(D) Force Method

084. The force in member AC of the truss shown in fig. is



(A) 5t tension
(B) 4t compression
(C) 4t tension
(D) 5t compression

085. The minimum quantity of cement per meter cube of reinforced concrete for mild exposure is

(A) 150 kg
(B) 250 kg
(C) 350 kg
(D) 300 kg

086. A Reinforced concrete structure has to be constructed along sea coast. The minimum grade of concrete to be used as per IS 456-2000

(A) M15
(B) M20
(C) M25
(D) M30

087. In Limit state design, the limiting value of depth of neutral axis for M 20 and Fe250 is

(A) 0.53 d
(B) 0.48 d
(C) 0.45 d
(D) 0.43 d

088. The minimum thickness of a flat slab required according to IS 456-2000 is

(A) 125 mm
(B) 150 mm
(C) 100 mm
(D) 200 mm

089. The Minimum thickness required at the edge of a footing according to IS:456-2000 is

(A) 230 mm
(B) 150 mm
(C) 100 mm
(D) 450 mm

090. A Shear key is provided in a retaining wall to avoid

(A) Sliding
(B) Overturning
(C) Buckling
(D) None of the above

091. Indian Standards Code recommends a minimum cube strength of _____for pre-tensioned system.

(A) 20 N/mm²
(B) 25 N/mm²
(C) 30 N/ mm²
(D) 40 N/mm²

092. As per IS 1893-2002 Part-I, the approximate fundamental natural period of vibration for Moment-resisting frame building without brick infill panels for RC frame building is taken as (with h and d as height and base width of building in m)

(A) $T_a = 0.075h^{0.75}$
(B) $T_a = 0.075h^{0.95}$
(C) $T_a = 0.085h^{0.70}$
(D) None of the above

093. As per IS 456-2000, the minimum cover required for the design of a water tank in severe exposure condition should not be less than

(A) 30 mm
(B) 45 mm
(C) 50 mm
(D) 75 mm

094. The number of treads in a flight is equal to

(A) Risers in the flight
(B) Risers plus one
(C) Risers minus one
(D) None of the above

095. Which of the following is not a mode of failure in tension member?

(A) Gross Section yielding
(B) Net section rupture
(C) Local buckling
(D) Block shear failure

096. The maximum size of fillet weld applied to the square edge of a plate of thickness greater than 6 mm is

(A) Not more than the thickness of plate
(B) 1.0 mm less than the thickness of plate
(C) 1.5 mm less than the thickness of plate
(D) Half the thickness of plate

097. The minimum edge distance in member with rolled edge is approximately

(A) 1.5 × hole diameter
(B) 1.7 × hole diameter
(C) 2 × bolt diameter
(D) 1.7 × bolt diameter

098. The Slenderness ratio of lacing shall not exceed

(A) 180
(B) 145
(C) 200
(D) 140

099. The maximum permissible vertical deflection of a simply supported beam in non-industrial building if the element is susceptible for cracking is :

(A) Span/360
(B) Span/350
(C) Span/325
(D) Span/300

100. The pitch of roof truss for Corrugated GI Sheets is kept between

(A) 1/3 and 1/6
(B) 1/4 and 1/5
(C) 1/5 and 1/7
(D) 1/6 and 1/8

101. Intermediate vertical stiffeners are provided in plate girders to

(A) Prevent local buckling
(B) Prevent web buckling
(C) Prevent excessive deflection
(D) Prevent flange buckling

102. As per the code, the effective length of a column fixed at both ends is (L = Length of column)

(A) 0.50 L
(B) 0.65 L
(C) 0.85 L
(D) L

103. Limiting vertical deflection of gantry girders carrying EOT cranes with capacity less than 500 kN is

(A) L/500
(B) L/600
(C) L/750
(D) L/1000

104. Structural Members subjected to bending and large axial compressive loads are known as

(A) Strut
(B) Purlin
(C) Beam-Column
(D) Lintel

105. Which of the following is correct dimension for dynamics viscosity(μ)?

(A) MLT^{-1}
(B) $ML^{-1}T^{-1}$
(C) $ML^{2}T^{-1}$
(D) $ML^{-1}T^{-2}$

106. Reynold's number is defined as the

(A) Ratio of Inertia force to gravity force
(B) Ratio of Inertia force to Pressure force
(C) Ratio of Inertia force to Surface Tension
(D) Ratio of inertia force to viscous force

107. A Newtonian fluid is defined as the fluid which

(A) Is incompressible and non-viscous
(B) Obeys Newton's law of viscosity
(C) Is highly viscous
(D) Is compressible and non-viscous

108. Which of the following assumptions are made in the analysis of hydraulic jump?

(A) Loss of head due to friction at the walls and channel bed is negligible.

(B) The Flow is uniform, and the pressure distribution is hydrostatic before and after the jump.

(C) The channel is horizontal, or it has a very small slope.

(D) All of the above

109. If 'm' is hydraulic mean depth and 'd' is a depth of flow, then the discharge through rectangular channel is maximum when

(A) m = d/3

(B) m = d/2

(C) m = 2d

(D) m = 3d/2

110. Venturi meter is used to measure

(A) Discharge

(B) Average velocity

(C) Velocity at a point

(D) Pressure at a point

111. The overall efficiency of turbine is the ratio of

(A) Power delivered to runner to the power supplied at inlet.

(B) Power at the shaft of the turbine to the power delivered by water to the runner

(C) Power available at the shaft of the turbine to the power supplied by the water at the inlet of the turbine.

(D) None of the above

112. Francis turbine is

(A) A Tangential flow impulse turbine

(B) An Inward flow reaction turbine having radial discharge at outlet

(C) Axial flow reaction turbine

(D) None of the above

113. Air vessel in a reciprocating pump is used

(A) To obtain a continuous supply of water at uniform rate

(B) To save a considerable amount of work in overcoming the frictional resistance in the suction & delivery pipe

(C) To run the pump at a high speed without separation

(D) All of the above

114. The drag force experienced by an object is

(A) The component of resultant fluid dynamics force in the flow direction.

(B) The horizontal force due to pressure variation over the surface of object.

(C) The resultant fluid dynamics force acting on the object.

(D) None of the above

115. The odour of water can be determined by

(A) Thermometer
(B) Osmoscope
(C) Jackson's turbid meter
(D) None of the above

116. The Suitable Layout for a water supply distribution system, for towns having rectangular layout of roads.

(A) Dead end system
(B) Grid iron system
(C) Ring system
(D) Radial system

117. Temporary hardness in water is caused by

(A) Bicarbonates of Ca and Mg
(B) Sulphates of Ca and Mg
(C) Chlorides of Ca and Mg
(D) Nitrates of Ca and Mg

118. According to Kuichling's formula, the fire demand (Q) in liters/minute is given by

(A) $Q = 1135((P/5) + 10)$
(B) $Q = 2500((P/5) + 10)$
(C) $Q = 5665\sqrt{P}$
(D) $Q = 3182\sqrt{P}$

119. The maximum permissible total dissolved solids content in water for domestic purposes should not exceed

(A) 300 ppm
(B) 400 ppm
(C) 500 ppm
(D) 1000 mm

120. The effective size of sand particles for rapid sand filters varies from

(A) 0.20 to 0.30 mm
(B) 0.35 to 0.55 mm
(C) 0.60 to 0.65 mm
(D) 0.65 to 0.75 mm

121. The most suitable section of sewer in combined sewerage system is:

(A) Rectangular
(B) Circular
(C) Egg-Shaped
(D) None of the above

122. The Secondary treatment of sewage is carried out by the use of

(A) Screens
(B) Grit chambers
(C) Trickling filters
(D) None of the above

123. BOD_5 represents 5-day biochemical oxygen demand at temperature of:

(A) 0° C
(B) 20° C
(C) 30° C
(D) None of the above

124. A septic tank is

(A) A settling tank
(B) A digestion tank
(C) Both (A) and (B)
(D) None of the above

125. As compared to stream water sea water contains

(A) 10% less dissolved oxygen
(B) 20% less dissolved oxygen
(C) 10% more dissolved oxygen
(D) 20% more dissolved oxygen

126. Which of the following is classified as a secondary Air pollutant?

(A) Sulphur dioxide
(B) Hydrocarbons
(C) Carbon monoxide
(D) Peroxy-acetyl-nitrate (PAN)

127. The acceptable noise level in 'db' for school building is

(A) 45 to 50
(B) 55 to 60
(C) 60 to 65
(D) 65 to 70

128. The aerobic method of composting as practised in India is called

(A) Bangalore Method
(B) Indore Method
(C) Both (A) and (B)
(D) None of the above

129. When the porosity of soil sample is 50 %, the void ratio is

(A) 0
(B) 0.50
(C) 1
(D) 1.5

130. Which of the following methods is best suited for determination of permeability of coarse-grained soils?

(A) Constant Head method
(B) Falling Head Method
(C) Both of the above
(D) None of the above

131. What is the Slope of flow curve?

(A) Liquidity Index
(B) Consistency Index
(C) Flow Index
(D) Plasticity Index

132. The maximum size of particle of clay is

(A) 0.2 mm
(B) 0.02 mm
(C) 0.002 mm
(D) 0.0002 mm

133. Coulomb's earth pressure theory is applicable for

(A) Homogeneous soils only
(B) Non-Homogeneous soils also
(C) Smooth Retaining Wall Only
(D) None of the above

134. An isobar is a curve which

(A) Joins points of equal horizontal stress
(B) Joins points of equal vertical stress
(C) Joins points of zero vertical stress
(D) Joins the points of maximum vertical stress

135. According to Rankine's Formula, the minimum depth of foundation when q = 180 kN/m^2, γ = 20 kN/m^3 and φ = 30° is

(A) 0.5 m
(B) 1 m
(C) 1.5 m
(D) 2.0 m

136. Which of the following assumptions made in the Terzaghi's bearing capacity theory?

(A) The base of footing is rough
(B) The footing is shallow
(C) The shear strength of soil is governed by the Mohr-Coulomb equation
(D) All of the above

137. In case of a counterfort retaining wall, the toe slab acts as a

(A) Cantilever slab
(B) Continuous slab
(C) Simply supported slab
(D) None of the above

138. In stability analysis, the term mobilized shear strength is referred to as

(A) Shear Strength
(B) Maximum shear stress
(C) Applied shear stress
(D) None of the above

139. A distance of 10 m on ground is plotted on a map as 0.5 cm. The representative fraction of the scale is

(A) 1/500
(B) 1/1000
(C) 1/200
(D) 1/2000

140. Surveys which are carried out to show natural features of country such as rivers, hills etc., is

(A) Cadastral survey
(B) Engineering survey
(C) Topographic survey
(D) None of the above

141. The elevation of a benchmark is +100.00. The backsight is taken on a staff held vertically is 2.30 m. If the foresight taken as a point of 'A' is + 2.45 m. then R.L. of 'A' is

(A) +100.15
(B) + 99.85
(C) +102.45
(D) +102.30

142. For a Simple circular curve which one of the following gives the correct relation between the radius R and degree of curve D, for 30m arc length?

(A) R = 5729.6 / D
(B) R = 1718.9 / D
(C) R = 1145.9 / D
(D) R = 572.9 / D

143. If the quadrantal bearing of a line is S 36° 30' W, then the whole circle bearing of the line is

(A) 190° 30'
(B) 170° 30'
(C) 350° 30'
(D) 216° 30'

144. Remote sensing is being used in land use analysis because

(A) Images of large areas can be acquired rapidly

(B) Problem of access is eliminated

(C) It is cheaper as compared to the ground survey

(D) All of the above

145. In GPS, satellites are placed in orbits with orbital radius approximately of

(A) 1500 km

(B) 15200 km

(C) 26600 km

(D) 18400 km

146. One nautical mile is equal to

(A) 1000 m

(B) 1853.18 m

(C) 2000 m

(D) 2012.2 m

147. Rocks formed due to alteration of original structure under heat and excessive pressure are

(A) Sedimentary rocks

(B) Igneous rocks

(C) Metamorphic rocks

(D) None of the above

148. The dam built in a broad valley covered with alluvial deposit is:

(A) Masonry Dam

(B) Earth Dam

(C) Rock-fill dam

(D) None of the above

149. Nagpur Road plan has recommended the use of road pattern type of

(A) Star circular pattern

(B) Star and Grid pattern

(C) Hexagonal pattern

(D) None of the above

150. An index map used in a Highway project shows

(A) The proposed and existing roads and important places to be connected.

(B) Details of alternate alignments.

(C) The general topography of the area.

(D) The general details of existing structures like buildings, well etc.

151. The minimum width of carriage way for a two-lane road without raised curbs is

(A) 7.0 m

(B) 3.75 m

(C) 12.5 m

(D) 15 m

152. Origin and destination studies are carried out for:

(A) Planning of road network for vehicular traffic

(B) Accident studies

(C) Pavement design

(D) Geometric design

153. The value of camber recommended for cement concrete roads in areas of heavy rainfall is

(A) 1 in 25

(B) 1 in 33

(C) 1 in 40

(D) 1 in 50

154. The selection of site for road bridges depends on :

(A) Nature of river banks and appropriate arches

(B) Width and depth of river at site to be bridged

(C) Availability of good and safe foundation for bridge

(D) All of the above

155. In 70-R Loading, the minimum spacing between successive vehicle is

(A) 30 m

(B) 40 m

(C) 60 m

(D) 70 m

156. As per I.R.C. recommendations, the approaches should have at least a minimum straight length of _____ on either side of a bridge

(A) 6 m

(B) 10 m

(C) 15 m

(D) 30 m

157. In case of long tunnels, the drainage system consists of sump wells which are located at a regular interval of about

(A) 50 m to 100 m

(B) 100 m to 200 m

(C) 200 m to 300 m

(D) 300 m to 500 m

158. Which one of the following tunneling methods is used for laying underground sewers?

(A) Needle Beam Method

(B) German Method

(C) Army Method

(D) None of the above

159. In River training work for bridge up to a height of about 12 m, the embankment is constructed _____

(A) Parallel to the river banks

(B) Transverse to the river banks

(C) Inclined to the river banks

(D) None of the above

160. The discharge per unit drawdown at a well is known as

(A) Specific Yield
(B) Specific Storage
(C) Safe Yield
(D) Specific Capacity

161. The standard Symons type rain gauge has a collecting area of diameter

(A) 12.7 cm
(B) 10 cm
(C) 5.08 cm
(D) 25.4 cm

162. The Probable Maximum Flood is

(A) The standard project flood of an extremely large river
(B) A Flood adopted in the design of all kinds of spillways
(C) An extremely large but physically possible flood in the region
(D) The maximum possible flood that can occur anywhere in the country

163. A Unit Hydrograph has one unit of

(A) Peak Discharge
(B) Rainfall Duration
(C) Direct Runoff
(D) None of the above

164. A geological formation which is essentially impermeable to the flow of water.

(A) Aquifer
(B) Aquiclude
(C) Aquitard
(D) Aquifuge

165. For No tension to develop in the gravity dam the eccentricity 'e' of the resultant force should be

(A) Less than b / 3
(B) Less than b / 6
(C) Less than b / 4
(D) Less than b / 12

166. Which of the following is a factor causing waterlogging of a land?

(A) Over and Intensive Irrigation
(B) Seepage of water from the Adjoining High Lands
(C) Seepage of water through the canals
(D) All of the above

167. A Super passage is a cross drainage work provided to carry a natural drain over a canal when

(A) bed of the natural drain is at the same level as the canal bed.
(B) bed of the natural drain is well above the canal F.S.L.
(C) bed of the natural drain is below the canal F.S.L.
(D) bed of the natural drain is below the canal bed.

168. Silt excluders are constructed:

(A) on the river bed downstream of the head regulator

(B) on the river bed upstream of the head regulator

(C) on the canal bed downstream of the canal head regulator

(D) none of the above

169. According to Lacey's theory the bed slope 'S' for a regime channel is given by:

(A) $(f^{4/3})/(3330\ Q^{1/2})$

(B) $(f^{5/3})/(3340\ Q^{1/6})$

(C) $(f^{2/3})/(3340\ Q^{1/2})$

(D) $(f^{1/3})/(3360\ Q^{1/2})$

170. The optimistic time, pessimistic time and most likely time required for completion of activity is 6, 16 and 8 days respectively. The expected time is

(A) 9 days

(B) 5 days

(C) 6.5 days

(D) 7 days

171. Which of the following network is Event oriented?

(A) PERT

(B) CPM

(C) Both (A) and (B)

(D) None of the above

172. Which of the following equipment is used for deep pits excavation in soft earth?

(A) Clamshell

(B) Backhoes

(C) Shovels

(D) None of the above

173. In India, every first week of _____ is celebrated as Road Safety Week.

(A) February

(B) January

(C) March

(D) December

174. Safety Management at construction sites aims at minimizing casualties and damage to manpower by

(A) Ensuring Safe Working Environment through well-Planned Safety Policy.

(B) Organized enforcement of safety measures.

(C) Creating safety awareness through education & training.

(D) All of the above.

175. Which of the following is the purpose of Rate Analysis?

(A) To determine the actual cost per unit of item

(B) To examine the item for economic processes and economic uses of materials involved in making the item.

(C) Both (A) and (B)

(D) None of the above

176. While submitting tender by three envelope method, which envelope contains the priced tender form with the signature of tenderer?

(A) Envelope: 3
(B) Envelope: 1 and 2
(C) Envelope: 1
(D) None of the above

177. Which of the following represents the requirements of valid contract?

a. Lawful Subject Matter
b. Legally competent parties
c. Valid consideration
d. Free consent

(A) (a) and (b) of the above
(B) (a) and (c) of the above
(C) (c) and (d) of the above
(D) (a), (b), (c) and (d) of the above

178. Which of the following is a purpose of work scheduling?

(A) To Simplify the project plan
(B) To optimize the resources employed
(C) To forecast the input resources and predict the output
(D) All of the above

179. What does the direct cost of project include?

(A) Labour Cost
(B) Material Cost
(C) Equipment Cost
(D) All of the above

180. What is the height of statue of Unity that is located in Gujarat?

(A) 93 m
(B) 120 m
(C) 153 m
(D) 182 m

181. The method of growing crops on ridges, running on the sides of water ditches, is known as:

(A) Flood Irrigation
(B) Furrow Irrigation
(C) Check Irrigation
(D) None of the above

182. Which of the following properties ceramics do not possess?

(A) Hardness
(B) Brittleness
(C) Elasticity at low temperature
(D) Malleability

183. The construction of formwork normally involves the following operation.

(A) Propping and Centering
(B) Shuttering
(C) Provision of camber
(D) All of the above

184. The specifications for base concrete of flooring for low cost housing project.

(A) 75 mm thick cement concrete 1:5:10

(B) 40 mm thick cement concrete 1:5:10

(C) 75 mm thick cement concrete 1:2:4

(D) 40 mm thick cement concrete 1:2:4

185. The _____ is made of steel sheet piles and this type of cofferdam is proved successful in unwatering large areas.

(A) Suspended cofferdam

(B) Cellular cofferdam

(C) Dikes

(D) Concrete cofferdam

186. The earth's water circulatory system is known as

(A) water cycle

(B) hydrologic cycle

(C) precipitation cycle

(D) all of the above

187. Where steep land is available, the method of irrigation adopted is

(A) free flooding

(B) border flooding

(C) check flooding

(D) basin flooding

188. The commonly used rain gauge is

(A) weighing bucket type

(B) tipping bucket type

(C) float type

(D) none of the above

189. According to Fanning's formula, the flood discharge (Q) in cumecs is given by

(A) $Q = CA^{2/3}$

(B) $Q = CA^{3/4}$

(C) $Q = CA^{5/6}$

(D) $Q = CA^{7/8}$

190. The canal aligned approximately parallel to the natural drainage of a country is called

(A) side slope canal

(B) contour canal

(C) watershed canal

(D) ridge canal

191. The Sardar Sarovar Dam is associated with

(A) Tapi River

(B) Narmada River

(C) Both (A) and (B)

(D) None of the above

192. Site order book is used for recording

(A) instructions of the executive engineer

(B) construction measurements

(C) requisition of plants and equipment

(D) indents for materials to be ordered

193. What is the Catchment area of Dharoi Dam in Gujarat?

(A) 5475 sq-km
(B) 7554 sq-km
(C) 5220 sq-km
(D) None of the above

194. Who among the following was the architect of Laxmi Vilas Palace of Vadodara?

(A) Le Corbusier
(B) Edwin Lutyens
(C) Robert Chisholm
(D) William Emerson

195. Which of the following is the UNESCO world heritage sites in Gujarat?

(A) Rani Ki Vav
(B) Dholavira
(C) Champaner-Pavagadh
(D) All of the above

196. Hazard markers reflecting yellow light should be visible from a long distance of about

(A) 150 m
(B) 100 m
(C) 200 m
(D) None of the above

197. Stop Sign Comes Under

(A) Regulatory Signs
(B) Cautionary Signs
(C) Informative Signs
(D) None of the above

198. In PERT technique, completion of an activity is called

(A) head activity
(B) head event
(C) tail activity
(D) tail event

199. Pedestrians can cross the road _____

(A) Anywhere
(B) Near the signals
(C) At Zebra Crossing
(D) None of the above

200. For a design speed of 40 kmph the recommended value of weaving length is

(A) 30 to 60 m
(B) 45 to 90 m
(C) 90 to 120 m
(D) None of the above

201. What does the following Road Sign indicates?

(A) Access to a vehicle up to 3.5 m height
(B) Access to a vehicle up to 3.5 m length
(C) Both of the above are wrong
(D) Both of the above are right

202. Which of the following concrete has ability to heal its crack?

(A) High Performance Concrete
(B) Bacterial Concrete
(C) Shotcrete
(D) Self-Compacting Concrete

203. Which of the following modelling can be done through BIM?

(A) MEP System
(B) Sustainability
(C) Management
(D) All of the above

204. Generally, water supply projects are designed for a design period of

(A) 5 to 10 years
(B) 10 to 20 years
(C) 20 to 40 years
(D) 40 to 60 years

205. The following is the effect of Nitrates impurities present in water

(A) Blue baby conditions
(B) Corrosiveness
(C) Toxic effect on heart, nerves
(D) Dental flurosis

206. In the Water Treatment Plant, following process is adopted to remove colloidal impurities

(A) Screening
(B) Aeration
(C) Sedimentation
(D) Filtration

207. Acceptable limit of Chlorides (as Cl) for drinking water as per IS 10500: 2012 is

(A) 250 mg/l
(B) 300 mg/l
(C) 600 mg/l
(D) 1000 mg/l

208. The following water distribution system is suitable for irregular developing town or city

(A) Dead-end
(B) Grid-iron
(C) Circular
(D) Radial

209. Which of the following is used for measuring the Turbidity of water in the field?

(A) Jackson's Turbidimeter
(B) Baylis Turbidimeter
(C) Nephelometer
(D) Turbidity Rod

210. The sewerage system originates from

(A) outfall sewer
(B) main sewer
(C) house sewer
(D) lateral sewer

211. The most common method of wastewater disposal is

(A) Evaporation
(B) Dilution in surface water
(C) Rapid infiltration
(D) Application in irrigation

212. If the sewage contains greases and fatty oils, they are removed in

(A) Grit chambers
(B) Detritus tanks
(C) Sedimentation tanks
(D) Skimming tanks

213. For the design of sewers in India, the percentage of sewage discharge is assumed as

(A) 25-30% of water supplied from waterworks
(B) 50-70% of water supplied from waterworks
(C) 75-80% of water supplied from waterworks
(D) 100% of water supplied from waterworks

214. Activated sludge is the

(A) aerated sludge in the aeration tank
(B) sludge settled in the humus tank
(C) sludge in the secondary tank after aeration and rich in microbial mass
(D) sludge in the secondary tank after aeration and rich in nutrients

215. Leachate is a coloured liquid that comes out of

(A) septic tanks
(B) sanitary landfills
(C) compost plants
(D) aerated lagoons

216. Acceptable noise level for residential and business urban areas as per IS: 4954-1968 is

(A) 25-35 dB
(B) 40-50 dB
(C) 50-60 dB
(D) 70-80 dB

217. The primary air pollutant which is formed due to incomplete combustion of organic matter is

(A) methane
(B) sulphur dioxide
(C) ozone
(D) carbon monoxide

218. Sandstone is

(A) sedimentary rock
(B) metamorphic rock
(C) extrusive igneous rock
(D) intrusive igneous rock

219. A 1st class brick immersed in water for 24 hours, should not absorb water (by weight) more than

(A) 10%
(B) 15%
(C) 20%
(D) 25%

220. Bulking of sand is caused due to

(A) surface moisture
(B) air voids
(C) viscosity
(D) clay contents

221. The lime which contains mainly calcium oxide and slacks with water is

(A) fat lime
(B) quick lime
(C) hydraulic lime
(D) poor lime

222. If p is the standard consistency of cement, the amount of water used in conducting the initial setting time test on cement is

(A) 0.65 p
(B) 0.85 p
(C) 0.6 p
(D) 0.78 p

223. The moisture content recommended for doors is

(A) 4-8%
(B) 8-14%
(C) 12-20%
(D) 2-4%

224. The split tensile strength of M 15 grade concrete when expressed as percentage of its compressive strength is

(A) 10-15%
(B) 15-20%
(C) 20-25%
(D) 25-30%

225. The ratio of Young's modulus of high tensile steel to that of mild steel is about

(A) 0.5
(B) 1.0
(C) 1.5
(D) 2.0

226. What is the minimum value of test results (in N/mm^2) for compressive strength compliance requirement for M 20 grade concrete for standard deviation of 0.36 as per IS code provisions?

(A) $f_{ck} - 1$
(B) $f_{ck} - 3$
(C) $f_{ck} - 4$
(D) $f_{ck} - 5$

227. Newton's law of viscosity states that

(A) Shear stress is directly proportional to the velocity
(B) Shear stress is directly proportional to the velocity gradient
(C) shear stress is directly proportional to shear strain
(D) shear stress is directly proportional to the viscosity

228. Reynold's number is defined as the

(A) ratio of inertia force to gravity force
(B) ratio of viscous force to gravity force
(C) ratio of viscous force to elastic force
(D) ratio of inertia force to viscous force

229. Lift force (F_L) is expressed mathematically, as

(A) $F_L = (\rho U^2 \times C_L)/2$
(B) $F_L = (\rho U^2 \times C_L \times A)/2$
(C) $F_L = 2\ \rho U^2 \times C_L \times A$
(D) $F_L = \rho U^2 \times C_L \times A$

230. Drag is defined as the force exerted by a flowing fluid on a slid body
(A) in the direction of flow
(B) perpendicular to the direction of flow
(C) in the direction which is at an angle of 45° to the direction of flow
(D) in the opposite direction of flow

231. If the density of a fluid changes from point to point in a flow region, it is called
(A) steady flow
(B) unsteady flow
(C) non-uniform flow
(D) compressible flow

232. The boundary layer takes place
(A) for ideal fluids
(B) for pipe flow only
(C) for real fluids
(D) for flow over flat plate only

233. The critical depth (h_c) is given by, where q = Rate of flow per unit width of channel
(A) $(q^2 / g)^{1/2}$
(B) $(q / g)^{1/3}$
(C) $(q^2 / g)^{1/3}$
(D) $(q^2 / g)^{2/3}$

234. Francis turbine is
(A) an impulse turbine
(B) a radial flow impulse turbine
(C) an axial flow turbine
(D) a reaction radial flow turbine

235. The work saved by fitting an air vessel to a single acting reciprocating pump is
(A) 39.2%
(B) 84.4%
(C) 48.8%
(D) 92.3%

236. A pump is defined as a device which converts
(A) Hydraulic energy into mechanical energy
(B) Mechanical energy into hydraulic energy
(C) Kinetic energy into mechanical energy
(D) Electrical energy into mechanical energy

237. Which type of hydro power plant can be with or without pondage?
(A) Mini hydel plants
(B) Pump storage power plants
(C) Low head plants
(D) Run-off river power plants

238. In order to determine the natural features such as valleys, rivers, lakes etc., the surveying preferred is
(A) City surveying
(B) Location surveying
(C) Cadastral surveying
(D) Topographical surveying

239. The method of measuring distance by pacing is chiefly used in

(A) reconnaissance surveys
(B) preliminary surveys
(C) location surveys
(D) all of the above

240. A vertical curve is designed on the basis of the

(A) radius of the curve
(B) minimum sight distance
(C) change of gradient
(D) all of the above

241. A 20 m chain is divided into

(A) 150 links
(B) 100 links
(C) 200 links
(D) 50 links

242. For taking an oblique offset which makes an angle of 45° with the chain line, the instrument used is the

(A) Adjustable cross-staff
(B) Open cross-staff
(C) French cross-staff
(D) All of the above

243. What will be the length of the baseline in case of short baseline method of GPS surveying?

(A) Less than 50 km
(B) Greater than 50 km
(C) Less than 2 km
(D) Greater than 100 km

244. The lens used in aerial photogrammetry is having a maximum coverage capacity of

(A) 93°
(B) 63°
(C) 53°
(D) 98°

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

(A) Geographical Information System
(B) Global Positioning System
(C) Passive Remote Sensing
(D) Active Remote Sensing

246. Which of the following is used while selecting an alignment for railway line?

(A) Compass
(B) Traversing
(C) Theodolite
(D) Soil survey

247. Basalt is a dark coloured igneous rock which is extensively used as road metal. Its crushing strength lies between

(A) 1000 – 2000 kg/cm^2
(B) 2000 – 3000 kg/cm^2
(C) 3000 – 4000 kg/cm^2
(D) 4000 – 5000 kg/cm^2

248. Rocks formed due to alteration of original structure under heat and excessive pressure are

(A) sedimentary rocks
(B) igneous rocks
(C) metamorphic rocks
(D) none of the above

249. Design of horizontal and vertical alignments, super elevation, sight distance and grades, is worst affected by

(A) width of the vehicle
(B) length of the vehicle
(C) height of the vehicle
(D) speed of the vehicle

250. In which method of traffic volume counts, Pneumatic tube is used?

(A) Manual count
(B) Combination of manual and mechanical methods
(C) Automatic devices
(D) Photographic method

251. For highway geometric design purposes the speed used is

(A) 15^{th} percentile
(B) 50^{th} percentile
(C) 85^{th} percentile
(D) 98^{th} percentile

252. Modes of transportation are typically evaluated on the basis of all of the following criteria except

(A) accessibility
(B) perishability
(C) capability
(D) dependability

253. If the porosity of a soil sample is 20%, the void ratio is

(A) 0.25
(B) 0.20
(C) 0.5
(D) 1.00

254. The deformation of the bar per unit length in the direction of the force is known as

(A) linear strain
(B) lateral strain
(C) volumetric strain
(D) shear strain

255. If the crushing stress in the material of a mild steel column is 3300 kg/cm^2, Euler's formula for crippling load is applicable for slenderness ratio equal to/greater than

(A) 40
(B) 50
(C) 60
(D) 80

256. A determinate structure

(A) cannot be analyzed without the correct knowledge of modulus of elasticity
(B) must necessarily have roller support at one of its ends
(C) requires only statical equilibrium equations for its analysis
(D) will have zero deflection at its ends

257. The analysis of statically indeterminate structures by the unit load method is based on

(A) Consistent deformation
(B) Stiffness method
(C) Consistent force
(D) None of the above

258. The three moment equation in structural analysis is basically a

(A) Stiffness method
(B) Displacement method
(C) Energy method
(D) Flexibility method

259. A suspension bridge with a two-hinged stiffening girder is

(A) statically determinate
(B) indeterminate of one degree
(C) indeterminate of two degree
(D) a mechanism

260. The moment distribution method in structural analysis can be treated as

(A) Force method
(B) Displacement method
(C) Flexibility method
(D) None of the above

261. For steady-state forced vibrations, the phase lag at resonance is

(A) 0°
(B) 45°
(C) 90°
(D) 180°

262. In influence line diagrams (ILD)

(A) Points remain fixed, position of load changes
(B) Points change, position of loads remains fixed
(C) Both of them change
(D) Neither of them changes

263. Limit State Method is based on _____

(A) calculations on service load conditions alone
(B) calculations on ultimate load conditions alone
(C) calculations at working loads and ultimate loads
(D) calculations on earthquake loads

264. Which of the following relation is correct?

(A) Design Load = Characteristic Load
(B) Design Load = Characteristic Load + Partial factor of safety
(C) Design Load = Characteristic Load / Partial factor of safety
(D) Design Load = Characteristic Load × Partial factor of safety

265. The steel beam of light sections placed in plain cement concrete are called

(A) joists
(B) simple joists
(C) filler joists
(D) concrete joists

266. As per IS:800-1984, the maximum thickness of plate girder web plate should not be less than _____ for vertically stiffed webs. (Where d = clear depth of plate girder)

(A) d / 85
(B) d / 200
(C) d / 250
(D) d / 400

267. Gantry girders are designed to resist

(A) lateral loads
(B) longitudinal loads
(C) lateral and longitudinal loads
(D) lateral, longitudinal and vertical loads

268. Which of the following is a best compression member section?

(A) Single angle section
(B) Double angle section
(C) I-section
(D) Tubular section

269. The built-up sections are used because they provide

(A) large cross-sectional area
(B) special shape and depth
(C) sufficient large radius of gyration
(D) all of the above

270. In roof trusses, the most frequently used section is

(A) two-angle sections placed back to back
(B) two channel sections placed back to back
(C) two channel sections placed at a distance apart
(D) four angle section

271. Which of the following is not a mode of failure in tension member?

(A) Gross-section yielding
(B) Net section rupture
(C) Local buckling
(D) Block shear failure

272. Second-order moments are created in beam-columns due to

(A) P-δ effects
(B) P-Δ effects
(C) due to both
(D) none of the above

273. Maximum area of tension reinforcement in beams shall not exceed

(A) 0.04 bD
(B) 0.02 bD
(C) 0.08 bD
(D) 1.10 bD

274. As per I.S. 456 recommendations the total thickness of flat slab should not be less than

(A) 8.5 cm
(B) 10 cm
(C) 12.5 cm
(D) 15 cm

275. The propagation of a shear crack in a pre-stressed concrete member depends upon

(A) tensile reinforcement
(B) compression reinforcement
(C) shear reinforcement
(D) shape of the cross-section of beam

276. The factor of safety due to sliding of the retaining wall is generally taken as

(A) 1
(B) 1.5
(C) 2
(D) 4

277. The dead weight of a stair consists of

(A) dead weight of waist slab
(B) dead weight of steps
(C) dead weight of stringer beam
(D) all of the above

278. As per IS: 456-1978, the permissible value of bond stress for M15 grade of concrete is limited to

(A) 0.5 N/mm^2
(B) 1 N/mm^2
(C) 1.5 N/mm^2
(D) 2 N/mm^2

279. According to IS: 456-1978, the thickness at the edge in reinforced concrete footings shall not be less than _____ for footings on soils.

(A) 100 mm
(B) 150 mm
(C) 250 mm
(D) 350 mm

280. For circular tanks, the height 'h' above base upto which cantilever action exists is taken as

(A) Height of the tank (H)
(B) H/3
(C) 1 m
(D) H/3 or 1 m whichever is more

281. In case of lintel design, the load enclosed in an equilateral triangle is fully transferred to the lintel provided the height of wall above lintel is

(A) not less than 1.25 times the height of equilateral triangle
(B) less than twice the height of equilateral triangle
(C) less than 1.25 times the height of equilateral triangle
(D) greater than twice the height of equilateral triangle

282. For earthquake resistant masonry buildings, where seismic coefficient is less than 0.08, the horizontal distance between two openings shall not be less than

(A) Vt × height of shorter opening

(B) Vt × height of longer opening

(C) Vi × height of shorter opening

(D) Vi × height of longer opening

283. Which one of the following rollers is suitable for soil cement stabilized road construction?

(A) Vibratory roller

(B) Sheepfoot roller

(C) Pneumatic roller

(D) Smooth wheel roller

284. The time by which the completion of an activity can be delayed without affecting the start of succeeding activity is called

(A) Total float

(B) Interfering float

(C) Independent float

(D) Free float

285. In PERT technique, completion of an activity is called

(A) head activity

(B) head event

(C) tail activity

(D) tail event

286. Site order book is used for recording

(A) instructions of the executive engineer

(B) construction measurements

(C) requisition of plants and equipment

(D) indents for materials to be ordered

287. The main function of the construction management is

(A) planning

(B) organising

(C) directing

(D) all of the above

288. The pre-tender stage of construction requires

(A) selection of site

(B) acquisition of land

(C) finalization of designs

(D) all of the above

289. Equipment job productivity is calculated by

(A) Work done units + efforts in equipment hours

(B) Work done units – efforts in equipment hours

(C) Work done units × efforts in equipment hours

(D) Work done units / efforts in equipment hours

290. The shear reinforcement in RCC is provided to resist

(A) diagonal tension
(B) diagonal compression
(C) horizontal shear
(D) vertical shear

291. The approximate Calcium oxide composition limits of Ordinary Portland cement is

(A) 60 – 67%
(B) 17 – 25%
(C) 3 – 8%
(D) 0.1 – 4%

292. The compound which is responsible for early strength of concrete is

(A) C_3S
(B) C_2S
(C) C_3A
(D) C_4AF

293. The water stored in the reservoir below the minimum pool level is called

(A) Useful storage
(B) Dead storage
(C) Conservation storage
(D) Flood mitigation storage

294. The precipitation which is caused by lifting of an air mass due to the pressure difference is called

(A) Natural Precipitation
(B) Organic Precipitation
(C) Convective Precipitation
(D) Cyclonic Precipitation

295. Which of this is not a minor method of disinfection of water?

(A) Treatment with excess lime
(B) Treatment with Iodine and Bromine
(C) Treatment with Potassium permanganate
(D) Treatment with Aluminum powder

296. The Total Dissolved Solids (TDS) of the Swimming pool should not exceed

(A) 500 mg/L
(B) 1500 mg/L
(C) 750 mg/L
(D) 2000 mg/L

297. Lustre doesn't depend on

(A) Refractive index mineral
(B) Absorption of mineral
(C) Transmittance of mineral
(D) Nature of reflecting surface

298. 'Representative Fraction' (RF) is defined as

(A) Length of an object in the drawing / Actual length of the object

(B) Length of an object in the drawing / Isometric length of the object

(C) Actual length of the object / Length of an object in the drawing

(D) Isometric length of the object / Length of an object in the drawing

299. The isometric projection of a circle is a

(A) Circle

(B) Ellipse

(C) Parabola

(D) Hyperbola

300. The igneous rock rich in cavities is

(A) Granite

(B) Basalt

(C) Gabbro

(D) Dolomite
