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Q : 26) The sum of all the forces acting on a body is zero. The inference that can be deduced from it

A : The body may be in equilibrium provided the forces are parallel

B : The body may be in equilibrium provided the forces are concurrent.

C : The body cannot be in equilibrium

D : The body must be in equilibrium

Q : 27) A solid cylinder, solid sphere and a hoop each of radius R and mass m are released simultaneously from rest on an incline at the same elevation. The order in which they will pass through a common mark at the same level is:

A : Cylinder, Hoop, Sphere

B : Hoop, Cylinder, Sphere

C : Sphere, Cylinder, Hoop

D : Cylinder, Sphere, Hoop

Q : 28) Under which part of the planning survey of highways. “Road life studies” is included.

A : Financial studies

B : Economic studies

C : Traffic use studies

D : Engineering studies

Q : 29) Name the test on aggregate, to determine the resistance of aggregates to weathering action:

A : Abrasion test

B : Bitumen adhesion test

C : Soundness test

D : Crushing test

Q : 30) Identify the factor which is not taken into account for computing the breaking distance in highways.

A : Reaction time of driver

B : Gradient

C : Speed of vehicle

D : Co-efficient of longitudinal friction

Q : 31) Identify the test that is not commonly adopted for evaluating the strength properties of subgrade soil in pavement

A : California bearing test (CBR)

B : Plate bearing test

C : Dynamic cone penetration (DCP) test

D : Pressure meter test (PMT)

Q : 32) The following 2 statements (S1 and S2) pertain to design of flexible pavements:

S1 : Most flexible pavement design procedure are based on Benkelman beam deflection measurements

S2 : Elastic deflection is a practical non-destructive measure of pavement stiffness which relates well to fatigue failure

A : S1 is false and S2 is true

B : Both S1 and S2 are true and S2 is the correct explanation of S1

C : Both S1 and S2 are true and S2 is not a correct explanation of S1

D : S1 is true and S2 is false

Q : 33) Which of the following is not the purpose of “Origin & Destination studies” in traffic engineering?

A : To judge the adequacy of existing routes and to plan new network of roads

B : To establish preferential routes for various categories of vehicle including bypass.

C : To locate terminals and to plan terminal facilities.

D : To study the causes of accidents and to suggest corrective treatment at potential locations.

Q : 34) The maximum super elevation to be provided on a road curve is 1 in 10. If the rate of change of super elevation is specified as 1 in 100 and the road width is 10 m, the minimum length of transition of be provided on either rend of circular curve is:

A : 50 m

B : 75 m

C : 125 m

D : 100 m

Q : 35) Which of the following is not correctly matched?

A : Bituminous mix design : Marshall method

B : Float test : water content in bitumen

C : Penetration test : Hardness of softness of bitumen

D : Los Angeles test : Hardness of aggregates

Q : 1) A body is acted upon a force system. It can in general be brought to equilibrium by the application of

A : A force acting on a suitable point on the body

B : A wrench acting anywhere on the body

C : A force acting along a suitable line and a moment along the direction of the force

D : A force acting anywhere along a suitable line

Q : 2) What is the height of free fall of hammer in the aggregate impact test?

A : 30 cm

B : 38 cm

C : 35 cm

D : 45 cm

Q : 3) According to Indian Road Congress (IRC), for the design of traffic control signals, the pedestrian green time required for the major and minor roads are calculated based on walking speed of:

A : 0.5 m/s

B : 1/5 m/s

C : 1.2 m/s

D : 1.0 m/s

Q : 4) Two statements S1 and S2 pertaining to D' Alembert principle in Mechanics is given.

S1 : It states that the net external force F actually acting in the body and the inertia force F_i together keep the body in state of fictitious dynamic equilibrium

S2 : This is a hypothetical principle and is independent of Newton's law of motion.

Choose the correct answer

A : Both S1 and S2 are true

B : Both S1 and S2 are false

C : S1 is true and S2 is false

D : S1 is false and S2 is true

Q : 5) As per the IRC guidelines for design of flexible pavements by CBR method, the load parameter required is:

A : Number of vehicles (all types) during the design life

B : Cumulative standard axles in msa

C : Equivalent single axle load

D : Number of commercial vehicles per day

Q : 6) Which type of traffic survey details are plotted by desire lines?

A : Speed and delay

B : Classified volume

C : Origin and destination

D : Accidents

Q : 7) Given the following parameters for a concrete pavement:

r – radius of load distribution,

p – wheel load,

h – thickness of slab,

μ – Poisson's ratio of concrete,

E – Modulus of elasticity of concrete,

K – modulus of subgrade reaction.

The combination of parameters required for estimating the radius of relative of concrete slab is:

A : p, h, K, μ

B : E, h, K, μ

C : h, K, μ, R

D : E, K, μ, r

Q : 8) Identify the traffic signs which do not come under the category of a regulatory sign.

A : Prohibitory signs

B : Stop and give-way signs

C : No parking & no stopping signs

D : Warning signs

Q : 9) The point of contraflexure in a loaded beam subjected to bending action is one where:

A : The shear force changes sign

B : The bending moment is maximum

C : The shear force is maximum

D : The bending moment changes sign

Q : 10) The recommended maximum spacing of contraction joints in 15 cm thick reinforced slabs of rigid pavements, for highways as per IRC 15 : 1981 is.....

A : 13 m

B : 12 m

C : 10 m

D : 14 m

Q : 11) A water sample contains 10^{-9} ml/litre of O^- ions at 25°C . The pH of this sample is:

A : 12

B : 2

C : 9

D : 5

Q : 12) In which method of forecasting population, the percentage increase in population from decade to decade is assumed to be constant.

A : Geometrical increase method

B : Incremental increase method

C : Logistic curve method

D : Arithmetical increase method

Q : 13) In sewerage system drop manholes are provided when there is a :

A : Sloping ground, with drop more than 0.6 m is required to control the gradient.

B : Change in alignment of sewer line

C : Change in size of sewers

D : Change from gravity system to pressure system

Q : 14) The major constituent gases produced from a land fill site are:

A : Hydrogen sulphide and oxygen

B : Carbon monoxide and nitrogen

C : Ammonia and hydrogen

D : Carbon dioxide and methane

Q : 15) The anaerobic fermentation of biodegradable matter in an enclosed space under controlled conditions of temperature. Moisture, pH, etc. The waste mass undergoes decomposition due to microbial activity, thereby generating biogas comprising of methane and carbon dioxide, and also digested sludge. Which of the following options is described here?

A : Bio methanation

B : Incineration

C : Plasma pyrolysis vitrification

D : Autoclaving

Q : 16) Which is the least preferred strategy of integrated solid waste management according to their environmental benefits:

A : Land fills

B : Composting

C : Waste to energy

D : Recycling

Q : 17) A bar of length L and cross-section area A is subjected to a gradually applied load Q . Another bar of the same material, Having the same length L , and cross section area $2A$ is also subjected to a gradually applied load Q . If the strain energy stored in the two bars are the same, then the ratio $\frac{P}{Q}$ is:

- A : $\frac{1}{\sqrt{2}}$**
- B : $\sqrt{2}$**
- C : $\frac{1}{2}$**
- D : 2**

Q : 18) The following statements S1 and S2 pertain to water treatment scheme.

S1 : The efficiency of sedimentation process, depends on the difference of specific gravities of the particle and the medium.

S2 : Disinfection being the last process in the treatment scheme, is not affected by poor coagulation and flocculation.

Choose the correct answer.

A : S1 is true and S2 is false

B : S1 is false and S2 is true

C : Both S1 and S2 are false

D : Both S1 and S2 are True

Q : 19) The features of anaerobic digestion of sewage are given. Identify the incorrect one.

A : Reduces odour / flies problem

B : Reduction in volume of sludge and improving the dewatering characteristics of the sludge, makes it easy to dry.

C : High operating cost

D : Reduce production of landfill greenhouse gases when otherwise these untreated sludge is disposed on landfill.

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Q : 20) The result of analysis of raw water sample from a source are given below.

Turbidity : 3.5 NTU

pH : 7.4

Fluoride : 1.0 mg/l

Total hardness : 350 mg/l

Iron : 2.7 mg/l

MPN : 60 per 100 ml

For the above data, treatment has to be provided to the water for the removal of :

A : Turbidity, fluoride, and hardness

B : Hardness, iron, followed by disinfection

C : Turbidity, fluoride, hardness, iron, followed by disinfection

D : Iron followed by disinfection

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