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Q : 1) Match List-I with List-II and select the correct answer

List-I	List-II
A. Concentrated sugar solution	1. Dilatant fluid
B. Sewage sludge	2. Bingham plastic fluid
C. Blood	3. Pseudoplastic fluid
D. Air	4. Newtonian fluid

Codes :

A : 1, 2, 3, 4

B : 1, 2, 4, 3

C : 2, 1, 3, 4

D : 2, 1, 4, 3

Q : 2) Which one of the following statements is correct?

A : Dynamic viscosity of water is nearly 50 times that of air

B : Kinematic viscosity of water is 30 times that of air

C : Water is soil is able to rise a considerable distance above the groundwater table due to viscosity

D : Vapour pressure of a liquid is inversely proportional to the temperature

Q : 3) Which of the following statements is correct?

A : Dynamic viscosity is the property of a fluid which is not in motion

B : Surface energy is a fluid property giving rise to the phenomenon of capillarity in water

C : Cavitation results from the action of very high pressure

D : Real fluids have lower viscosity than ideal fluids

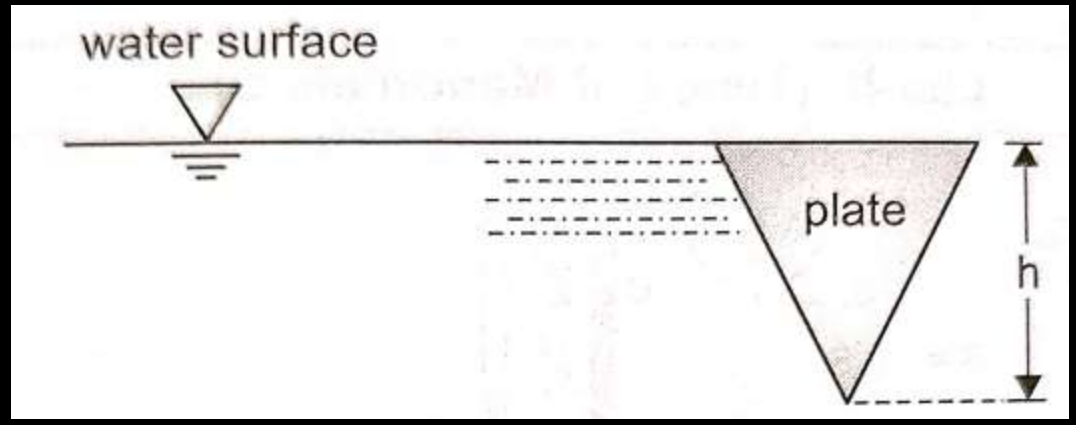
Q : 4) An equilateral triangular plate is immersed in water as shown in the above figure. The centre of pressure below the water surface is at a depth of

A : 3h/4

B : h/3

C : 2h/3

D : h/2



Q : 5) Multi U-tube manometers with different fluids are used to measure

A : Low pressures

B : Medium pressures

C : High pressures

D : Very low pressures

Q : 6) Which of the following conditions will be satisfied by steady irrotational flow?

1. $\frac{\partial u}{\partial y} + \frac{\partial v}{\partial x} = 0$
2. $\frac{\partial v}{\partial x} + \frac{\partial u}{\partial y} = 0$
3. $\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} = 0$

Select the correct answer using the codes given below

A : 1 and 2

B : 2 and 3

C : 1 and 3

D : 1, 2 and 3

Q : 7) Consider the following statements:

Euler's equation of motion:

1. Can be derived from Navier-Stokes equation
2. Refers to energy balance
3. Develops into Bernoulli's equation under appropriate conditions
4. Is applicable to rotational as well as irrotational flows

Which of these statements are correct?

A : 1, 2, 3 and 4

B : 1 and 2 only

C : 1 and 3 only

D : 3 and 4 only

Q : 8) Match List-I (Type of turbines) with List-II (ranges of specific speeds in MKS unit) and select the correct answer

List-I	List-II
A. Francis	1. 10 – 35
B. Kaplan	2. 35 – 60
C. Pelton with one jet	3. 60 – 300
D. Pelton with two jets	4. 300 – 1000

Codes :

A : 3, 4, 2, 1

B : 4, 3, 2, 1

C : 3, 4, 1, 2

D : 4, 3, 1, 2

Q : 9) In case of semi-circular vanes, the theoretical maximum efficiency of the wheel can be?

A : 50%

B : 67%

C : 75%

D : 100%

Q : 10) Without residual whirl in the flow at the entrance to a draft tube, the best cone angle is

A : $< 6^{o}$

B : 9^{o} to 11^{o}

C : 18^{o}

D : 24^{o}

Q : 11) match List-I (Process) with List-II (Biological agent) and select the correct answer using the codes given below the lists

List-I	List-II
A. Oxidation ditch	1. Facultative bacteria
B. Waste stabilization pond	2. Anaerobic bacteria
C. Imhoff tank	3. Aerobic bacteria (Suspended culture)
D. Rotating biological contractor (RBC)	4. Aerobic bacteria (Attached culture)

Codes :

A : 4, 1, 2, 3

B : 3, 1, 2, 4

C : 1, 2, 3, 4

D : 3, 4, 1, 2

Q : 12) What is the correct sequence of the following treatment units employed in a conventional sewage treatment plant?

1. Screen chamber
2. Primary settling tank
3. Trickling filter
4. Grit chamber
5. Secondary settling tank

A : 4, 5, 2, 3 and 1

B : 1, 4, 2, 3 and 5

C : 5, 2, 3, 4 and 1

D : 1, 4, 3, 2 and 5

Q : 13) Which one of the following gases is the principal by-product of anaerobic decomposition of the organic content in waste water?

A : Carbon Monoxide

B : Ammonia

C : Hydrogen Sulphide

D : Methane

Q : 14) Which one of the following pairs is not correctly matched?

Plume behaviour	Atmospheric condition
A. Looping	Stable
B. Fumigation	Inversion above and lapse below the stack
C. Fanning	inversion
D. Trapping	Inversion above and below the stack with lapse in between

Q : 15) A rectangular footing 1m × 2m is placed at a depth of 2m in a saturated clay having an unconfined compressive strength of 100 kN/m^2. According to Skempton, the net ultimate bearing capacity is

A : 420 kN/m^2

B : 412.5 kN/m^2

C : 385 kN/m^2

D : 350 kN/m^2

Q : 16) A raft foundation is to be constructed on a sandy soil. The maximum differential settlement and limiting maximum settlement as recommended by Indian standard code are:

Max. differential settlement	Limiting max settlement
A. 40 mm	65 mm to 100 mm
B. 40 mm	40 mm to 65 mm
C. 25 mm	65 mm to 100 mm
D. 25 mm	40 mm to 65 mm

Q : 17) Match List-I (Unit/test) with List-II (Purpose) and select the correct answer using the codes

List-I	List-II
A. Casagrande's apparatus	1. Determination of grain size distribution
B. Hydrometer	2. Consolidation characteristics
C. Plate load test	3. Determination of consistency limits
D. Oedometer	4. Determination of safe bearing capacity of soil

Codes:

A : 1, 3, 2, 4

B : 1, 3, 4, 2

C : 3, 1, 2, 4

D : 3, 1, 4, 2

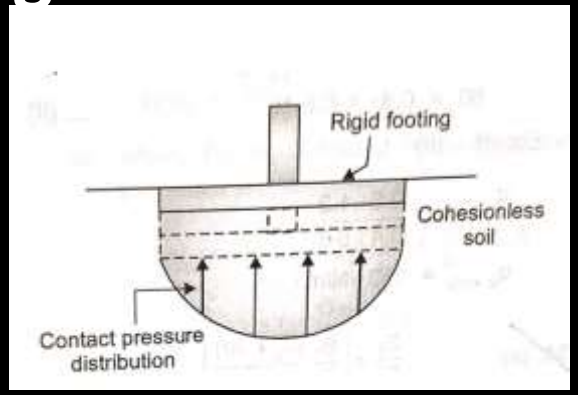
Q : 18) The contact pressure distribution under a rigid footing on a cohesionless soil would be

A : Uniform throughout

B : Zero at centre and maximum at edges

C : Zero at edges and maximum at centre

D : Maximum at edges and minimum at centre



Q : 19) When the observed value of N exceeds 15, the corrected penetration number N_c as per Terzaghi and Peck recommendation in the silty fine sands will be

A : 15 - $\frac{1}{2}(N_R - 15)$

B : 15 - $\frac{1}{2}(N_R + 15)$

C : 15 + $\frac{1}{2}(N_R - 15)$

D : 15 + $\frac{1}{2}(N_R + 15)$

Where, N = Penetration number, and N_R = recorded value

Q : 20) Consider the following statements related to the properties of a good quality soil sample

1. Area ratio should be low
2. Cutting edge should be thick
3. Outside clearance should be high
4. Outside clearance should be low

Which of the above statements are correct?

A : 1 and 2

B : 2 and 3

C : 3 and 4

D : 1 and 4

Q : 21) Under the Nagpur Road Plan, which of the following are NOT relevant in planning the road development programme in a backward district?

1. Existing agriculture drainage network if drain canals
2. Existing number of panchayat unions
3. Existing of villages mud0track roads
4. Number of villages with population of 10000 and above

A : 1, 2, 3 and 4

B : 1, 2 and 3 only

C : 1, 2 and 4 only

D : 2, 3 and 4 only

Q : 22) Which one of the following expressions gives intermediate sight distance as per I.R.C. standards? (SSD : Stopping sight distance; OSD : Overtaking sight distance)

A : 2 SSD

B : $\frac{(SSD+OSD)}{2}$

C : $\frac{(OSD-SSD)}{2}$

D : 2 OSD

Q : 23) Total reaction time of a driver does not depend upon

A : Perception time

B : Brake reaction time

C : Condition of mind of the driver

D : Speed of vehicle

Q : 24) A horizontal curve of 480 m for 7.5 m two-lane road is to be designed for a speed of 80 kmph. The raising of the outer edge of the pavement with respect to the inner edge to cater to the mixed traffic condition is

A : 0.14 m

B : 0.22 m

C : 0.24 m

D : 0.27 m

Q : 25) Consider the following situations

1. Traffic volume entering from all roads is less than 3000 vehicles per hour.
2. Pedestrian volume is high
3. Total right turning traffic is high
4. A road in a hilly region

A rotary will be more suitable than control by signals, in situations listed against

A : 1 and 3

B : 1 and 4

C : 2 and 4

D : 2 and 3

Q : 26) When two roads with two-lane, two way traffic, cross at an uncontrolled intersection, the total number of potential major conflict points would be

A : 32

B : 24

C : 16

D : 4

Q : 27) Reconnaissance survey for determining feasibility and estimation of scheme falls under the classification based on the

A : Nature of the filed of survey

B : Object of surveying

C : Instruments used

D : Method employed

Q : 28) Which one of the following statements is correct?

A : In a retrograde vernier, (n – 1) divisions on the primary scale are divided into n divisions on the vernier scale

B : A double vernier consists of two simple verniers placed end-to-end forming one scale with the zero in the centre

C : In an extended vernier, (2n + 1) primary divisions are divided into n divisions on the vernier

D : In a direct vernier, (n+1) primary divisions and divided into n equal divisions on the vernier scale

Q : 29) In an old map, a line AB was drawn to a magnetic bearing of 5°30’, the magnetic declination at the time being 1° East. If the present magnetic declination is 8°30’ east, the line should be set to a magnetic bearing of

A : 358°

B : 2°

C : 6°30’

D : 257°

Q : 30) Which of the following statements with reference to isogonic line are correct in magnetic declination?

1. It is drawn through the points of same declination
2. It does not form complete great circle
3. It radiates from north and south magnetic regions and follows irregular paths

A : 1 and 2 only

B : 1 and 3 only

C : 2 and 3 only

D : 1, 2 and 3

Q : 31) Consider the following statements

Errors eliminated by taking both face observations are those due to

1. Horizontal axis not being perpendicular to the vertical axis
2. Non-parallelism of the axis of telescope level and line of collimation
3. Imperfect adjustment of vertical circle vernier

Which of the above statements are correct?

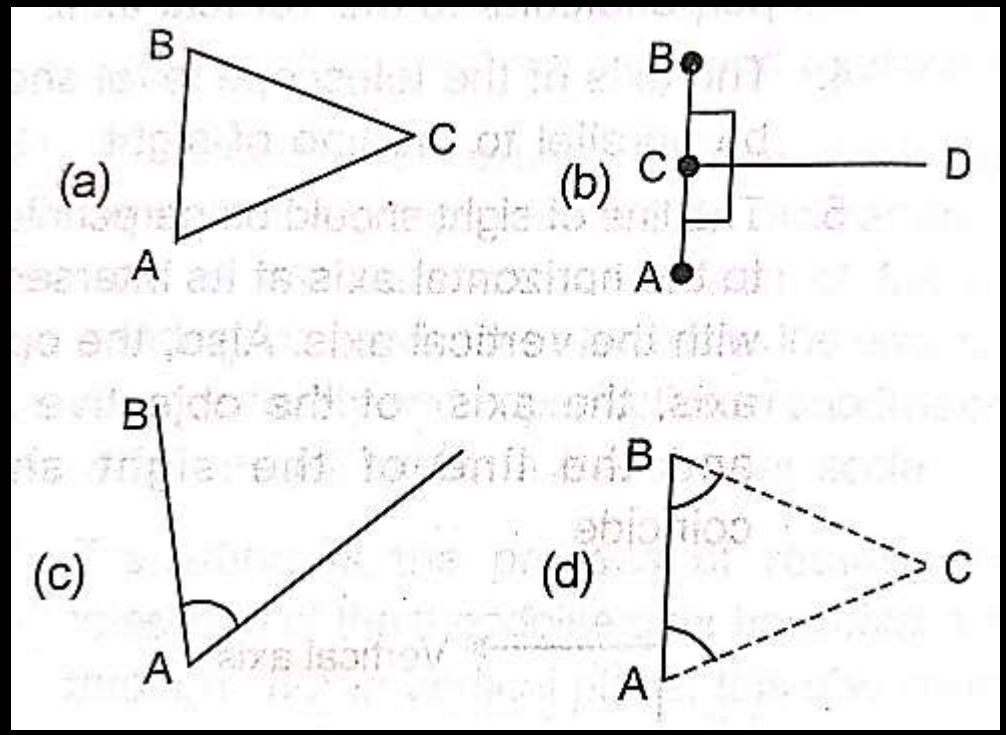
A : 1, 2 and 3

B : 1 and 2 only

C : 2 and 3 only

D : 1 and 3 only

Q : 32) Which of the following figures indicates the principle of traversing?



Q : 33) Match List-I with List-II and select the correct answer using the code given below the lists

List-I	List-II
A. Rails	1. Connect one section of rail to next
B. Sleepers	2. Convert line load into uniformly distributed load
C. Ballast	3. Convert point load into uniformly distributed load
D. Fish plates	4. Convert rolling loads into point load (s)

Codes :

A : 4, 3, 2, 1

B : 1, 2, 3, 4

C : 4, 2, 3, 1

D : 1, 3, 2, 4

Q : 34) For a sleeper density of (n + 5), number of sleepers required for constructing a broad gauge (BG) railway track of length 650 m is

A : 975

B : 918

C : 900

D : 880

Q : 35) Which one of the following statement is correct regarding ballast used for railway tracks?

A : The minimum depth of ballast for B.G. section is 20 cm – 25 cm

B : The quantity of stone ballast required for one metre length of track is 0.53 m^3 for B.G. section

C : For M.G. section the width of ballast is 1.83 m

D : The minimum depth of ballast for N.G. section is 10 cm

Result : SSC JE 2019

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