Q :) If two triangulation signals of 6.75 m height each are to be just visible over ground mutually, what is the maximum distance between their locations on the ground surface?

A : 10 km

B : 20 km

C : 30 km

D : 50 km

Q :) The ratio of curvature correction to that of refraction is

A : 3

B : 12

C : 14

D : 7

Q :) In a vertical curve, an upgrade of 2.0% is followed by a downgrade of 2.0%. The rate of change of grade is 0.05% per 20 m chain. The length of the vertical curve will be

A : 800 m

B : 1000 m

C : 1200 m

D : 1600 m

Q :) The velocity distribution in turbulent flow is a function of the distance ‘y’ measured from the boundary surface and the friction velocity μ and follows a

A : Parabolic law

B : Hyperbolic law

C : Logarithmic law

D : Linear law

Q :) While conducting flow measurement using a rectangular notch, an error of 2% in head over the notch and error of 3% in the length was observed. The percentage error in the computed discharge would be

A : +6%

B : –1%

C : –2.5%

D : Zero

Q :) A channel designed by Lacey's theory has a mean velocity of 1 m/s and silt factor of unity. The hydraulic mean radius will be

A : 2.5 m

B : 2 m

C : 1 m

D : 0.5 m

Q :) A pipe is said to be equivalent to another if, in both

A : Length and discharge are the same

B : Velocity and diameter are the same

C : Discharge and frictional head loss are the same

D : Length and diameter are the same

Q :) The pressure drop per unit length of pipe ($\Delta P / L$) in Laminar flow is dependent on the velocity, viscosity and diameter. It is equal to

(a) $\frac{d^2}{32\mu V}$

(b) $\frac{32\mu VL}{\gamma d^2}$

(c) $\frac{32\mu V}{d^2}$

(d) $\frac{8\mu V}{d^2}$

Q :) The ratio of pressures between the two points A and B located respectively at depth 0.25 m and 0.75 m below a constant level of water in a tank is

A : 1 : 2

B : 1 : 3

C : 1 : 4

D : 1 : 5

Q :) A circular plate 1 m in diameter is submerged vertically in water such that its upper edge is 8 m below the free surface of water. The total hydrostatic pressure force on one side of the plate is

A : 6.7 kN

B : 65.4 kN

C : 45.0 kN

D : 77.0 kN

Q :) A turbine in which the total energy of water available is converted to kinetic energy is called

A : Axial flow turbine

B : Reaction turbine

C : Impulse turbine

D : Mixed flow turbine

Q :) Discharge per unit drawn down at a well is called

A : Specific storage

B : Specific yield

C : Specific capacity

D : None of the above

Q :) For one-dimensional flow without recharge in unconfined aquifer between two water bodies, the steady water table profiles

A : A straight line

B : A parabola

C : An ellipse

D : An arc of a circle

Q :) As per the recommendation of the Bureau of Indian Standards, the shape of the lined canal is

A : Circular

B : Trapezoidal

C : Parabolic

D : Elliptic

Q :) The standard BOD_5 at 20°C, when compared to BOD_u is

A : 50%

B : 68%

C : 75%

D : 100%

Q :) Sludge bulking can be controlled by

A : Chlorination

B : Coagulation

C : Aeration

D : Denitrification

Q :) Uniformity coefficient of filter sand is given by

A : $D_{60}D_5$

B : D_{50}/D_5

C : D_{50}/D_{10}

D : D_{60}/D_{10}

Q :) Which of the following causes a decrease demand of water in per capita consumption ?

A : Use of metering system

B : Good quality of water

C : Better standard of living of the people

D : Hotter climate

Q :) The following data pertain to a sewage sample :

Initial DO = 9.5 mg/L;

final DO = 2 mg/L; Dilution = 1%

The BOD of the given sample is

A : 7.5 mg/L

B : 10 mg/L

C : 75 mg/L

D : 750 mg/L

Q :) An Engineer measured the distance between two locations on a plan having a scale of 1 cm = 50 m as 600 m. Later, however, he found that he used a wrong scale of 1 cm = 30 m to measure the distance. The true distance between the locations is

A : 200 m

B : 250 m

C : 500 m

D : 1000 m

Q :) If the probable error in single observation is ± 0.04m and that of the mean is ± 0.01m,then the number of observations are

A : 4

B : 10

C : 16

D : 64

Q :) Two straights AB and BC have the bearing of 70° and 120° respectively. They are to be connected by a circular curve. The deflection angle will be

A : 130°

B : 70°

C : 50°

D : 120°

Q :) The following boundary condition exists at the wall (y = 0) in a boundary layer.

A : u = U

B : (dP/dX)=-ve

C : τ_0= 0

D : u = 0, v = 0

Q :) Uniform flow in an open channel exists, when the flow is steady and the channel is

A : Prismatic

B : Non-prismatic and depth of flow is constant along the channel

C : Prismatic and depth of flow is constant along the channel

D : Frictionless

Q :) For a hydraulically efficient rectangular channel section, the ratio of width to normal depth is

A : 0.5

B : 1.0

C : 2 3

D : 2.0

Q :) As the depth of immersion of a vertical plane surface increases, the location of centre of pressure

A : Moves apart from the centre of gravity of the area

B : Comes closer to the centre of gravity of the area

C : Coincide with the centre of gravity of the area

D : Remains unaffected

Q :) In differential manometer used in a venturimeter along a water pipeline, if an error of 2 mm has been made in observing a differential head of 10 mm, the percentage error in pressure difference is

A : 12.6

B : 25.2

C : 20

D : 10

Q :) With rise in pressure, the bulk modulus of liquid

A : Remains constant

B : Increases

C : Decreases

D : None of the above

Q :) When an irrigation canal is taken over a drainage channel the crossing is called

A : An aqueduct

B : A super passage

C : A level crossing

D : None of the above

Q :) Lacey's scour depth for a stream, carrying a discharge of 3 cumecs per meter width and having a silt factor 1.2 is

A : 1.32 m

B : 2.64 m

C : 3.96 m

D : 4.32 m

Q :) The discharge passing over an ogee spillway, per unit length of its apex line is proportional to (where H is head over the apex of its crest)

A : H

B : H^2

C : $H^{1/2}$

D : $H^{3/2}$

Q :) Lysimeter is an instrument used to measure

A : Evaporation

B : Infiltration

C : Evapotranspiration

D : Transpiration

Q :) The relation between duty D in hectares/ cumec, depth of water in meter and base period B in days is given by

(a) $\Delta = \frac{1.98\,B}{D}$

(b) $\Delta = \frac{8.64\,B}{D}$

(c) $\Delta = \frac{5.68\,B}{D}$

(d) $\Delta = \frac{8.64\,D}{B}$

Q :) The use of unit hydrographs for estimating floods is generally limited to catchments of size less than

A : 5000 Km^2

B : 500 Km^2

C : 106 Km^2

D : 5000 ha

Q :) According to Khosla, to keep the structure safe against piping, exit gradient to be provided lies between

A : 0.10 and 0.15

B : 0.15 and 0.20

C : 0.20 and 0.26

D : 0.25 and 0.30

Q :) Determine the slope and deflection at the free of the cantilever loaded as shown in the figure. Take I = 10,000 cm^4 and E = 2.1 × 10^6 kg/cm^2

Q :) The cross-section of a joist is a T-section, 120 mm × 200 mm × 12 mm, with 120 mm side horizontal, sketch the shear stress distribution and hence find the maximum shear stress if it has to resist a shear force of 200 kN.

[SSC JE – 08-04-2012 : 15 marks]

Q :) For the I-section shown in figure determine the position of centroid and moment of inertia about the base flange (I_{KL})