(Paper) SSC Junior Engineers (JE) Exam - 2016 "held on 4th March 2017" Morning Shift (General Engineering)

QID : 801 - According to the Gay-Lussac law for a perfect gas, the absolute pressure of given mass varies directly as

Options:

1) temperature

2) absolute temperature

3) absolute temperature, if volume is kept constant

4) volume, if temperature is kept constant

Correct Answer: absolute temperature, if volume is kept constant

QID : 802 - Which of the following can be regarded as gas so that gas laws could be applicable, within the commonly encountered temperature limits.

Options:

1) O_2, N_2, steam, CO_2

2) O_2, N_2, water vapour

3) SO_2, NH_3, CO_2, moisture

4) O_2, N_2, H_2, air

Correct Answer: O_2, N_2, H_2, air

QID : 803 - Temperature of a gas is produced due to

Options:

1) its heating value

2) kinetic energy of molecules

3) repulsion of molecules

4) attraction of molecules

Correct Answer: kinetic energy of molecules

QID : 804 - The pressure of a gas in terms of its mean kinetic energy per unit volume E is equal to

Options:

1) E/3

2) E/2

3) 3E/4

4) 2E/3

Correct Answer: 2E/3

QID : 805 - According to Boyle's law for a perfect gas

Options:

1) $T_2/T_1 = P_2/P_1$, if V is kept constant

2) $T_2/T_1 = V_2/V_1$, if P is kept constant

3) $P_1/P_2 = V_2/V_1$, if T is kept constant

4) None of these

Correct Answer: $P_1/P_2 = V_2/V_1$, if T is kept constant

QID : 806 - Boyle's law i.e. pV= constant is applicable to gases under

Options:

1) all ranges of pressures

2) only small range of pressures

3) high range of pressures

4) steady change of pressures

Correct Answer: only small range of pressures

QID : 807 - According to which law, all perfect gases change in volume by (1/273)th of their original volume at 0°

C for every 1°C change in temperature when pressure remains constant

Options:

1) Joule's law

2) Boyle's law
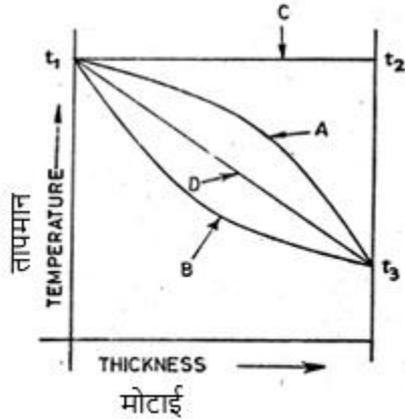
3) Regnault's law

4) Charles' law

Correct Answer: Charles' law

QID : 808 -

In the figure given below, curve A will be applicable when thermal conductivity of the material.

नीचे दी गयी आकृति में वक्र मान्य होगा जब सामग्री के लिए उष्मीय चालकता।

Options:

1) increases with increase in temperature

2) decreases with increase in temperature

3) is very large

4) is constant at all the temperatures

Correct Answer: increases with increase in temperature

QID : 809 - In order that a cycle be reversible, following must be satisfied

Options:

1) free expansion or friction resisted expansion/compression process should not be encountered

2) when heat is being absorbed, temperature of hot source and working substance should be same

3) when heat is being rejected, temperature of cold source and working substance should be same

4) All options are correct

Correct Answer: All options are correct

QID : 810 - Which of the following parameters remains constant during ideal throttling process

Options:

1) pressure

2) temperature

3) volume

4) enthalpy

Correct Answer: enthalpy

QID : 811 - Maximum work by an expansion of a gas in a closed system is possible when process takes place at constant

Options:

1) pressure

2) temperature

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3) volume

4) enthalpy

Correct Answer: pressure

QID : 812 - In an isothermal process, the internal energy

Options:

1) increases

2) decreases

3) remains constant

4) first increases and then decreases

Correct Answer: remains constant

QID : 813 - Which of the following represents the perpetual motion of the first kind

Options:

1) engine with 100 % thermal efficiency

2) a full reversible engine

3) transfer of heat energy from low temperature source to high temperature source

4) a machine that continuously creates its own energy

Correct Answer: a machine that continuously creates its own energy

QID : 814 - The door of a running refrigerator inside a room was left open. Which of the following statement is correct?

Options:

1) The room will be cooled to the temperature inside the refrigerator

2) The room will be cooled slightly

3) The room will be gradually warmed up

4) The temperature of the air in the room will remain unaffected

Correct Answer: The room will be gradually warmed up

QID : 815 - A perfect gas at 27° C was heated until its volume was doubled. The temperature of the gas will now be

Options:

1) 270° C

2) 540° C

3) 327° C

4) 729° C

Correct Answer: 327° C

QID : 816 - For same compression ratio and for same heat added

Options:

1) Otto cycle is more efficient than Diesel cycle

2) Diesel cycle is more efficient than Otto cycle

3) efficiency depends on other factors

4) both Otto and Diesel cycles are equally efficient

Correct Answer: Otto cycle is more efficient than Diesel cycle

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QID : 817 - The efficiency of Diesel cycle with decrease in cut off

Options:

1) increases

2) decreases`

3) remains unaffected

4) first increases and then decreases

Correct Answer: increases

QID : 818 - The ideal efficiency of an Ericsson cycle with perfect regeneration and operating between two given temperature limits is

Options:

1) equal to Joule cycle

2) equal to Carnot cycle

3) equal to Brayton cycle

4) less than Carnot cycle

Correct Answer: equal to Carnot cycle

QID : 819 - A steam nozzle converts_____.

Options:

1) kinetic energy into heat

2) heat energy into potential energy

3) potential energy into heat

4) heat energy into kinetic energy

Correct Answer: heat energy into kinetic energy

QID : 820 - Which is the wrong assumption for calculation of air standard efficiency?

Options:

1) All processes are reversible

2) Specific heat remains constant at all temperatures

3) No account of the mechanism of heat transfer is considered

4) Gases dissociate at higher temperatures

Correct Answer: Gases dissociate at higher temperatures

QID : 821 - Calculate the enthalpy of 3 kg of fluid that occupies a volume of 1.5 m3, if the internal energy is 3.5 M Joules/kg and the pressure is 0.3 MN/m2

Options:

1) 3.95 MJ

2) 3.65 MJ

3) 10.95 MJ

4) None of these

Correct Answer: None of these

QID : 822 - When a process undergoes a complete cycle then the change of entropy will be

Options:

1) + ve value

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2) - ve value

3) zero value

4) + ve or - ve value depending on initial condition

Correct Answer: zero value

QID : 823 - Following relationship defines the Gibb's free energy G

Options:

1) G = H + TS

2) G = H - TS

3) G = U + TS

4) F = U - TS

Correct Answer: G = H - TS

QID : 824 - During a process on the closed system its internal energy increases by twice the units than the heat added to it. It is possible due to

Options:

1) radiation of heat from surroundings

2) lowering of the temperature

3) increasing of the temperature

4) performing of shaft work on the system

Correct Answer: performing of shaft work on the system

QID : 825 - Fusion curve on p-t diagram for all substances possesses the following slope

Options:

1) zero

2) infinity

3) positive

4) variable

Correct Answer: variable

QID : 826 - When heat is transferred from one particle of hot body to another by actual motion of the heated particles, it is referred to as heat transfer by:

Options:

1) conduction

2) convection

3) radiation

4) conduction and convection

Correct Answer: conduction

QID : 827 - Which of the following is a case of steady state heat transfer?

Options:

1) I.C. engine

2) Air preheaters

3) Heating of building in winter

4) None of these

Correct Answer: None of these

QID : 828 - The time constant of a thermocouple is

Options:

1) the time taken to attain the final temperature to be measured

2) the time taken to attain 50 % of the value of initial temperature difference

3) the time taken to attain 63.2% of the value of initial temperature difference

4) determined by the time taken to reach 100°C from 0°C

Correct Answer: the time taken to attain 63.2% of the value of initial temperature difference

QID : 829 - Which of the following is expected to have highest thermal conductivity

Options:

1) steam

2) solid ice

3) melting ice

4) water

Correct Answer: solid ice

QID : 830 - The rate of energy emission from unit surface area through unit solid angle, along a normal to the surface, is known as

Options:

1) emissivity

2) transmissivity

3) reflectivity

4) intensity of radiation

Correct Answer: intensity of radiation

QID : 831 - Dynamic viscosity of most of the gases with rise in temperature

Options:

1) increases

2) decreases

3) remains unaffected

4) unpredictable

Correct Answer: increases

QID : 832 - The resultant of all normal pressures acts

Options:

1) at c.g. of body

2) at centre of pressure

3) vertically upwards

4) at metacentre

Correct Answer: vertically upwards

QID : 833 - A body floats in stable equilibrium

Options:

1) when its metacentric height is zero

2) when the metacentre is above c.g.

3) when its c.g. is below its centre of buoyancy

4) metacentre has nothing to do with position of c.g. for determining stability

Correct Answer: when the metacentre is above c.g.

QID : 834 - Metacentre is the point of intersection of

Options:

1) vertical upward force through c.g. of body and center line of body

2) buoyant force and the center line of body

3) mid-point between c.g. and center of buoyancy

4) All of these

Correct Answer: buoyant force and the center line of body

QID : 835 - The two important forces for a floating body are

Options:

1) buoyancy, gravity

2) buoyancy, pressure

3) buoyancy, inertial

4) inertial, gravity

Correct Answer: buoyancy, gravity

QID : 836 - The normal stress is same in all directions at a point in a fluid

Options:

1) only when the fluid is frictionless

2) only when the fluid is incompressible and has zero viscosity

3) when there is no motion of one fluid layer relative to an adjacent layer

4) irrespective of the motion of one fluid layer relative to an adjacent layer

Correct Answer: when there is no motion of one fluid layer relative to an adjacent layer

QID : 837 - An ideal flow of any fluid must satisfy

Options:

1) Pascal law

2) Newton's law of viscosity

3) boundary layer theory

4) continuity equation

Correct Answer: continuity equation

QID : 838 - The flow in which the velocity vector is identical in magnitude and direction at every point, for any given instant, is known as

Options:

1) one dimensional flow

2) uniform flow

3) steady flow

4) turbulent flow

Correct Answer: uniform flow

QID : 839 - Two dimensional flow occurs when

Options:

1) the direction and magnitude of the velocity at all points are identical

2) the velocity of successive fluid particles, at any point, is the same at successive periods of time

3) the magnitude and direction of the velocity do not change from point to point in the fluid

4) the fluid particles move in plane or parallel planes and the streamline patterns are identical in each plane

Correct Answer: the fluid particles move in plane or parallel planes and the streamline patterns are identical in each plane

QID : 840 - The upper surface of a weir over which water flows is known as

Options:

1) crest

2) nappe

3) sill

4) weir top

Correct Answer: sill

QID : 841 - The fluid forces considered in the Navier strokes equation are

Options:

1) gravity, pressure and viscous

2) gravity, pressure and turbulent

3) pressure, viscous and turbulent

4) gravity, viscous and turbulent

Correct Answer: gravity, pressure and viscous

QID : 842 - Bernoulli equation deals with the law of conservation of

Options:

1) mass

2) momentum

3) energy

4) work

Correct Answer: energy

QID : 843 - Specific weight of sea water is more than that of pure water because it contains _____.

Options:

1) dissolved air

2) dissolved salt

3) suspended matter

4) All options are correct

Correct Answer: All options are correct

QID : 844 - Darcy-Weisabach equation for loss of head in pipe is: -

Where f = friction factor, L = length, V = velocity

m = A/P = area/wetted perimeter

Options:

1) f (L/4m).(V2/2g)

2) f (L/m)(V2/2g)

3) f (4L/m)(V2/2g)

4) f (4m/L)(V2/2g)

Correct Answer: f (L/4m).(V2/2g)

QID : 845 - A mouthpiece can't be used under very large head because of

Options:

1) creation of vortex at vena contracta

2) cavitation problem at vena contracta

3) large variation of discharge

4) erratic flow

Correct Answer: cavitation problem at vena contracta

QID : 846 - For very high discharge at low pressure such as for flood control and irrigation applications, which of the following types of pump is preferred?

Options:

1) Centrifugal

2) Axial Flow

3) Reciprocating

4) Mixed Flow

Correct Answer: Axial Flow

QID : 847 - Time required to empty uniform rectangular tank is proportional to its

Options:

1) height H

2) √H

3) H2

4) H3/2

Correct Answer: √H

QID : 848 - The hydraulic radius in the case of an open channel with great width is equal to

Options:

1) depth of channel

2) 1/2 x depth of channel

3) 1/3 x depth of channel

4) 1/4 x depth of channel

Correct Answer: depth of channel

QID : 849 - Runaway speed of a hydraulic turbine is

Options:

1) full load speed

2) the speed at which turbine runner will be damaged

3) the speed if the turbine runner is allowed to revolve freely without load and with the wicket gates wide open

4) the speed corresponding to maximum overload permissible

Correct Answer: the speed if the turbine runner is allowed to revolve freely without load and with the wicket gates wide open

QID : 850 - The cipoletti weir functions as if it were a following notch without end contractions

Options:

1) triangular notch

2) trapezoidal notch

3) rectangular notch

4) parallelogram notch

Correct Answer: rectangular notch

QID : 851 - The velocity distribution in the turbulent boundary layer follows

Options:

1) straight line law

2) parabolic law

3) hyperbolic law

4) logarithmic law or Power law

Correct Answer: logarithmic law or Power law

QID : 852 - When a liquid rotates at constant angular velocity about a vertical axis as a right body, the pressure

Options:

1) varies as the square of the radial distance

2) decreases as the square of the radial distance

3) increases linearly as the radial distance

4) varies inversely as the elevation along any vertical line

Correct Answer: varies as the square of the radial distance

QID : 853 - The magnitude of water hammer depends on

Options:

1) length of pipe

2) elastic properties of pipe material

3) rate of stoppage of flow

4) All options are correct

Correct Answer: All options are correct

QID : 854 - Power transmitted through a pipe is maximum when the loss of head due to friction is

Options:

1) one-half of the total head supplied

2) one-third of the total head supplied

3) one-fourth of the total head supplied

4) equal to the total head supplied

Correct Answer: equal to the total head supplied

QID : 855 - To replace a pipe of diameter D by n parallel pipes of diameter d, the formula used is

Options:

1) d= D/n

2) d= D/n1/2

3) d= D/n3/2

4) d= D/n2/5

Correct Answer: d= D/n2/5

QID : 856 - The total frictional resistance to fluid flow is independent of

Options:

1) density of fluid

2) velocity

3) pressure

4) surface roughness

Correct Answer: pressure

QID : 857 - Which of the following represents unsteady non-uniform flow

Options:

1) flow through an expanding tube at an increasing rate

2) flow through an expanding tube at constant rate

3) flow through a long pipe at decreasing rate

4) flow through a long pipe at constant rate

Correct Answer: flow through an expanding tube at an increasing rate

QID : 858 - Discharge through a totally submerged orifice is directly proportional to

Options:

1) the difference in elevation of water surface

2) the square root of the difference in elevation of water surface

3) the square root of the area of the opening

4) reciprocal of the area of the opening

Correct Answer: the square root of the difference in elevation of water surface

QID : 859 - In turbulent flow

Options:

1) the shear stresses are generally larger than in a similar laminar flow

2) fluid particles move in an orderly manner

3) momentum transfer is on a molecular scale only

4) cohesion is more effective than momentum transfer in causing shear stress

Correct Answer: the shear stresses are generally larger than in a similar laminar flow

QID : 860 - The shear stress in a fluid flowing in a round pipe

Options:

1) is constant over the cross-section

2) is zero at the wall and increases linearly to the center

3) is zero at the center and varies linearly with radius

4) varies parabolically across the section

Correct Answer: is zero at the center and varies linearly with radius

QID : 861 - The property of a material which enables it to resist fracture due to high impact loads is known as

Options:

1) elasticity

2) endurance

3) strength

4) toughness

Correct Answer: toughness

QID : 862 - Resilience of a material is important, when it is subjected to

Options:

1) combined loading

2) fatigue

3) thermal stresses

4) shock loading

Correct Answer: shock loading

QID : 863 - Which of the following is not the correct procedure to increase the fatigue limit

Options:

1) cold working

2) shot peening

3) surface decarburization

4) under-stressing

Correct Answer: surface decarburization

QID : 864 -

The rivet head for boiler applications shown in the figure given below is:-

नीचे दर्शाई गई आकृति में बॉयलर अनुप्रयोग के लिए रिवेट शीर्ष, _____ है:-

Options:

1) snap

2) pan

3) conical

4) steeple

Correct Answer: steeple

QID : 865 -

The drawing representation shown in the figure given below for welding is used to represent.

नीचे दी गई आकृति में वेल्डिंग के लिए चित्रित किया गया निरूपण _____ को प्रदर्शित करता है।

Options:

1) field weld

2) weld all around

3) flush contour

4) chipping finish

Correct Answer: weld all around

QID : 866 - A key made from a cylindrical disc having segmental cross-section, is known as

Options:

1) wood-ruff key

2) feather key

3) flat saddle key

4) gib head key

Correct Answer: wood-ruff key

QID : 867 - A bench vice has following type of threads

Options:

1) metric

2) buttress

3) acme

4) square

Correct Answer: square

QID : 868 - The function of cutting oil when threading a pipe is to

Options:

1) provide cooling action

2) lubricate the dies

3) help remove chips

4) All options are correct

Correct Answer: All options are correct

QID : 869 - Aircraft body is usually fabricated by

Options:

1) welding

2) precasting

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3) riveting

4) casting

Correct Answer: riveting

QID : 870 - Which is a correct statement about flexibility and endurance of ropes?

Options:

1) lang lay rope is more flexible and endurable than regular lay rope

2) regular lay rope is more flexible and endurable than lang lay rope

3) both are equally good

4) other factors decide these considerations

Correct Answer: lang lay rope is more flexible and endurable than regular lay rope

QID : 871 - In arc welding, eyes need to be protected against:-

Options:

1) intense glare

2) sparks

3) infra-red rays only

4) both infra-red rays and ultraviolet rays

Correct Answer: both infra-red rays and ultraviolet rays

QID : 872 - The main criterion for selection of electrode diameter in arc welding is:-

Options:

1) materials to be welded

2) type of welding process

3) thickness of material

4) voltage used

Correct Answer: thickness of material

QID : 873 - Open circuit voltage for arc welding is of the order of:-

Options:

1) 18 - 40 volts

2) 40 - 95 volts

3) 100 - 125 volts

4) 130 - 170 volts

Correct Answer: 40 - 95 volts

QID : 874 - Which of the following is not a casting defect?

Options:

1) hot tear

2) blow hole

3) scab

4) decarburization

Correct Answer: decarburization

QID : 875 - The chief advantage of die casting is:-

Options:

1) possibility of incorporating thick sections in small castings

2) casting of inserts is possible

3) wide tolerances are possible

4) high production rates are possible

Correct Answer: high production rates are possible

QID : 876 - For mounting several patterns at a time, which of the following type of pattern is used?

Options:

1) combined pattern

2) loose, piece pattern

3) sweep pattern

4) match plate pattern

Correct Answer: match plate pattern

QID : 877 - Casting process is preferred for parts having _____.

Options:

1) a few details

2) many details

3) no details

4) non-symmetrical shape

Correct Answer: many details

QID : 878 - Holes in parts which have been hardened by heat treatment can be finished to accurate size only by:-

Options:

1) drilling

2) boring

3) internal grinding

4) reaming

Correct Answer: internal grinding

QID : 879 - A grinding wheel gets glazed due to:-

Options:

1) wear of abrasive grains

2) wear of bond

3) breaking of abrasives

4) cracks in wheel

Correct Answer: wear of abrasive grains

QID : 880 - Which of the following is the not a natural abrasive?

Options:

1) Garnet

2) Emery

3) Borron-carbide

4) Corundum

Correct Answer: Borron-carbide

QID : 881 - Hooke's law holds good upto:-

Options:

1) yield point

2) limit of proportionality

3) breaking point

4) elastic limit

Correct Answer: limit of proportionality

QID : 882 - Deformation per unit length in the direction of force is known as:-

Options:

1) strain

2) lateral strain

3) linear strain

4) linear stress

Correct Answer: linear strain

QID : 883 - A thin mild steel wire is loaded by adding loads in equal increments till it breaks. The extensions noted with increasing loads will behave as under:-

Options:

1) uniform throughout

2) increase uniformly

3) first increase and then decrease

4) increase uniformly first and then increase rapidly

Correct Answer: increase uniformly first and then increase rapidly

QID : 884 - Tensile strength of a material is obtained by dividing the maximum load during the test by the:-

Options:

1) area at the time of fracture

2) original cross-sectional area

3) the time of fracture and original cross-sectional area

4) minimum area after fracture

Correct Answer: original cross-sectional area

QID : 885 - Percentage reduction of area in performing tensile test on cast iron may be of the order of:-

Options:

1) 50%

2) 25%

3) 0%

4) 15%

Correct Answer: 0%

QID : 886 - For steel, the ultimate strength in shear as compared to in tension is nearly:-

Options:

1) same

2) half

3) one-third

4) two-third

Correct Answer: half

QID : 887 - In a tensile test on mild steel specimen, the breaking stress as compared to ultimate tensile stress is:-

Options:

1) more

2) less

3) same

4) more/less depending on composition

Correct Answer: less

QID : 888 - If a part is constrained to move and heated, it will develop

Options:

1) principal stress

2) tensile stress

3) compressive stress

4) shear stress

Correct Answer: compressive stress

QID : 889 - The materials which exhibit the same elastic properties in all directions are called:-

Options:

1) homogenous

2) inelastic

3) isotropic

4) isentropic

Correct Answer: isotropic

QID : 890 - Poisson's ratio is defined as the ratio of _____.

Options:

1) longitudinal stress and longitudinal strain

2) longitudinal stress and lateral stress

3) lateral stress and longitudinal stress

4) lateral stress and lateral strain

Correct Answer: lateral stress and longitudinal stress

QID : 891 - The interface or undercutting in involute gears can be avoided by:-

Options:

1) varying the centre distance by changing pressure angle

2) using modified involute or composite system

3) increasing the addendum of small wheel and reducing it for the larger wheel

4) All options are correct

Correct Answer: All options are correct

QID : 892 - In reciprocating engines, primary forces _____.

Options:

1) are completely balanced

2) are partially balanced

3) cannot be balanced

4) are balanced by secondary forces

Correct Answer: are partially balanced

QID : 893 - The forces which meet at one point and have their lines of action in different planes are called _____.

Options:

1) coplanar non-concurrent forces

2) non-coplanar concurrent forces

3) non-coplanar non-concurrent forces

4) intersecting forces

Correct Answer: non-coplanar concurrent forces

QID : 894 - Swaying couple results due to:-

Options:

1) primary disturbing force

2) secondary disturbing force

3) partial balancing

4) use of two cylinders

Correct Answer: primary disturbing force

QID : 895 - In order to balance the reciprocating masses:-

Options:

1) primary and secondary forces must be balanced

2) primary couple must be balanced

3) secondary couple must be balanced

4) All options are correct

Correct Answer: All options are correct

QID : 896 - If a body is transmitting torque T N-m at N rpm, then horsepower (Watts) transmitted will be:-
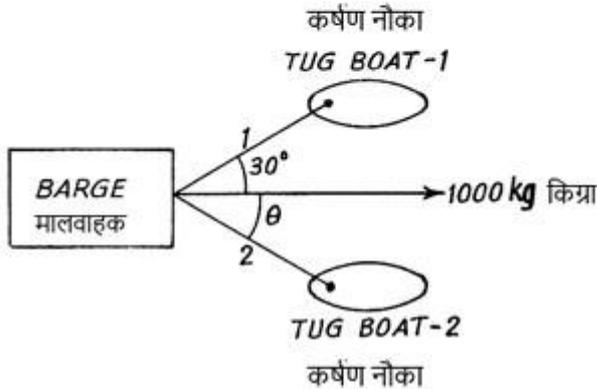
Options:

1) TN

2) TN/75

3) TN/4500

4) 2πNT/75

Correct Answer: 2πNT/75

QID : 897 -

A barge is pulled by two tugboats as shown in the figure below. The resultant of forces exerted by the tugboats is 1000 kg force. What will be the value of θ so that tension in rope 2 is minimum?

नीचे दी गई आकृति में एक मालवाहक नौका को दो कर्षण नौकाओं द्वारा खींचा जाता है । कर्षण नौकाओं दारा लगने वाला कुल बल 1000 किग्रा बल है । θ के किस मान के लिए रस्सी 2 में लगने वाला तनाव न्यूनतम होगा ?

Options:

1) 30°

2) 45°

3) 60°

4) 0°

Correct Answer: 60°

QID : 898 - An elevator weighing 1000 kg attains an upward velocity of 4 m/sec in two seconds with uniform acceleration. The tension in the supporting cables will be:-

Options:

1) 1000 N

2) 800 N

3) 1200 N

4) None of these

Correct Answer: 1200 N

QID : 899 - A 13 m ladder is placed against a smooth vertical wall with its lower end 5 m from the wall. What should be the coefficient of friction between the ladder and floor so that it remains in equilibrium?

Options:

1) 0.1

2) 0.15

3) 0.28

4) None of these

Correct Answer: None of these

QID : 900 - A particle while sliding down a smooth plane of 19.86 √2 m length acquires a velocity of 19.86 m/sec. The inclination of plane is:-

Options:

1) 30°

2) 45°

3) 60°

4) 75°

Correct Answer: 45°