GPSC

Previous Year Paper

GES PYP Paper 2-2017

ESP-2 (PAPER-2)

PROVISIONAL ANSWER KEY

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Note:-

(1) All Suggestions are to be sent with reference to website published Question paper with Provisional Answer Key Only.
(2) All Suggestions are to be sent in the given format only.
(3) Candidate must ensure the above compliance.

(૧) ઉમેદવારે વાંધા-સૂચનો રજૂ કરવા વેબસાઇટ પર પ્રસિધ્ધ થયેલ નિયત નમૂનાનો ઉપયોગ કરવો.

(૨) ઉમેદવારોએ પોતાને પરીક્ષામાં મળેલ સીરીઝની પ્રશ્નપુસ્તિકામાં છપાયેલ પ્રશ્ન ક્રમાંક મુજબ વાંધા-સૂચનો રજૂ ન કરતા તમામ વાંધા-સૂચનો વેબસાઇટ પર પ્રસિધ્ધ થયેલ પ્રોવિઝનલ આન્સર કીના પ્રશ્ન ક્રમાંક મુજબ અને તે સંદર્ભમાં રજૂ કરવા

(૩) ઉમેદવારોએ ઉક્ત સૂચનાનું અચૂક પાલન કરવું અન્યથા વાંધા-સૂચનો અંગે કરેલ રજૂઆતો ધ્યાને લેવાશે નહી.

001. The true length of a line is known to be 200 m. When this is measured with a 20 m tape, the length is 200.80 m. The correct length of the 20 m tape is

(A) 19.92 m
(B) 19.98 m
(C) 20.04 m
(D) 20.08 m

002. The magnitude of the sag correction during measurement of length by chaining is proportional to the

(A) Cube of the weight of the chain, in kg per m run
(B) Cube root of the weight of the chain, in kg per m run
(C) Square of the weight of the chain, in kg per m run
(D) Square root of the weight of the chain, in kg per m run

003. A rectangular plot of 16 km^2 in area is shown on a map by a similar rectangular area of 1 cm^2. The Representative Fraction of the scale to measured a distance of 40 km will be

(A) 1/1600
(B) 1/400000
(C) 1/400
(D) 1/16000

004. In reciprocal levelling, the error which is not completely eliminated, is due to

(A) earth's curvature
(B) non-adjustment of line of collimation
(C) refraction
(D) non-adjustment of the bubble tube.

005. Imaginary line passing through points having equal magnetic declination is termed as

(A) isogonic line
(B) agonic line
(C) isoclinic line
(D) aclinic line

006. To find the RL of a roof slab of a building, staff readings were taken from a particular set-up of the leveling instrument. The readings were 1.050 m with staff on the Bench Mark and 2.300 m with staff below the roof slab and held inverted. Taking the RL of the Bench Mark as 135.15 m, the RL of the roof slab will be

(A) 136.400 m
(B) 131.800 m
(C) 133.900 m
(D) 138.500 m

007. Consider the following:

(i) Line ranger
(ii) Reciprocal Ranging
(iii) Random line ranging
(iv) Optical square

Which of these are employed to solve the problem of vision obstructed but chaining free?

(A) (i), (ii), (iii) and (iv)
(B) (ii) and (iii) only
(C) (ii) and (iv) only
(D) (iii) and (iv) only

008. The arithmetic check for the computation of RL by 'Rise and Fall' method is given by

(A) $\Sigma FS - \Sigma BS$ = RL of last station point – RL of first station point = $\Sigma Fall - \Sigma Rise$
(B) $\Sigma BS - \Sigma FS$ = RL of first station point – RL of last station point = $\Sigma Rise - \Sigma Fall$
(C) $\Sigma BS - \Sigma FS$ = RL of last station point – RL of first station point = $\Sigma Rise - \Sigma Fall$
(D) $\Sigma BS - \Sigma FS$ = RL of first station point – RL of last station point = $\Sigma Fall - \Sigma Rise$

009. A level when set up 25 m from peg A and 50 m from peg B reads 2.847 m on staff held on A and 3.462 m on staff held on B, keeping bubble at its centre while reading. If the reduced levels of A and B are 283.665 m and 284.295 m respectively, what is the collimation error per 100.0 m

(A) 0.015 m
(B) 0.030 m
(C) 0.045 m
(D) 0.060 m

010. The reduced bearing of a line is N 87°W. Its whole circle bearing is

(A) 93°
(B) 87°
(C) 3°
(D) 273°

011. Measuring with a 30 m chain which is 0.01 m too short introduces a

(A) positive compensating error
(B) negative compensating error
(C) positive cumulative error
(D) negative cumulative error

012. The sensitiveness of a bubble tube in a theodolite would decrease if
(A) the viscosity of the liquid is increased
(B) the radius of curvature of the internal surface of the tube is increased
(C) the diameter of the tube is increased
(D) the length of the vapour bubble is increased.

013. Which of the following is carried out by the two theodolite method?
(A) Circular curve ranging (B) Tacheometric survey
(C) Geodetic survey (D) Astronomical survey

014. The whole circle bearing of line AB and AC are 20°15′ and 337°45′ respectively. What is the value of the included angle BAC?
(A) 317°30′ (B) 42°30′
(C) 358° (D) 177°

015. The intercept of a staff
(A) is maximum if the staff is held truly normal to the line of sight.
(B) is minimum if the staff is held truly normal to the line of sight
(C) decreases if the staff is tilted away from normal
(D) increases if the staff is tilted towards normal

016. A bearing of a line is also known as
(A) reduced bearing (B) true bearing
(C) magnetic bearing (D) azimuth

017. Keeping the instrument height as 1.5 m, height of staff 4 m, the slope of the ground as 1 in 10, the sight distance on the down-slope must be less than
(A) 25 m (B) 30 m
(C) 15 m (D) 20 m

018. A negative declination shows that the magnetic meridian is to the
(A) eastern side of the true meridian
(B) western side of the true meridian
(C) southern side of the true meridian
(D) northern side of the true meridian

019. The horizontal angle between the true meridian and magnetic meridian at a place is called.

(A) azimuth
(B) declination
(C) local attraction
(D) magnetic bearing

020. Match list I with list II and select the correct answer using the codes given below the lists:

List I	List II
(a) Adjustment of surveying instruments	(i) Bringing the various fixed parts of the instrument into proper relation with one another
(b) Bowditch Rule	(ii) Solution of 3-point problem
(c) Triangulation	(iii) measuring all the angles and the base line
(d) Bessel's method	(iv) Balancing the latitudes and departures

(A) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)
(B) (a)-(ii), (b)-(iv), (c)-(i), (d)-(iii)
(C) (a)-(i), (b)-(iv), (c)-(iii), (d)-(ii)
(D) (a)-(iii), (b)-(ii), (c)-(i), (d)-(iv)

021. A graph showing reflectance characteristics with respect to wavelength is called

(A) Spectral reflectance curve
(B) Spectral signature
(C) Spectral Band
(D) Spectral Emissivity curve

022. Which of the following methods of leveling eliminates the error due to curvature and refraction?

(A) Fly levelling
(B) Reciprocal levelling
(C) Check levelling
(D) Precise levelling

023. On a conformal projection

(A) the shape of any small geographical area is preserved
(B) equivalent map maintains true relationships of area, at a given scale, for every part as well as the whole
(C) the scale is preserved in the direction perpendicular to the line of zero distortion
(D) the scale is preserved in the direction radially outward from a point of zero distortion.

024. Remote sensing of the earth's surface is done by making use of the properties of which types of electromagnetic waves.

(a) Emitted
(b) Reflected
(c) Diffracted
(d) Absorbed

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

025. The remotely sensed data has errors due to the following:

(A) Imaging characteristics of the sensor
(B) Stability and orbit characteristics of the platform
(C) Motion of the earth
(D) Atmospheric effects

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

026. When was the Water (Prevention and Control of Pollution) act enacted by the Indian Parliament.

(A) 1970
(B) 1974
(C) 1980
(D) 1985

027. The daily per capita consumption of water apparently increases with

(a) Higher standard of living
(b) Availability of sewerage in the city
(c) Metered water supply
(d) Wholesome and potable quality of water

Which of these statements are correct?

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

028. If the total hardness and alkalinity of a sample of water are 300 mg/l and 100 mg/l (as $CaCO_3$) respectively, then its carbonate and non-carbonate hardness will be respectively.

(A) 100 mg/l and 200 mg/l
(B) 400 mg/l and 300 mg/l
(C) 100 mg/l and 400 mg/l
(D) 400 mg/l and 0 mg/l

029. Electrical conductivity (EC) of water and total dissolved solids (TDS) are interrelated. The value of EC will

(A) decrease with increase in TDS

(B) increase with increase in TDS

(C) decrease initially and then increase with increase in TDS

(D) increase initially and then decrease with increase in TDS

030. Which one of the following would contain water with the maximum amount of turbidity

(A) Lakes (B) Oceans

(C) Rivers (D) Wells

031. Match List-I (parameters) with List-II (Permissible concentrations in drinking water) and select the correct answer using the codes given below the lists:

List I		List II
(a) Hardness	(i)	0.3 mg/l
(b) Chlorides	(ii)	200 mg/l
(c) Iron	(iii)	250 mg/l
(d) Fluoride	(iv)	0.1 mg/l

(A) (a)-(ii), (b)-(iii), (c)-(i), (d)-(iv)

(B) (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)

(C) (a)-(iii), (b)-(ii), (c)-(i), (d)-(iv)

(D) (a)-(iii), (b)-(ii), (c)-(iv), (d)-(i)

032. Match List-I (parameters) and List-II (diseases) and select the correct answer using the codes given below the lists:

List I		List II
(a) Absence of fluorides	(i)	Methaemoglobinemia
(b) Excess of lead	(ii)	Goitre
(c) Presence of excess nitrate	(iii)	Dental caries
(d) Absence of iodide	(iv)	Anaemia

(A) (a)-(iii), (b)-(iv), (c)-(i), (d)-(ii)

(B) (a)-(ii), (b)-(iii), (c)-(i), (d)-(iv)

(C) (a)-(iii), (b)-(ii), (c)-(i), (d)-(iv)

(D) (a)-(iii), (b)-(iv), (c)-(ii), (d)-(i)

033. If the methyl orange alkalinity of water equals or exceeds total hardness, all of the hardness is

(A) Non-carbonate hardness

(B) Carbonate hardness

(C) Pseudo hardness

(D) Negative none-carbonate hardness

034. One Nephelometry Turbidity Unit is equal to the turbidity produced by

(A) 1 mg of SiO_2 dissolved in 1 litre of distilled water with the test being run according to absorption principle.

(B) 1 mg of SiO_2 dissolved in 1 litre of distilled water with the test being run according to scattering principle.

(C) 1 mg of Formazin dissolved in 1 litre of distilled water with the test being run according to absorption principle.

(D) 1 mg of Formazin dissolved in 1 litre of distilled water with the test being run according to scattering principle.

035. The cleaning of slow sand filter is done by

(A) Reversing the direction of flow of water

(B) Passing air through the filter

(C) Passing a solution of alum and lime through the filter

(D) Scrapping off top layer of sand admitting water

036. Uniformity coefficient of filter sand is given by

(A) D_{50}/D_5 (B) D_{50}/D_{10}

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

037. The various treatment processes in a water treatment plant are listed below:

(a) Filtration (b) Chlorination

(c) Sedimentation (d) Coagulation

(e) Flocculation

The correct sequence of processes in water treatment is

(A) (d), (e), (c), (a), (b) (B) (c), (d), (e), (a), (b)

(C) (d), (e), (c), (b), (a) (D) (d), (c), (e), (a), (b)

038. The purpose of a proportional weir at the effluent end of a channel type grit removal unit is to

(A) provide easy passage of solid particles

(B) measure the rate of flow in the channel

(C) keep the depth of flow in the channel above a certain value

(D) maintain constant mean velocity in the channel

039. A water supply scheme serves a population of 10,000 at the rate of 50 litres per capita per day. For chlorine dose of 2 ppm, the required amount of bleaching powder with 20% available chlorine will be

(A) 0.5 kg (B) 5 kg

(C) 10 kg (D) 15 kg

040. Which one of the following filters will produce water of high quality with respect to the bacteriological parameter.

(A) Slow sand filter (B) Rapid sand filter

(C) Pressure filter (D) Dual media filter

041. The purpose of providing a balancing reservoir in a water supply distribution system is to

(A) equalize pressure in the distribution system

(B) store adequate quantity of water to meet requirements in case of break-down of inflow.

(C) store adequate fire fighting reserve

(D) take care of fluctuations in the rate of consumption.

042. Which one of the following chemicals is employed for dechlorination of water?

(A) Sodium sulphite (B) Sodium bicarbonate

(C) Calcium carbonate (D) Hydrogen peroxide

043. Which one of the following can fix atmospheric nitrogen

(A) Green algae (B) Blue green algae

(C) Red algae (D) Brown algae

044. Which one of following test employs Ethylene Diamine Tetra Acetic Acid as a titrating agent?

(A) Chlorides
(B) Dissolved Oxygen
(C) Hardness
(D) Residual Chlorine

045. The slope of a 1.0 m diameter concrete sewer laid at a slope of 1 in 1000, develops a velocity of 1 m/s when flowing full. When it is flowing half-full, the velocity of flow through the sewer will be

(A) 0.5 m/s
(B) 1.0 m/s
(C) 2.0 m/s
(D) 4.0 m/s

046. Self-cleansing velocity is

(A) The minimum velocity of flow required to maintain a certain amount of solids in the flow
(B) The maximum velocity of flow required to maintain a certain amount of solids in the flow
(C) Such flow velocity as would be sufficient to flush out any deposited solids in the sewer
(D) Such flow velocity as would be sufficient to ensure that sewage does not remain in the sewer

047. The following data pertain to a sewage sample:

(a) Initial DO = 10 mg/l
(b) Final DO = 2 mg/l
(c) Dilution Ratio = 1 : 100

The BOD of the given sewage sample is

(A) 8 mg/l
(B) 10 mg/l
(C) 100 mg/l
(D) 800 mg/l

048. Sewage sickness occurs when

(A) sewage contains pathogenic organisms
(B) sewage enters the water supply system
(C) sewage get clogged due to accumulation of solids
(D) voids of soil get clogged due to continuous application of sewage on a piece of land.

049. The correct statement of comparison of ultimate BOD (BOD_u), COD, Theoretical Oxygen Demand (ThOD) and 5-day BOD (BOD_5) is

(A) BOD_u > COD > ThOD > BOD_5

(B) COD > ThOD > BOD_u > BOD_5

(C) ThOD > COD > BOD_u > BOD_5

(D) COD > BODu > BOD_5 > ThOD

050. A municipal sewage has BOD_5 of 200 mg/l. It is proposed to treat it and dispose off into a marine environment. For what minimum efficiency should the sewage treatment plant should be designed?

(A) 85%

(B) 60%

(C) 50%

(D) 33.67%

051. What is 5 days 20°C BOD equal to?

(A) 3 days at 27°C BOD

(B) 4 days at 30°C BOD

(C) 6 days at 18°C BOD

(D) 7 days at 32°C BOD

052. Self purification of running streams may be due to

(A) Sedimentation, oxidation and coagulation

(B) Dilution, sedimentation and oxidation

(C) Dilution, sedimentation and coagulation

(D) Dilution, oxidation and coagulation

053. From ecological consideration, the minimum level of Dissolved Oxygen (DO) necessary in the rivers and streams is

(A) 1 mg/l

(B) 2 mg/l

(C) 4 mg/l

(D) 8 mg/l

054. When wastewater is disposed of into a running stream, four zones are formed. In which one of the following zones will the minimum level of dissolved oxygen be found?

(A) Zone of degradation

(B) Zone of active decomposition

(C) Zone of recovery

(D) Zone of clear water

055. The two main gases liberated from an anaerobic sludge digestion tank would include

(A) NH_3 and CO_2

(B) CO_2 and CH_4

(C) CH_4 and H_2S

(D) NH_3 and CH_4

056. Presence of nitrogen in a wastewater sample is due to the decomposition of

(A) Carbohydrates
(B) Proteins
(C) Fats
(D) Vitamins

057. When the recirculation ratio in a high rate trickling filter is unity then what is the value of the recirculation factor?

(A) 1
(B) > 1
(C) < 1
(D) 0

058. According the National Ambient Air Quality Standards (NAAQS), the permissible limit (daily average) for RSPM in Residential areas is

(A) 40 $\mu g/m^3$
(B) 60 $\mu g/m^3$
(C) 100 $\mu g/m^3$
(D) 120 $\mu g/m^3$

059. Aerodynamic diameter is the diameter of a sphere of unit density (1g/cc) that has the same

(A) terminal settling velocity
(B) terminal viscosity
(C) gravimetric effect
(D) coefficient of thermal expansion

060. The effective height of the chimney is equal to

(A) Height of the chimney + plume rise
(B) Height of the chimney + plume rise + thermal rise
(C) Height of the chimney + plume rise + pressure rise
(D) Height of the chimney – plume rise

061. In a Gaussian Dispersion Model, the lateral dispersion coefficients are dependent on

(A) Surface roughness
(B) Atmospheric Stability
(C) Downwind distance
(D) Both Atmospheric stability and Downwind distance

062. Emission factor can be defined as:

(A) the amount of substance released / intensity of a specific activity

(B) the amount of substance released / second

(C) the amount of substance released / gram of the fuel burnt

(D) the total amount of substance released.

063. In a condition when Environmental Lapse Rate (ELR) > > Dry Adiabatic Lapse Rate (DALR), which of the following plume behavior would be observed

(A) Looping (B) Fanning

(C) Conning (D) Lofting

064. Following are the 4 scenarios given relating the Environmental Lapse Rate (ELR) and Dry Adiabatic Lapse Rate (DALR). In which of the case, the mixing height would be the maximum.

(A) ELR >> DALR (B) ELR = DALR

(C) ELR << DALR (D) ELR = 0.75 * DALR

065. Which one of the following pairs of pollutants is formed due to photochemical reactions.

(A) CO and RSPM (B) O_3 and PAN

(C) PAN and NH_3 (D) NH_3 and CO

066. Which one of the following gases act as an asphyxiant?

(A) CO (B) SO_2

(C) NO_2 (D) Cl_2

067. Which one of the following procedures is used for sampling of the flue gas in a chimney for Suspended Particulate Matter (SPM)

(A) Isothermal sampling (B) Isokinetic sampling

(C) Adiabatic sampling (D) Differential sampling

068. What will be the resultant decibel level when two sources make noise of equal decibels?

(A) Decibel level will be the same

(B) Decibel level will increase by 3 decibels

(C) Decibel level will decrease by 3 decibels

(D) Decibel level will be equal to the sum of decibels of the two sources

069. Which type of noise can be abated by providing lining on walls and ceiling with sound absorbing materials?

(A) Reflection Noise (B) Refraction Noise
(C) Source Noise (D) Structural Noise

070. A person can make a complainant to the competent authority if the noise levels exceeds the ambient noise levels by

(A) 10 dB (B) 20 dB
(C) 30 dB (D) 40 dB

071. If super elevation is not provided on a horizontal curve of a highway, then on which portion of the road are the pot holes likely to develop

(A) Outer edge of the road (B) Inner edge of the road
(C) Centre of the road (D) Shoulder of the road

072. Full amount of super elevation on a horizontal curve is provided at the

(A) beginning of the transition curve
(B) centre of the circular curve
(C) end of the transition curve
(D) centre of the transition curve

073. With all other relevant conditions remaining the same, the speed of a vehicle negotiating a curve is proportional to
(Note : W = Weight of the vehicle)

(A) $W^{1/2}$ (B) W
(C) 1/W (D) $1/ W^{1/2}$

074. An ideal horizontal transition curve is a

(A) Parabola (B) Circle
(C) Clothoid (D) Hyperbola

075. If R is the radius of the curve and L is the length of the long chord, the shift of the curve is (all in meter units)

(A) L^2/R (B) $L^2/2R$
(C) $L^2/24R$ (D) $L^2/6R$

076. It is a common practice to design a highway to accommodate the traffic volume corresponding to the

(A) 30th hour
(B) Peak hour
(C) Average daily traffic
(D) 15 minute peak period

077. Which set of traffic studies is needed for functional design as well as for highway capacity design.

(A) Origin and Destination studies
(B) Parking and Accident studies
(C) Speed and volume studies
(D) Axle load studies

078. Speed and Delay study is conducted by which of the following method / instrument

(A) Floating car method
(B) Workspot interview method
(C) Doppler Radar
(D) Electronic Detector

079. Space mean speed is used for which of the following studies

(A) Road conditions studies
(B) Accident studies
(C) Traffic flow studies
(D) Delay studies

080. Traffic volume can be defined as

(A) Number of vehicles occupying a unit length of road at a given instant of time
(B) Number of vehicles at the cross roads.
(C) Number of vehicles passing a given point on road in a given unit of time in a given direction.
(D) Number of vehicles passing a given point on road in a given unit of time in all the possible directions.

081. Consider the following factors :

(i) Reaction time
(ii) Speed
(iii) Coefficient of longitudinal friction
(iv) Gradient.

Which of these factors are taken into account for computing braking distance

(A) (i) and (iv)
(B) (i), (ii) and (iv)
(C) (ii), (iii) and (iv)
(D) (ii) and (iii)

082. Total reaction time of a driver depend upon:

(i) Perception time

(ii) Brake reaction time

(iii) Speed of vehicle

(A) (i) and (ii)
(B) (i) and (iii)
(C) (ii) and (iii)
(D) (i), (ii) and (iii)

083. California bearing ratio is a

(A) Measure of soil strength
(B) Method of soil identification
(C) Measure to indicate the relative strengths of paving materials
(D) Measure of shear strength under lateral confinement

084. The essential difference between rigid and flexible pavements is

(A) Distribution of load over sub-grade
(B) Distribution of load over sub-base
(C) Materials used
(D) Thickness of layers

085. Rigid pavement are commonly made of

(A) Bitumen
(B) Portland cement concrete
(C) Dry lean concrete
(D) High performance concrete

086. Which of the following pavement can be used, for construction on black cotton soils?

(A) Flexible pavement
(B) Semi-flexible pavement
(C) Rigid pavement
(D) Semi-Rigid pavement

087. Which of the following layer of pavement should withstand high level of deformation?

(A) Base course
(B) Sub-base
(C) Sub-grade
(D) Surfacing course

088. IRC 37-2001 revised version for flexible pavement design has been designed as

(A) 4-layer
(B) 3-layer
(C) 2-layer
(D) 5-layer

089. Which one of the following expressions gives the Intermediate Sight Distance as per IRC standards

(A) 2 SSD
(B) (SSD + OSD) / 2
(C) (OSD – SSD) / 2
(D) 2 OSD

090. Which of the following pairs is NOT correctly matched

(A) Horizontal curves - Super elevation
(B) Origin and Destination studies - Desire Lines
(C) Los Angeles Test - Hardness of aggregates
(D) Soundness test - Purity of bitumen

091. The liquid limit and plastic limit of sample are 65% and 29% respectively. The percentage of the soil fraction with grain size finer than 0.002 mm is 24. The activity ratio of the soil sample is

(A) 0.50
(B) 1.00
(C) 1.50
(D) 2.00

092. The soil sample has a shrinkage limit of 10% and specific gravity of soil solids as 2.7. The porosity of the soil at shrinkage limit is

(A) 21.2%
(B) 27.0%
(C) 73.0%
(D) 78.8%

093. In a wet soil mass, air occupies 1/6 of its volume and water occupies 1/3 of its volume. The void ratio of the soil is

(A) 0.25
(B) 0.50
(C) 1.00
(D) 1.50

094. Lacustrine soils are soils

(A) transported by rivers and streams
(B) transported by glaciers
(C) deposited in sea beds
(D) deposited in lake beds

095. A soil sample is having a specific gravity of 2.60 and a void ratio of 0.78. The water content in percentage required to fully saturate the soil at that void ratio would be

(A) 10
(B) 30
(C) 50
(D) 70

096. A clay sample has a void ratio of 0.50 in dry state and specific gravity of solids is 2.70. Its shrinkage limit will be

(A) 12% (B) 13.5%

(C) 18.5% (D) 22.0%

097. A soil has liquid limit of 60%, plastic limit of 35% and shrinkage limit of 20% and it has a natural moisture content of 50%. The liquidity index of soil is

(A) 1.5 (B) 1.25

(C) 0.6 (D) 0.4

098. Consider the following statement in the context of Aeolian soils:

(i) The soil has low density and low compressibility

(ii) The soil is deposited by wind

(iii) The soil has large permeability

Which of these statements are correct?

(A) (i), (ii) and (iii) (B) (ii) and (iii)

(C) (i) and (iii) (D) (i) and (ii)

099. The collapsible soil is associated with

(A) Dune sand (B) Laterite soil

(C) Loess (D) Black cotton soil

100. Consistency as applied to cohesive soils is an indicator of its

(A) Density (B) Moisture content

(C) Shear strength (D) Porosity

101. In comparison to Atterberg limits of normal soil, the expansive soils which of the following:

(i) More liquid limit (ii) Less plastic limit

(iii) Less shrinkage limit (iv) More volumetric shrinkage

Select the correct answers using the codes given below.:

(A) (i), (ii), (iii) and (iv) (B) (i), (iii) and (iv)

(C) (ii), (iii) and (iv) (D) (i), (ii) and (iv)

102. The correct sequence of plasticity of minerals in soil in an increasing order is

(A) Silica, Kaolinite, Illite, Montmorillonite

(B) Kaolinite, Illite, Montmorillonite, Silica

(C) Montmorillonite, Silica, Kaolinite, Illite,

(D) Kaolinite, Illite, Silica, Montmorillonite

103. Oedometer is used to calculate which of the following soil parameter

(A) Compressibility (B) Permeability

(C) Specific gravity (D) Particle size analysis

104. The total, neutral and effective vertical stresses (in t/m^2) at a depth of 5 m below the surface of a fully saturated soil deposit with a saturated density of 2 t/m^3 would respectively be

(A) 5, 5 and 10 (B) 5, 10 and 5

(C) 10, 5 and 10 (D) 10, 5 and 5

105. Consider the following statements:

(i) Organic matter increases the permeability of a soil

(ii) Entrapped air decreases the permeability of a soil

Which of these statements is / are correct?

(A) Only (i) (B) Only (ii)

(C) Both (i) and (ii) (D) Neither (i) or (ii)

106. The coefficient of permeability does not depends upon

(A) Void ratio of the soil

(B) Duration of flow

(C) Equivalent diameter of the soil grains

(D) Shape of the particle

107. A soil has discharge velocity of 5×10^{-7} m/s and a void ratio of 0.5. Its seepage velocity will be

(A) 15×10^{-7} m/s (B) 10×10^{-7} m/s

(C) 20×10^{-7} m/s (D) 30×10^{-7} m/s

108. A saturated clay layer with double drainage taken 5 years to attain 90% degree of consolidation under a structure. If the same layer were to be single drained, what would be time (in years) required to attain the same consolidation under the same loading conditions?

(A) 10 (B) 15

(C) 20 (D) 25

109. Riprap is provided to

(A) protect river banks from erosion by river flow

(B) increase the bearing capacity of the soil

(C) accelerate the process of consolidation

(D) reduce the pore pressure of the soil

110. The main function of a sand column to

(A) prevent the escape of fine soils by seepage water

(B) reduce damage due to liquefaction of saturated granular soils during earthquakes.

(C) reduce seepage of water through the body of the earth dams.

(D) facilitate the drainage of water through the body of the earth dams.

111. Consider the following statements:

(i) A recovery ratio of less than 1 implies that the soil has compressed

(ii) A recovery ratio greater than 1 implies that the soil has swelled

(iii) A recovery ratio less than 1 implies that the soil has swelled

(iv) A recovery ratio greater than 1 implies that the soil has compressed

Which of these statements is/are correct?

(A) (i) and (ii) (B) only (i)

(C) (iii) and (iv) (D) only (iv)

112. Which one of the following equations correctly gives the relationship between the specific gravity of soil grains (G) and the hydraulic gradient (i) to initiate 'quick' condition in a sand having a void ratio of 0.5?

(A) $G = 0.5i + 1$ (B) $G = i + 0.5$

(C) $G = 1.5i + 1$ (D) $G = 1.5i - 1$

113. A strata of 3.5 m thick fine sand has a void ratio of 0.7 and G of 2.7. For a quick sand condition to develop in this strata, the water flowing in upward direction would require a head of

(A) 7 m
(B) 5.56 m
(C) 5 m
(D) 3.5 m

114. Consider the following statements:

(i) Quicksand is a special variety of sand
(ii) Quicksand is not a material but a hydraulic condition.
(iii) In nature, quicksand condition is observed usually in coarse silt or fine sand.

Which of the above statements are correct?

(A) (i), (ii) and (iii)
(B) (i) and (ii)
(C) (ii) and (iii)
(D) (i) and (iii)

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

(A) Increase in maximum dry density and the Optimum Moisture Content
(B) Increase in maximum dry density but Optimum Moisture Content remains same
(C) Increase in maximum dry density and decrease Optimum Moisture Content
(D) No change in maximum dry density and Optimum Moisture Content

116. Sheep foot rollers are used for

(A) Compacting soil in confined areas and at corners
(B) Compacting road and railway embankments of sandy soils
(C) Densifying sandy soils over large are and to a larger depth
(D) Compacting clayey soil fills

117. The following soils are compacted at the same compactive effort in the field. Which one of the following is the correct sequence in the increasing order of their maximum dry density?

(A) Clay < Silty clay < Sand < Gravel sand clay mixture
(B) Silty clay < Sand < Gravel Sand clay mixture < Clay
(C) Sand < Gravel sand clay mixture < Clay < Silty Clay
(D) Sand < Clay < Silty Clay < Gravel sand clay mixture

118. In the case of stratified soil layers, the best equation that can be adopted for computing the pressure distribution is

(A) Prandtl's (B) Skempton's

(C) Westergaard's (D) Boussinesq's

119. The change in the vertical stress in the soil mass estimated by Boussinesq's equation when Poisson's ratio of soil changes from 0.3 to 0.5 will be

(A) reduction by 30% (B) increase by 50%

(C) reduction by 20% (D) no change

120. In a Mohr's diagram, a point above Mohr's envelope indicates

(A) an imaginary condition (B) a safe condition

(C) an imminent failure condition (D) a condition of maximum obliquity

121. For assessing the long-term stability of a slope in stiff fissured clay which type of the following laboratory test has to be done.

(A) Undrained triaxial test (B) Drained triaxial test

(C) Consolidated undrained test (D) Quick vane shear test

122. A shear test was conducted on a soil sample. At failure, the ratio of $(P_1 - P_3) / 2$ to $(P_1 + P_3) / 2$ was equal to 1. Which one of the following shear test represents this condition?

(A) Drained triaxial compression test

(B) Undrained triaxial compression test

(C) Undrained shear test

(D) Unconfined compression test

123. Considerable loss of shear strength due to shock or disturbance is exhibited by

(A) Under-consolidated clays (B) Normally consolidated clays

(C) Over consolidated clays (D) Organic soil

124. The correct sequence of the given parameters in descending order of earth pressure intensity is

(A) Active, Passive, At rest (B) Passive, Active, At rest

(C) Passive, At rest, Active (D) At rest, Passive, Active

125. Terzaghi's consolidation theory is applicable to one-dimensional consolidation test

(A) for small load increment ratios

(B) for large load increment ratios

(C) for a load increment ratio of nearly one

(D) in situations where there is no excess pore pressure

126. To get the required shape of the tunnel section, we use

(A) Cut holes (B) Trimmers

(C) Easers (D) Chisels

127. Forepoling method is generally adopted for tunnelling in

(A) Soft ground (B) Firm ground

(C) Running ground (D) Rock Ground

128. Railway tunnels, are generally

(A) polycentric (B) rectangular

(C) parabolic (D) circular

129. The explosive used for tunneling in soft rocks is

(A) Ammonia Dynamite (B) Special Gelatine

(C) Blasting Gelatine (D) Semi Gelatine

130. For highways, tunneling is preferred to if the open cuts exceeds

(A) 10 m (B) 15 m

(C) 25 m (D) 50 m

131. Given that the base period is 100 days and the duty of the cannal is 1000 hectares per cumecs, the depth of water will be

(A) 0.864 cm (B) 8.64 cm

(C) 86.4 cm (D) 864 cm

132. Acidic soils are reclaimed by

(A) Leaching of the soil

(B) Using limestone as a soil amendment

(C) Using gypsum as a soil amendment

(D) Provision of drainage

133. The delta for a crop having base period 120 days is 70 cm. What is the duty?

(A) 2480 hectare / cumec
(B) 1481 hectare / cumec
(C) 14.81 hectare / cumec
(D) 1.481 hectare / cumec

134. What is the moisture depth available for evapotranspiration in root of 1 m depth soil, if dry weight of soil is 1.5 gm/cc, field capacity is 30% and permanent wilting point is 10%?

(A) 450 mm
(B) 300 mm
(C) 200 mm
(D) 150 mm

135. Which of these does not relate to the zone of aeration in the soil profile?

(A) Saturation zone
(B) Capillary zone
(C) Intermediate zone
(D) Soil water zone

136. The total number of independent equations that form the Lacey's regime theory are

(A) 2
(B) 3
(C) 4
(D) 5

137. Balanced depth of cutting of canal is

(A) half the total depth of a canal
(B) half of full supply depth
(C) the maximum cut that an excavator can take
(D) where volume of cutting is equal to volume of filling

138. The theory of Unit Hydrograph was propounded by

(A) L. K. Sherman
(B) A. N. Khosla
(C) L. Prandtl
(D) C. Inglis

139. Garret's diagram are used to

(A) Separate base flow from total runoff
(B) Correct inconsistency in rainfall data
(C) Determine reservoir capacity
(D) Design channels

140. The general depth of scour calculated by Lacey's formula in a river represents the depth below the

(A) maximum flood level in the river

(B) minimum flood level in the river

(C) normal flow water level in the river

(D) existing river bed level.

141. According to Kennedy, non-silting and non-scouring velocity is called

(A) Optimal velocity (B) Critical velocity

(C) Mean velocity (D) Average velocity

142. Hydraulic mean depth of a canal is the ratio between

(A) Area of flow section and top water surface width

(B) Area of flow section and the wetted perimeter

(C) Total cross sectional area and top water surface width

(D) Total cross sectional area and the wetted perimeter

143. Lacey's theory is applicable to flow

(A) through pipes (B) over spillways

(C) in alluvial rivers and canal (D) in concrete lined canals

144. Meandering of a river is due to

(A) Sediment load of streams

(B) Discharge and hydraulic properties of streams

(C) Erodibility of the bed and banks of stream

(D) The natural topography of the location

145. Isohyetal method is used for determination of

(A) evapotranspiration (B) seepage loss

(C) precipitation (D) intensity of flood

146. Hyetograph is a plot of

(A) Cumulative rainfall v/s time (B) Rainfall intensity v/s time

(C) Rainfall depth v/s time (D) Discharge v/s time

147. Probable maximum flood is
(A) an impossibly large flood discharge
(B) largest flood that could conceivably occur at a particular location
(C) a flood with maximum probability of occurrence
(D) the maximum possible flood which is probable for that year

148. Base flow separation is used in connection with
(A) Seepage flow
(B) Infiltration
(C) Evaporation
(D) Stream flow

149. Kor water is the
(A) first watering before a crop is sown
(B) first watering after a crop is sown
(C) first water after a crop is grown
(D) water of least depth

150. Permanent wilting point is
(A) a characteristic of a plant
(B) a soil characteristic
(C) a soil characteristics modified by a plant
(D) dependent on soil water plant fertilizer interaction

151. The cavitation and pitting can be prevented by creating which one of the following conditions?
(A) Reducing the pressure head
(B) Reducing the velocity head
(C) Increasing the elevation head
(D) Reducing the piezometric head

152. Maximum pressure rise due to water hammer in a pipeline is
(Note : a = area of the pipe, V = Velocity, g = acceleration due to gravity, t = time period, length of the pipe line)
(A) $aV/2g$
(B) $aV^2/2g$
(C) LV/gt
(D) LV^2/gt

153. Choose the best option for the Newtonian fluid
(A) Frictionless and incompressible
(B) Viscosity is invariant with shear stress
(C) Viscosity decreases at higher shear stress
(D) Viscosity increases at higher shear stress

154. Which one of the following pressure units represent the least pressure

(A) Millibar
(B) Mm of Hg
(C) N / mm^2
(D) Kgf / cm^2

155. Consider the following parameters related to fluid flow:

(i) Vorticity
(ii) Velocity potential
(iii) Stream Function

Which of these parameters exit both in rotational and irrotational flows

(A) i and ii
(B) ii and iii
(C) i and iii
(D) i, ii and iii

156. Which of the following pair is incorrectly matched

(A) Piezometric Head : Sum of datum head and pressure head
(B) Dynamic Head : Sum of datum head and velocity head
(C) Stagnation Head : Sum of pressure head and velocity head
(D) Total Head : Sum of piezometric head and dynamic head

157. Hot wire anemometer is used for measuring which of the following parameter

(A) Turbulence
(B) Pressure
(C) Mean velocity
(D) Discharge

158. Lawn sprinkler can be best explained by which of the following equation of property?

(A) Energy equation
(B) Continuity equation
(C) Moment of momentum principle
(D) Impulse-momentum principle

159. The terminal velocity of a sphere settling in a viscous fluid varies as

(A) the Reynolds number
(B) the square of its diameter
(C) Its diameter
(D) viscosity of the fluid

160. Two identical pumps, each capable of delivering 0.2 cumec, against a head of 30 m, are connected in parallel. The resulting discharge will be

(A) 0.4 cumec against a head of 30 m
(B) 0.4 cumec against a head of 60 m
(C) 0.2 cumec against a head of 30 m
(D) 0.2 cumec against a head of 60 m

161. If the velocity of flow as well as the diameter of the flowing pipe are respectively doubled, the head loss thereafter be

(A) Halved
(B) Doubled
(C) Increased 4 times
(D) No change

162. Weber number can be best connected to which of the following

(A) Formation of liquid droplet
(B) High speed flow of a gas
(C) Flow in closed conduits
(D) Sloping interface between fluids of different densities

163. Euler number is related to

(A) Inertia force and pressure force
(B) Inertia force and elastic force
(C) Inertia force and viscous force
(D) Inertia force and gravity force

164. The gases are considered incompressible when Mach number is

(A) equal to 1.0
(B) equal to 0.5
(C) more than 0.3
(D) less than 0.2

165. Bernoulli's theorem deals with the law of conservation of

(A) Mass
(B) Momentum
(C) Energy
(D) None of the above

166. The flow in open channel is laminar if the Reynold number is

(A) equal to 2000
(B) between 500 – 2000
(C) less than 500
(D) more than 4000

167. Hydraulic Gradient Line represents the sum of
(A) Pressure Head and kinetic Head
(B) Kinetic Head and Elevation Head
(C) Pressure Head, Kinetic Head and Elevation Head
(D) Pressure Head and Elevation Head

168. Boundary layer thickness is the distance from the surface of the solid body in the direction perpendicular to flow where the velocity of fluid is equal to
(A) Free stream velocity
(B) 0.5 times the free stream velocity
(C) 0.9 times the free stream velocity
(D) 0.99 times the free stream velocity

169. The range of coefficient of discharge for a venturimeter is
(A) 0.5 to 0.7
(B) 0.7 to 0.8
(C) 08. to 0.9
(D) 0.95 to 0.99

170. Maximum discharge through a circular channel takes place when depth of flow is equal to
(A) 0.95 times the diameter
(B) 0.81 times the diameter
(C) 0.5 times the diameter
(D) 0.3 times the diameter

171. An aggregate is termed as flaky if
(A) its least lateral dimension is less than 0.6 times its mean dimension.
(B) its length is 1.8 times more than its mean dimension.
(C) its least lateral dimension is less than 1.8 times its mean dimension.
(D) its length is 0.6 times more than its mean dimension.

172. Maximum shear stress in a triangular section is
(A) 1.33 times the average shear stress at y = h/3
(B) 1.5 times the average shear stress at y = h/3
(C) 1.33 times the average shear stress at y = h/2
(D) 1.5 times the average shear stress at y = h/2

173. Total Kjeldahl Nitrogen is the

(A) Summation of Organic and Ammonical Nitrogen

(B) Summation of Organic and Albuminoid Nitrogen

(C) Summation of Organic and Free Nitrogen

(D) Difference of Organic and Ammonical Nitrogen

174. Heavy duty bricks used for bridges, foundation or industrial buildings, multi-story building, etc. have a compressive strength

(A) less than 25 N/mm^2

(B) between 25 N/mm^2 and 30 N/mm^2

(C) between 30 N/mm^2 and 40 N/mm^2

(D) more than 40 N/mm^2

175. Lime is mixed with brick earth to

(A) impart plasticity

(B) increase durability

(C) prevent shrinkage

(D) increase permeability

176. A good brick earth should contain Iron oxide in the range of

(A) 5 – 7%

(B) 12 – 15%

(C) 15 – 20%

(D) 20 – 25%

177. The soils which plot above the A-line in the plasticity chart are

(A) Sands

(B) Silts

(C) Organic Soils

(D) Clays

178. As per IS 456:2000, the permissible limit for sulphates in water to be used for making concrete is

(A) 100 mg/lit

(B) 200 mg/lit

(C) 400 mg/lit

(D) 500 mg/lit

179. If a simply supported beam is loaded with point load W at the centre then what is the ratio of bending moment at the support to the bending moment at the centre?

(A) 0.5

(B) 0

(C) 1

(D) 2

180. Deficiency of which of the following oxide causes reduction in setting time of cement

(A) CaO
(B) Al_2O_3
(C) Fe_2O_3
(D) MgO

181. In limit state method of design, the value of permissible shear stress in concrete when shear reinforcement is not provided is

(A) $0.16(f_{ck})^{1/2}$
(B) $0.25(f_{ck})^{1/2}$
(C) $0.34(f_{ck})^{1/2}$
(D) $0.48(f_{ck})^{1/2}$

182. The under-reamed piles are connected by a reinforced beam known as

(A) plinth beam
(B) grade beam
(C) plate beam
(D) arch beams

183. A sand deposit has a porosity of 0.33 and its specific gravity is 2.5. The critical hydraulic gradient to cause sand boiling in the stratum will be

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

184. A cable subjected to its sown weight and free of any other loads will take the form of

(A) parabolic curve
(B) elliptic curve
(C) catenary curve
(D) Bernoulli's Lemniscate

185. The area under the Beta distribution curve is divided into two equal parts by

(A) most likely time
(B) optimistic time
(C) pessimistic time
(D) expected time

186. Free float is mainly used to

(A) Identify the activities which can be delayed without affecting the total float of the preceding activities
(B) Identify the activities which can be delayed without affecting the total float of the succeeding activities
(C) Identify the activities which can be delayed without affecting the total float of the preceding activities or succeeding activities
(D) Establish priorities

187. Critical Path is always

(A) the longest path (B) the shortest path

(C) the most profitable path (D) the fastest path

188. Economic saving of time results by crashing

(A) Cheapest critical activity (B) Cheapest non-critical activity

(C) Costliest critical activity (D) Costliest non-critical activity

189. Interfering float is the difference between

(A) Total float and Free float

(B) Total float and Independent float

(C) Independent float and Free Float

(D) None of the above

190. The ability of a building material to withstand prolonged action of high temperature without melting or losing shape is

(A) Thermal capacity (B) Refractoriness

(C) Specific Heat (D) Fire Resistance

191. Intermediate vertical stiffeners are provided in plate girders to

(A) eliminate web buckling (B) eliminate local buckling

(C) prevent excessive deflection (D) to transfer concentrated loads

192. As per IS 456:2000, the maximum strain in concrete at the outer most compression fiber in limit state of design for a flexural member is taken as

(A) 0.0065 (B) 0.0050

(C) 0.0035 (D) 0.0020

193. The minimum grade of concrete for reinforced concrete construction in moderate exposure condition is

(A) M20 (B) M25

(C) M30 (D) M35

194. The thermal conversion technique where solid waste is treated with high temperature in absence of oxygen is called

(A) Gasification (B) Vitrification

(C) Pyrolysis (D) Incineration

195. Use of accelerators in concrete

(A) Shortens the setting time (B) Shortens the curing time

(C) Increases the setting time (D) Increases the curing time

196. Impact test is done to test which of the following properties

(A) Ductility (B) Toughness

(C) Endurance Limit (D) Resistance to abrasion

197. A single bay portal frame of height 'h' fixed at the base is subjected to a horizontal displacement Δ at the top. The base moment developed is proportional to

(A) $1/h$ (B) $1/h^2$

(C) $1/h^3$ (D) $1/h^4$

198. Influence line Diagram for redundant structures can be obtained by

(A) Castigliano's Theorem (B) Muler-Breslau Principle

(C) Unit Load Theorem (D) All of the above

199. The number of simultaneous equations to be solved in the slope deflection method is equal to

(A) the degree of statical indeterminacy

(B) the degree of kinematic indeterminacy

(C) the difference of the degree of statical indeterminacy and kinematic indeterminacy

(D) the number of joints in the structure

200. According to IS 800, the maximum slenderness ratio of compression member carrying both dead load and live load is

(A) 180 (B) 200

(C) 250 (D) 350

201. A strut is a structural member subjected to

(A) tension in a direction parallel to its longitudinal axis

(B) tension in a direction perpendicular to its longitudinal axis

(C) compression in a direction parallel to its longitudinal axis

(D) compression in a direction perpendicular to its longitudinal axis

202. In plastic analysis, collapse load for a fixed uniform beam with central point load is

(Note : M_p is plastic moment capacity and L is the span of the beam)

(A) $2M_p/L$ (B) $4M_p/L$

(C) $8M_p/L$ (D) $16M_p/L$

203. A reinforced concrete beam is subjected to 5 kNm bending moment due to dead load and 25 kNm bending moment due to live load. What should be the design bending moment for limit state of collapse?

(A) 30.0 kN.m (B) 34.5 kN.m

(C) 45.0 kN.m (D) 50.0 kN.m

204. Stability of the upstream slope of an earthen dam becomes critical for the condition of

(A) Reservoir full (B) Reservoir empty

(C) Sudden draw down (D) Slow filling of reservoir

205. Hydraulic jump occurs when flow changes from

(A) Super-critical to sub-critical (B) Sub-critical to super-critical

(C) Critical to turbulent (D) Laminar to turbulent

206. Eutrophication of lakes is caused by the discharge of water containing excessive quantities of

(A) Nitrogen (B) Phosphorus

(C) Potassium (D) Carbonaceous matter

207. Well oxidized sewage will contain sulphur largely in the form of

(A) Sulphites (B) Sulphates

(C) Hydrogen Sulphide (D) Carbon Sulphide

208. Which of the following coagulant is singularly effective in producing sludge for the activated sludge process

(A) Alum (B) Chlorinated copperas

(C) Ferric chloride (D) Ferric sulphate

209. The commonly used indicator for measuring iron concentration in water is

(A) Erichrome Black T (B) Phenolphthalein

(C) Methyl Orange (D) 1, 10 Phenanthroline

210. Fineness of cement is measured in the units of
(A) Volume/Mass (B) Mass/Volume
(C) Area/Mass (D) Mass/Area

211. Stainless steel resist corrosion due to presence of
(A) Carbon (B) Manganese
(C) Chromium (D) Sulphur

212. Linseed oil is used in paints as
(A) Base (B) Vehicle
(C) Drier (D) Accelerator

213. A circular shaft is subjected to a twisting moment T and bending moment M. The ratio of maximum bending stress to maximum shear stress is given by
(A) 2M/T (B) M/T
(C) 2T/M (D) M/2T

214. Pressure measured with the help of piezometer tube is
(A) Atmospheric Pressure (B) Gauge Pressure
(C) Absolute Pressure (D) Vacuum Pressure

215. Echo sounder is used to measure
(A) Width of river (B) Velocity of river
(C) Depth of river (D) Length of river

216. Bending moment at any section in a conjugate beam gives ..... in the actual beam.
(A) Slope (B) Curvature
(C) Defection (D) Frictional resistance

217. Which of the following is a non-recording type of rain guage?
(A) Symon's guage (B) Tipping-bucket type
(C) Syphon type (D) Weighing bucket type

218. In limit state approach, the spacing of main reinforcement primarily controls
(A) Collapse (B) Cracking
(C) Deflection (D) Durability

219. A raft foundation of 6 m × 9 m is placed at a depth of 3 m in a cohesive soil having c = 120 kN/m^2. The net ultimate bearing capacity of the soil using Terzaghi's theory will be.

(A) 820 kN/m^2 (B) 1020 kN/m^2
(C) 1220 kN/m^2 (D) 1420 kN/m^2

220. Sulphate attack over a building material is caused by salts of

(A) Calcium (B) Magnesium
(C) Sodium (D) Potassium

221. Porcelain is made by heating materials having

(A) Kaolinite (B) Montmorillonite
(C) Bentonite (D) Phyllite

222. Original plastic material without fibre reinforcement is called

(A) Composite (B) Admixture
(C) Binding agent (D) Virgin Plastic

223. Stress is

(A) a measure of deformation of a material
(B) resistance to forces resulting in elongation
(C) internal force exerted by neighboring particles over each other
(D) resistance to bending and torsion

224. Principal stresses are

(A) Parallel to principal planes (B) Normal to principal planes
(C) Parallel to each other (D) Opposite to each other

225. If Reynold's number is less than 1, then

(A) Viscous forces are very strong as compared to inertial forces
(B) Viscous forces are very weak as compared to inertial forces
(C) Viscous forces are equal to inertial forces
(D) Flow is turbulent in saturated soils

226. When the coefficient of rugosity is increased from 0.01 to 0.02, the gradient of a pipe of a given diameter to carry the same flow at the same velocity should be

(A) increased by 4 times (B) increased by 2 times
(C) decreased by 2 times (D) decreased by 4 times

227. Sonoscope is used for which of the following
(A) Checking the accuracy of the water meter
(B) Regulating the fire hydrants
(C) Detecting of leakage in underground water mains
(D) Checking the pressure in the water distribution network

228. Which of the following is the most important design parameter for a continuous flow rectangular sedimentation tank
(A) Surface overflow rate
(B) Length of the tank
(C) Depth of the tank
(D) Temperature of the water to be treated

229. Which of the following treatments is the most economically effective method for controlling Schistosomiasis
(A) Filtration
(B) Ozonation
(C) Chlorination
(D) UV radiation

230. Air binding in rapid sand filters is encountered when
(A) the water is subjected to prolonged aeration
(B) the water contains high dissolved gases
(C) the filter bed comprises largely of coarse sand
(D) there is excessive negative head

231. The purpose of recarbonation after lime-soda process of water softening is
(A) Removal of excess soda from water
(B) Removal of non-carbonate hardness
(C) Conversion of precipitates to soluble form
(D) Recovery of excess lime

232. As per IS1343-1980, the minimum characteristics strength pre-stressed concrete for post-tensioned and pre-tensioned work is
(A) 25 MPa and 30 MPa respectively
(B) 25 MPa and 35 MPa respectively
(C) 30 MPa and 35 MPa respectively
(D) 30 MPa and 40 MPa respectively

233. The permissible stress in axial tension in steel member on the net effective area of the section shall not exceed the following value *(Note : f_y is the yield stress)*

(A) 0.80 f_y (B) 0.75 f_y

(C) 0.60 f_y (D) 0.50 f_y

234. The partial factor of safety for concrete as per IS 456-2000 is

(A) 1.50 (B) 1.15

(C) 0.87 (D) 0.446

235. The dominating microorganisms in an activated sludge process reactor are

(A) Aerobic heterotrophs (B) Anaerobic heterotrophs

(C) Autotrophs (D) Phototrophs

236. The ideal C:N ratio during composting of waste is

(A) 25 : 1 (B) 40 : 1

(C) 10 : 1 (D) 8 : 1

237. The brick laid with its breadth parallel to the face of a wall is known as

(A) Header (B) Stretcher

(C) Closer (D) Queen Closer

238. In any good staircase, the maximum and minimum pitch respectively should be

(A) 90° and 0° (B) 75° and 5°

(C) 60° and 10° (D) 40° and 25°

239. Which of the following is not a carbonate mineral?

(A) Dolomite (B) Calcite

(C) Magnesite (D) Halite

240. Refractory cement is rich in

(A) Calcium (B) Magnesium

(C) Iron (D) Aluminum

241. The duty is the largest
(A) At the head of the water course
(B) At the head of the main canal
(C) At the head of the distributary canal
(D) At the field

242. What type of cross drainage work is provided when the canal runs below the river?
(A) Aqueduct
(B) Super passage
(C) Level crossing
(D) Siphon aqueduct

243. The relation between probability (P) and recurrence interval (T) is given by
(A) $PT = 1$
(B) $PT^2 = 1$
(C) $P/T = 1$
(D) $P/T^2 = 1$

244. Which of the equipment is used for controlling gaseous pollutants in air
(A) Cyclone air separator
(B) Bag house filter
(C) Elactrostatic precipitator
(D) Wet scrubber

245. Charpy's V notch test is done on a building material to determine
(A) Brittleness
(B) Abrasion
(C) Hardness
(D) Elasticity

246. The size of aggregate, particle shape, colour, surface texture, all of which have influence on the durability of concrete should conform to
(A) IS 383-1970
(B) IS 1489-1976
(C) IS 12269-1987
(D) IS 456-2000

247. If sufficient moisture is always available to completely meet the needs of vegetation fully covering the area, the resulting evapotranspiration is called
(A) Potential evapotranspiration
(B) Actual evapotranspiration
(C) Consumptive evapotranspiration
(D) Direct evapotranspiration

248. In chemical Oxygen Demand test, the digested sample is titrated with standard Ferrous Ammonium Sulphate to determine the un reacted amount of

(A) Mercuric sulphate
(B) Postassium dichromate
(C) Silver sulphate
(D) Sulphuric acid

249. In plastic method of analysis, the value of yield stress of the grade of steel shall not exceed.

(A) 250 MPa
(B) 415 MPa
(C) 450 MPa
(D) 500 MPa

250. Which of following tests is conducted to assess shear strength parameter of the soil.

(A) Hygrometer test
(B) Compaction test
(C) Triaxial test
(D) Vane shear test

251. The species which if eliminated seriously affect the ecosystem are called as

(A) Critical species
(B) Keystone species
(C) Niche species
(D) Core species

252. Pug mill is used for

(A) Clay preparation
(B) Clay moulding
(C) Brick drying
(D) Brick burning

253. Fat lime is also called as

(A) Quick lime
(B) Hydraulic lime
(C) Slaked lime
(D) White lime

254. The bending moment on a section is maximum where shear force

(A) is zero
(B) is maximum
(C) is minimum
(D) changes sign

255. A body having similar properties throughout its volume is said to be

(A) Homogenous
(B) Isotropic
(C) Continuous
(D) Anisotropic

256. The moment of inertia of an area is always least with respect to

(A) Vertical axis
(B) Bottom most axis
(C) Radius of gyration
(D) Central axis

257. The hoop stress induced in a thick cylinder due to radial pressure will be

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

258. In a particular material, if the modulus of rigidity is equal to the bulk modulus, the Poisson Ratio would be

(A) 1/8
(B) 1/4
(C) 1/2
(D) 1

259. The tendency of a small drop of fallen water to remain in a spherical form is due to the property of

(A) Viscosity
(B) Adhesion
(C) Surface tension
(D) Gravimetric pull

260. Mercury is used in barometers because

(A) it is a perfect liquid
(B) its volume changes uniformly with temperature
(C) it is a liquid metal
(D) it gives less height of column for high pressure

261. The Euler's equation for steady flow of an ideal fluid along a stream line is based on Newton's

(A) First law of motion
(B) Second law of motion
(C) Third law of momentum
(D) Law of friction

262. In a venturimeter, the ratio between throat diameter and pipe diameter is generally adopted as

(A) 1 : 2
(B) 1 : 4
(C) 1 : 6
(D) 1 : 8

263. In a free vortex, velocity

(A) decreases with radius

(B) increases with radius

(C) initially decreases than increases

(D) remains constant

264. For laminar flow between parallel plates separated by a discharge of 2h, head loss varies

(A) directly as h

(B) inversely as h

(C) directly as h^2

(D) inversely as h^2

265. Maximum surface run-off is because of

(A) a flash storm

(B) Leaf shaped catchment

(C) Improved land management

(D) Presence of forest area

266. A lysimeter is used to measure

(A) Infiltration

(B) Evaporation

(C) Evapotranspiration

(D) Radiation

267. The maximum size of clay particle is

(A) 0.2 mm

(B) 0.02 mm

(C) 0.002 mm

(D) 0.0002 mm

268. The porosity of a soil sample having its void ratio equal to unity would be

(A) 33.33%

(B) 50.00%

(C) 66.66%

(D) 75.00%

269. The shear strength of a soil in the plastic limit state is

(A) Maximum

(B) Zero

(C) Equal to saturated soil strength

(D) Very little

270. A Grillage foundation is essentially a

(A) Shallow foundation

(B) Deep foundation

(C) Spread foundation

(D) Pile foundation

271. The observe N value from a standard penetration test conducted on a saturated sandy soil is 30; the N-value corrected for dilatancy may be taken as

(A) 15 (B) 20

(C) 23 (D) 29

272. Gravity model is used in transportation planning process for

(A) Modal split (B) Trip distribution

(C) Trip generation (D) Trip assignment

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

(A) Stiffness method (B) Displacement method

(C) Energy method (D) Flexibility method

274. The behavior of concrete under instantaneous load is

(A) Elastic (B) Plastic

(C) Anelastic (D) Visco-elastic

275. In limit state design of concrete structure, the strain distribution is assumed to be

(A) Linear (B) Non-linear

(C) Parabolic (D) Parabolic and Rectangular

276. The maximum deflection due to load in RCC beams in buildings is limited to

(A) Span/100 (B) Span/250

(C) Span/350 (D) Span/500

277. If the shape factor of a section is 1.5 and the factor of safety to be adopted in 2, then the load factor will be

(A) 0.75 (B) 1.5

(C) 2.5 (D) 3.0

278. The lighter sections of structural members subject to transverse loading are called as

(A) Struts (B) Tie

(C) Joists (D) Stancions

279. The following statement is true between Period (P) and frequency (F) of a sound wave

(A) P is inversly proportional to f

(B) P is linearly proportional to f

(C) P is directly proportional to the square of f

(D) P is directly proportional to f

280. Choose the odd-one out from the following, in context with sinusoidal sound wave between sound pressure and time

(A) Amplitude (B) Wavelength

(C) Period (D) Frequency

281. In a sinusoidal wave of the sound pressure, the number of times a peak amplitude arrives in one second is called as

(A) Amplitude (B) Wavelength

(C) Period (D) None of these

282. The equivalent noise level is significant for the following:

(A) Fluctuating noise over different time periods

(B) Fluctuating noise over constant time periods

(C) Constant noise over different time periods

(D) Constant noise over same time periods

283. Choose the odd-one out from the following noise pollution control means

(A) Providing sound proof chambers/coatings for noisy sources

(B) Use of ear plugs

(C) Lubrication and maintenance of machinery

(D) Providing rubber / neoprene pads at the machine foundations

284. In a water distribution network, which of the following values will work automatically?

(A) Check valve (B) Butterfly valve

(C) Scour valve (D) Sluice valve

285. The commonly used handpump is the

(A) Centrifugal pump (B) Reciprocating pump

(C) Rotary pump (D) Axial flow pump

286. Which of the following is not the characteristic of coliform organism?

(A) Bacillus
(B) Gram-negative
(C) Ferments lactose
(D) Spore-forming

287. Tintometer is used for measuring which parameter in water?

(A) Temperature
(B) Colour
(C) Turbidity
(D) Volatile Solids

288. Which one of the following is the purpose of providing a surge tank in a pipeline carrying water?

(A) To store water
(B) To increase pressure throughout the pipeline
(C) To store overflowing water
(D) To protect the pipeline against water hammer

289. Which one of the following should be recommended for protected rural water supply project?

(A) Pressure filter
(B) Slow sand filter
(C) Diatomaceous earth filter
(D) Rapid sand filter

290. Orthotolidine test is done for assessing which of the following parameter?

(A) Residual chlorine
(B) Hardness
(C) Chloride
(D) Arsenic

291. In which treatment unit is Schmutzdecke formed?

(A) Sedimentation tank
(B) Rapid sand filter
(C) Coagulation tank
(D) Slow sand filter

292. What is predominant coagulating mechanism for raw water having high turbidity and high alkalinity

(A) lonic layer compression
(B) adsorption and charge neutralization
(C) sweep coagulation
(D) Inter particle bridging

293. In a water treatment, the optimum time of flocculation is usually given as 30 minutes. In case the time of flocculation is increased beyond this value, the flocs will

(A) become heavy and settle down in the flocculation tank itself

(B) entrap air and will float in the sedimentation tank

(C) break up and defeat the purpose of flocculation

(D) stick to the paddles

294. EDTA titration method of hardness determination of water sample uses an indicator which combines with hardness causing divalent cations and forms a coloured complex. The name of the indicator and the colour of the formed complex respectively are

(A) Ferroin and Dark blue

(B) Ferroin and Wine red

(C) Erichrome Black T and Dark blue

(D) Erichrome Black T and Wine red

295. Which of the following material is used as land fill sealants for the control of gas and leachate movement?

(A) Lime (B) Sand

(C) Fly ash (D) Bentonite

296. Shallow ponds in which dissolved oxygen is present at all depth are called

(A) Aerobic lagoons (B) Aerobic ponds

(C) Facultative lagoons (D) Facultative ponds

297. For a sandy soil with soil grains in shape and uniform in size, what is the theoretical void ratio?

(A) 0.61 (B) 0.71

(C) 0.81 (D) 0.91

298. Two footings, one circular and the other square, are founded on the surface of purely cohesionless soil. The diameter of the circular footing is the same as that of the side of the square footing. The ratio of the ultimate bearing capacities of the circular footing to the square footing will be

(A) 1.0 (B) 1.3

(C) 1.33 (D) 0.75

299. The load carrying capacity of an individual friction pile is 200 kN. What is the total load carrying capacity of a group of 9 such piles with a group efficiency factor of 0.8?

(A) 1800 kN (B) 1640 kN

(C) 1440 kN (D) 900 kN

300. The main reason of the sick building syndrome focusing the Indoor Air Quality in buildings is

(A) Inadequate ventilation

(B) Contamination from inside the buildings

(C) Contamination from outside buildings

(D) Microbial contamination