

DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO
TEST BOOKLET SERIES

TEST BOOKLET
A.E.(C)PWINDIPH-2016



Time Allowed : 2 Hours]

[Maximum Marks : 100

All questions carry equal marks.

INSTRUCTIONS

1. Immediately after the commencement of the examination, you should check that test booklet does not have any unprinted or torn or missing pages or items, etc. If so, get it replaced by a complete test booklet.
2. **Encode clearly the test booklet series A, B, C or D as the case may be in the appropriate place in the answer-sheet.**
3. Write your Roll Number only in the box provided alongside.
Do not write anything else on the Test Booklet.
4. This Test Booklet contains **100** items (questions). Each item comprises four responses (answers). Choose only one response for each item which you consider the best.
5. After the candidate has read each item in the Test Booklet and decided which of the given responses is correct or the best, he has to mark the circle containing the letter of the selected response by blackening it completely with Black or Blue ball pen. In the following example, response "C" is so marked :

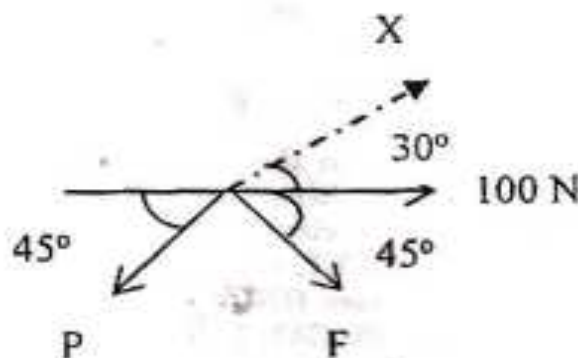
(A) (B) ● (D)
6. Do the encoding carefully as given in the illustrations. While encoding your particulars or marking the answers on answer sheet, you should blacken the circle corresponding to the choice in full and no part of the circle should be left unfilled. After the response has been marked in the ANSWER SHEET, no erasing/fluid is allowed.
7. You have to mark all your responses **ONLY** on the ANSWER SHEET separately given according to 'INSTRUCTIONS FOR CANDIDATES' already supplied to you. *Responses marked on the Test Booklet or in any paper other than the answer sheet shall not be examined.*
8. All items carry equal marks. Attempt all items. Your total marks will depend only on the number of correct responses marked by you in the Answer Sheet. There will be no negative marking.
9. Before you proceed to mark responses in the Answer Sheet fill in the particulars in the front portion of the Answer Sheet as per the instructions sent to you.
10. If a candidate gives more than one answer, it will be treated as a wrong answer even if one of the given answers happens to be correct.
11. After you have completed the test, hand over the Answer Sheet only, to the Invigilator.

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Time Allowed : 2 Hours]

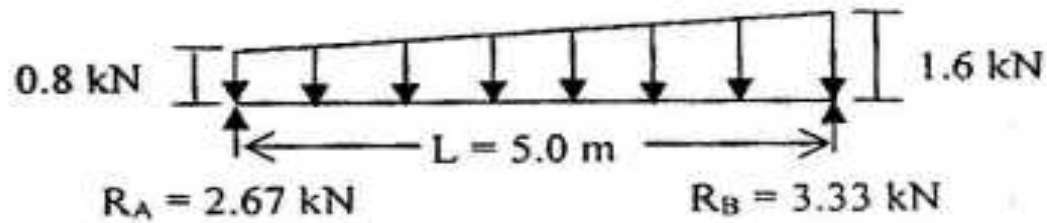
[Maximum Marks : 100

1. A wooden diving board of length 3.5 m is hinged at one end and supported 2 m from this end by a spring with a constant of 35 kN/m. How much will the spring deflect if a young man weighing 400 N stands at the end of the board ?
- (A) 0.002 m (B) 0.2 m
(C) 0.02 m (D) 2.0 m
2. Select the equation that represents force equilibrium in X-direction as shown :

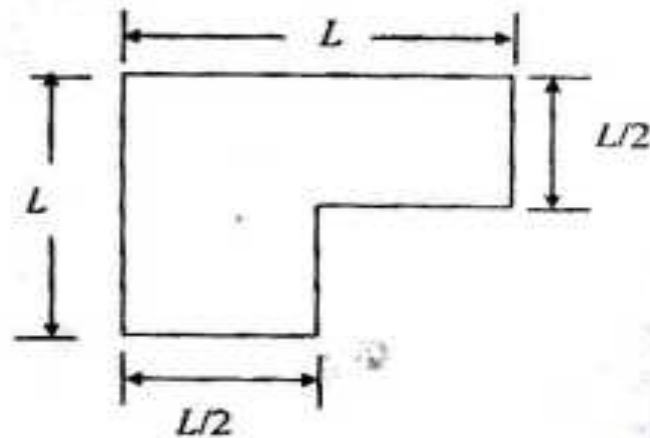


- (A) $P \cos 45^\circ - F \cos 45^\circ + 100 \cos 30^\circ = 0$
 (B) $-P \cos 45^\circ + F \cos 75^\circ + 100 \cos 30^\circ = 0$
 (C) $100 \cos 30^\circ + F \cos 75^\circ - P \cos 15^\circ = 0$
 (D) $-P \cos 45^\circ - F \cos 75^\circ - 100 \cos 30^\circ = 0$

3. The position and magnitude of maximum bending moment (from support with reaction R_A) for the beam shown in Figure is :

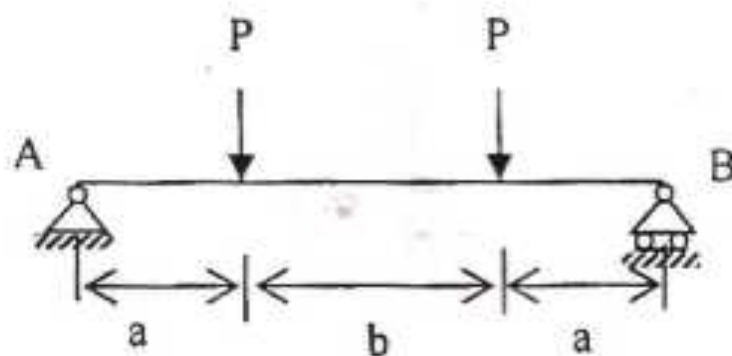


- (A) 2.5 m , 3.65 kN-m (B) 2.63 m , 3.79 kN-m
 (C) 2.97 m , 2.75 kN-m (D) 2.44 m , 3.56 kN-m
4. For the section shown in the figure, the neutral axis lies at :



- (A) $\frac{L}{3}$ from the top (B) $\frac{L}{12}$ from the top
 (C) $\frac{5L}{12}$ from the top (D) $\frac{7L}{12}$ from the top

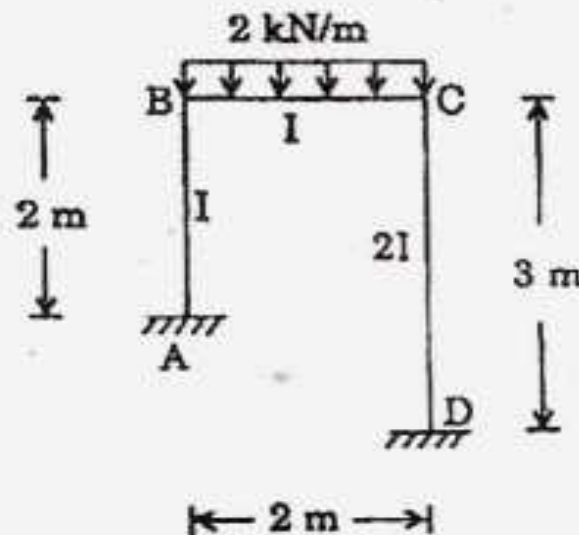
5. In a simply supported rectangular beam loaded transversely, the maximum tensile bending stress occurs at :
- (A) top fiber
(B) bottom fiber
(C) neutral axis
(D) between top fiber and neutral axis
6. A thin plate having stress components as $\sigma_x = 40$ MPa, $\sigma_y = -20$ MPa, and $\tau_{xy} = 10$ MPa. What will be the yield strength in simple tension as per Mises criterion ?
- (A) $Y = 3100$ MPa
(B) $Y = 55.67$ MPa
(C) $Y = 54.3$ MPa
(D) $Y = 1500$ MPa
7. For a rectangular beam with cross-section having width b and depth d , and loaded as shown in Figure, choose the ratio of maximum shear stress to maximum bending stress :



- (A) $\frac{d}{4a}$
(B) $\frac{d}{2a}$
(C) $\frac{b}{4a}$
(D) $\frac{b}{2a}$

8. Yield strength is :
- (A) stress required to produce certain arbitrary plastic deformation
 - (B) stress required to produce certain arbitrary elastic deformation
 - (C) stress required to cause fracture
 - (D) stress required to cause fatigue
9. Pure torsion of a shaft produces :
- (A) longitudinal normal stress in shaft
 - (B) only direct shear stress in the transverse section of the shaft
 - (C) circumferential share stress on a surface element of shaft
 - (D) a longitudinal shear stress and a circumferential shear stress on a surface element of shaft
10. A solid shaft of diameter 100 mm, length 1000 mm is subjected to a twisting moment of M_t . The maximum shear stress developed in shaft is 60 N/mm^2 . A hole of 50 mm diameter is now drilled throughout the shaft. To develop a maximum shear stress of 60 N/mm^2 in hollow shaft, the torque must be reduced by :
- (A) $\frac{M_t}{4}$
 - (B) $\frac{M_t}{8}$
 - (C) $\frac{M_t}{12}$
 - (D) $\frac{M_t}{16}$

11. In a circular shaft subjected to pure twisting moment, the principal stress at a point close to the outer periphery of shaft act on a plane :
- (A) 90° to the axis of the shaft
 (B) 45° to the axis of the shaft
 (C) 30° to the axis of the shaft
 (D) Parallel to the axis of the shaft
12. If the deflection at the free end of a uniformly loaded cantilever beam is 15 mm and the slope of deflection curve at free end is 0.02 radian, then the length of the beam is :
- (A) 0.8 m (B) 1.0 m
 (C) 1.13 m (D) 1.5 m
13. If a portal frame is subjected to a uniformly distributed load of intensity '2 kN/m' as shown in the figure, the ratio of sway moments in columns AB (of 2 m length) and CD (of 3 m length) will be equal to :



- (A) $\frac{1}{2}$ (B) $\frac{2}{3}$
 (C) $\frac{8}{27}$ (D) $\frac{9}{8}$

14. Match List-I (Elastic constant) with List-II (Definition) and select the correct answer using the codes given below the lists :

List I		List II
(Elastic constant)		(Definition)
(a) Young's modulus	(1)	The ratio of lateral strain to linear strain within elastic limit
(b) Poisson's ratio	(2)	The ratio of stress to strain within elastic limit
(c) Bulk modulus	(3)	The ratio of shear stress to shear strain within
(d) Rigidity modulus	(4)	The ratio of direct stress to corresponding volumetric strain

Codes :

	(a)	(b)	(c)	(d)
(A)	(3)	(1)	(4)	(2)
(B)	(2)	(1)	(4)	(3)
(C)	(2)	(4)	(1)	(3)
(D)	(3)	(4)	(1)	(2)

15. A concrete member under compressive load is called pedestal when the ratio of effective length and least lateral dimension does not exceeds :

(A) 3	(B) 6
(C) 12	(D) 60

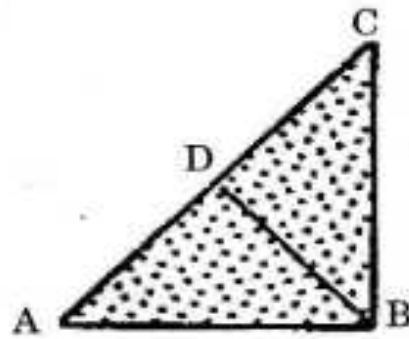
16. In two-way slabs, the torsional reinforcement is provided at :
- (A) mid-depth only (B) top face only
(C) bottom face only (D) top and bottom face both
17. If a rectangular under-reinforced section is subjected to bending moment equal to its moment carrying capacity and the stress in steel and extreme compression fiber of concrete at this moment are σ_s and σ_c respectively then which of the following is correct ?
- (A) $\sigma_c = f_c$ (B) $\sigma_s = f_y$
(C) $\sigma_s < f_y$ (D) $\sigma_s = f_y$ and $\sigma_c = f_c$
- where, f_y and f_c are the permissible stresses in steel and concrete respectively.
18. In an under-reinforced one-way slab with effective depth 100 mm, the main steel is provided as 10 mm bars at 200 mm centre to centre. The moment of resistance of the slab for M-20 grade concrete and Fe-415 steel will be :
- (A) 10 kNm/m (B) 13 kNm/m
(C) 27.6 kNm/m (D) 29.8 kNm/m
19. For the calculation of wind loading, the entire country is divided into zones.
- (A) Four (B) Six
(C) Three (D) Five

20. Concrete in sea-water or exposed directly along the sea-coast shall be at-least in case of reinforced concrete.
- (A) M 20 (B) M 30
(C) M 25 (D) M 40
21. The unsupported length between end restraints shall not exceed times the least lateral dimension of a column.
- (A) 60 (B) 25
(C) 30 (D) 12
22. In an interior span of flat slab, the negative design moment is taken as times the total design moment.
- (A) 0.35 (B) 0.70
(C) 0.65 (D) 0.50
23. An ordinary mild steel bar has been prestressed to a **working stress** of 200 MPa. If the Young's modulus of steel is 200 MPa and permanent negative strain due to shrinkage and creep is 0.0008, what is the effective stress left in the steel ?
- (A) 190 MPa (B) 170 MPa
(C) 85 MPa (D) 40 MPa

24. The maximum effective slenderness ratio for a tension member subjected to reversal of stress due to others (other than wind and earthquake) is
- (A) 250 (B) 350
(C) 400 (D) 180
25. In the plate girders, shear force is mainly resisted by :
- (A) Top flange (B) Bottom flange
(C) Web (D) Horizontal stiffener
26. The buckling class associated with the built up compression member is
- (A) Buckling class "a" (B) Buckling class "b"
(C) Buckling class "c" (D) Buckling class "a" or "b"
27. Which one of the following solid sections will have minimum shape factor ?
- (A) Circular (B) Rectangular
(C) Triangular (D) Diamond
28. For the 16 mm nominal diameter rivets, the diameter of the rivet hole is kept equal to :
- (A) 14.0 mm (B) 14.5 mm
(C) 17.5 mm (D) 18 mm

29. The code advocates that for the determination of stress in a column section, the beam reactions can be assumed to be applied at an eccentricity of from the face of section or at the centre of bearing.
- (A) 200 mm (B) 5d or 450 mm
(C) 100 mm (D) 3d or 300 mm
30. As per IS : 800-2007, the partial safety factor for materials, in which resistance is governed by the ultimate stress, is
- (A) 1.10 (B) 0.85
(C) 1.25 (D) 1.05
31. The critical load for a column of length L will be minimum when :
- (A) both end are hinged
(B) both ends are rigid
(C) one end is fixed and other hinged
(D) one end is fixed and other free
32. A single angle is connected by one leg only. If the area of outstanding leg is x , net area of connecting leg is y , and k is reduction factor whose value is less than 1, then the net effective area of angle in tension will be :
- (A) $x + y$ (B) $x + ky$
(C) $y + kx$ (D) $k(x + y)$

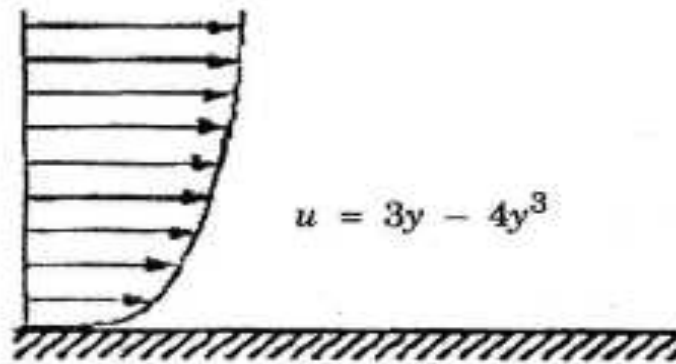
33. For the fillet weld cross-section shown in figure the throat thickness is :



- (A) AB (B) BC
(C) AD (D) BD
34. For the design of column bases, the assumed friction coefficient for the computation of shear resistance between steel base and concrete may be taken as
- (A) 0.45 (B) 1.15
(C) 1.05 (D) 0.7
35. In a fully developed rough-turbulent regime in pipe flow :
- (A) rough and smooth pipes have the same friction factor
(B) the laminar sublayer is thicker than the roughness projections
(C) the friction factor is independent of the Reynolds number
(D) the friction factor is independent of the relative roughness

36. In a turbulent flow through smooth pipe of radius r_0 the velocity distribution plotted against $\frac{y}{r_0}$.
- (A) will be logarithmic and independent of the Reynolds number
 - (B) shows increasing fullness with decrease in Reynolds number
 - (C) will be parabolic and independent of the Reynolds number
 - (D) shows increasing fullness with increase in Reynolds number
37. A penstock is 3000 meters long. Pressure wave travels in it with a velocity of 1500 m/s. If the turbine gates are closed uniformly and completely in a period of 4.5 seconds, then it is called :
- (A) rapid closure
 - (B) slow closure
 - (C) sudden closure
 - (D) uniform closure
38. Consider the following for a hydraulic jump a prismatic channel :
- (i) the specific energy decreases due to jump formation
 - (ii) the specific energy increases after the jump
 - (iii) the specific energy increases due to jump formation
 - (iv) the specific force remains constant
- Of these statements :
- (A) Only (i) is correct
 - (B) Only (ii) is correct
 - (C) Both (i), (iv) are correct
 - (D) Both (ii) and (iii) are correct

39. If the dynamic viscosity of the fluid shown in the diagram is 0.001 N.s/m^2 , what is the shear stress 30 cm from the wall ?
- (A) $1.92 \times 10^{-3} \text{ N/m}^2$
- (B) Zero
- (C) $7.92 \times 10^{-3} \text{ N/m}^2$
- (D) None of the above

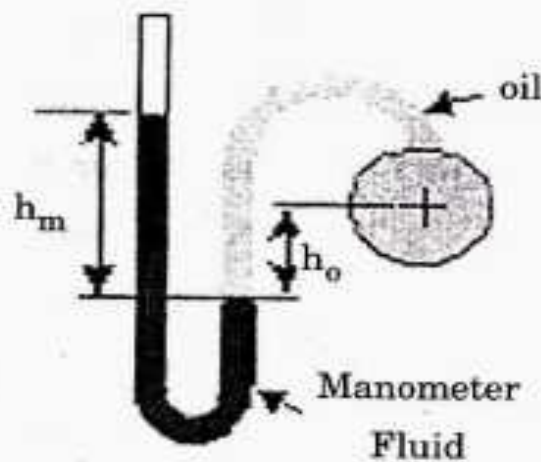


40. The Strouhal number is defined as :

- (A) $\frac{fd}{V}$
- (B) $\frac{dV}{f}$
- (C) $\frac{dV}{g}$
- (D) $\frac{V}{c}$

where, f = vortex shedding frequency; d = cylinder diameter, V = free stream velocity, and c = local velocity of sound.

41. The figure shows the cross-section of an oil pipe with a manometer attached. On the right side of the manometer the manometer fluid is in contact with oil, and on the left side the manometer is open to the atmosphere. The oil has a specific gravity of 0.85 and the manometer fluid has a specific gravity of 1.5. What is the gage pressure at the center of the pipe if h_m is 10 cm and h_o is 5 cm ?
- (A) 2.05 kN/m^2 (B) 1.47 kN/m^2
 (C) Zero (D) None of these



42. Blood pressure is measured by mercury manometer and a stethoscope by wrapping a closed air-filled jacket around the upper arm of a person at the level of the heart. The systolic pressure (the maximum pressure when the heart is pumping) and the diastolic pressure (the minimum pressure when the heart is resting) of a healthy person are indicated as $\frac{120}{80}$ respectively. These values are expressed in :
- (A) mmHg (B) kPa
 (C) Pa (D) psi

43. If a device consists of one inlet and one outlet and the volume flow rates at the inlet and at the outlet are the same, the flow through this device :

- (A) must be steady (B) is not necessarily steady
(C) must be uniform (D) must be laminar

44. Match List-I (Surface profile) with List-II (Description of the profile) and select the correct answer using the codes given below the lists :

List I

(Surface profile)

(a) M_2

(b) S_3

(c) C_1

(d) A_3

List II

(Description of the profile)

(1) Convex upward; asymptotic to horizontal at downstream end; depth increasing in downstream direction

(2) Concave downward; upstream asymptotic to normal depth with depth decreasing in downstream direction

(3) Depth increasing downstream and meeting at an angle to CDL; a curve with an inflexion point

(4) Convex upward and depth increasing in flow direction; asymptotic to NDL at downstream

Codes :

	(a)	(b)	(c)	(d)
(A)	(2)	(4)	(1)	(3)
(B)	(2)	(1)	(4)	(3)
(C)	(3)	(4)	(1)	(2)
(D)	(3)	(1)	(4)	(2)

45. Assuming the thrust T of a propeller depends upon the diameter D , speed of advance V , angular velocity ω , dynamic viscosity μ , and density ρ , which of the following dimensionless parameters can be derived by dimensional analysis ?

(1) $\frac{T}{\rho D^2 V^2}$

(2) $\frac{VD\mu}{\rho}$

(3) $\frac{D\omega}{V}$

(4) $\frac{VD\rho}{\mu}$

Select the *correct* answer using the codes given below :

- (A) (1), (2) and (3) (B) (2), (3) and (4)
(C) (1), (3) and (4) (D) (1), (2) and (4)
46. In a tidal model, the horizontal scale ratio is $\frac{1}{1000}$ and the vertical scale ratio $\frac{1}{100}$. If the time period for prototype is 12 hours, the correct time period for model would be :
- (A) 12 minutes (B) 120 minutes
(C) 200 minutes (D) 6.32 hours
47. For a triangular channel having a vertex angle of 120° , the critical depth for a discharge of $3.0 \text{ m}^3/\text{s}$ would be :
- (A) 0.906 m (B) 1.982 m
(C) 1.019 m (D) 2.352 m

48. To generate 8100 kW under a head of 81 m while working at a speed of 540 r.p.m., what type of turbine is suitable ?
- (A) Pelton (B) Francis
(C) Bulb (D) Kaplan
49. Match List-I (Typical occurrence) with List-II (Relevant flow condition) and select the correct answer using the codes given below the lists :

List I

(Typical occurrence)

(a) Cavitation

(b) Separation

(c) Stagnation point

(d) Wake

List II

(Relevant flow condition)

(1) Absence of fluid velocity

(2) Fluid pressure reduces to vapour pressure

(3) Bluff body in flow

(4) Adverse pressure gradient in widening Boundaries of flow

Codes :

	(a)	(b)	(c)	(d)
(A)	(4)	(2)	(3)	(1)
(B)	(2)	(4)	(3)	(1)
(C)	(4)	(2)	(1)	(3)
(D)	(2)	(4)	(1)	(3)

50. A unit hydrograph consists of one unit of :
- (A) effective rainfall duration (B) peak discharge
(C) hydrograph time base (D) direct runoff
51. When two identical centrifugal pumps are operating in series on a common rising main, then ?
- (A) The pressure in the rising main will be nearly doubled, while discharge will remains same
(B) The discharge will be nearly doubled while the pressure remains the same
(C) Discharge as well as the pressure in the rising main will be doubled
(D) Discharge as well as the pressure in the rising main will increase but not become double
52. An aquifer confined at top and bottom by impermeable layers is stratified into three layers as follows :

Layer	Thickness (m)	Permeability (m/day)
Top layer	4	30
Middle layer	2	10
Bottom layer	6	20

The transmissivity (m^2/day) of the aquifer is :

- (A) 260 (B) 227
(C) 80 (D) 23

53. Match List-I with List-II and select the correct answer using the codes given below the lists :

List I		List II	
(a)	Evapotranspiration	(1)	Penman method
(b)	Infiltration	(2)	Snyder's method
(c)	Synthetic unit hydrograph	(3)	Muskingum method
(d)	Channel Routing	(4)	Horton's method

Codes :

	(a)	(b)	(c)	(d)
(A)	(1)	(4)	(2)	(3)
(B)	(3)	(4)	(1)	(2)
(C)	(1)	(2)	(4)	(3)
(D)	(2)	(4)	(3)	(1)

54. A watershed is changed from rural to urban category over a period of time due to development process. The effect of urbanization on storm run-off hydrograph of such watershed :
- (A) decreases the volume of run-off
- (B) increases the time to peak discharge
- (C) decreases the time base
- (D) decreases the peak discharge

55. The correct sequence, in the direction of the flow of water for installation is a hydropower plant is :
- (A) Reservoir, surge tank, turbine, penstock
 - (B) Reservoir, surge tank, penstock, turbine
 - (C) Reservoir, penstock, turbine, surge tank
 - (D) Reservoir, penstock, surge tank, turbine
56. The following zones are formed in a polluted river under the self-purification process :
- (1) Zone of clear water
 - (2) Zone of active decomposition
 - (3) Zone of recovery
 - (4) Zone of pollution

The correct sequence in which these zones occur progressively downstream in a polluted river is :

- (A) (4) (2) (1) (3)
- (B) (4) (2) (3) (1)
- (C) (2) (4) (3) (1)
- (D) (2) (4) (1) (3)

57. The equation consists of two statements; one labeled as 'Assertion (A)' and the other as 'Reason (R)' :

Assertion (A) : While laying a sewer line the socket end of a sewer is kept facing the downward slope in the trench.

Reason (R) : The socket end being heavy will slide down the slope if it faces the downward slope.

Examine above two statements carefully and select the correct answer from the options given below :

- (A) Both (A) and (R) are true and (R) is correct explanation of (A)
 - (B) Both (A) and (R) are true and (R) is not correct explanation of (A)
 - (C) (A) is true but (R) is false
 - (D) (A) is false but (R) is true
58. A river is the source of water for water supply to a town. Its water is very turbid and polluted. The correct sequence of steps for treating the river water would be :
- (A) pre-sedimentation → pre-chlorination → coagulation → sedimentation
 - (B) coagulation → sedimentation → post-chlorination
 - (C) coagulation → filtration → sedimentation → post-chlorination
 - (D) sedimentation → post-chlorination

59. Match List-I (Impurities to be removed from sewage) with List-II (Treatment unit used) and select the correct answer using the codes given below the lists :

List I	List II
(Impurities to be removed from sewage)	(Treatment unit used)
(a) Large floating matter	(1) Trickling filter
(b) Suspended inorganic matter	(2) Primary clarifier
(c) Suspended organic matter	(3) Screens
(d) Dissolved organic matter	(4) Grit chamber

Codes :

	(a)	(b)	(c)	(d)
(A)	(1)	(4)	(2)	(3)
(B)	(3)	(1)	(2)	(4)
(C)	(3)	(4)	(2)	(1)
(D)	(2)	(4)	(3)	(1)

60. Which one of the following methods can be employed for plastic and rubber waste disposal ?

(A) Composting	(B) Incineration
(C) Sanitary landfill	(D) Pyrolysis

61. Which of the following air pollutants is/are responsible for photochemical smog ?

- (1) Oxides of nitrogen
- (2) Ozone
- (3) Unburnt hydrocarbons
- (4) Carbon monoxide

Select the *correct* answer using the codes given below :

Codes :

- | | |
|----------------------|----------------------|
| (A) (1) alone | (B) (2), (3) and (4) |
| (C) (1), (3) and (4) | (D) (1) and (4) |

62. Bosco has developed the following equation :

$$K = K' + \frac{v}{y}\eta$$

where v = average velocity of river stream, H = average depth of river and h = bed activity coefficient of the river. In this equation :

- (A) K is the Deoxygenation rate and K' is the BOD rate
- (B) K is the BOD rate and K' is the Deoxygenation rate
- (C) K is the Deoxygenation rate and K' is the Re-aeration rate
- (D) K is the Re-aeration rate and K' is the Deoxygenation rate

63. The short-circuiting occurring in a sedimentation tank is represented by :

- | | |
|-------------------------|-----------------------------|
| (A) surface loading | (B) displacement efficiency |
| (C) recirculation ratio | (D) detention time |

64. Excavation was being done for a foundation **trench** in a plastic clay having unit weight of 2.3 gm/cc. When the depth of **excavation** reached 4 meters, it failed. On the assumption that $\phi = 0$, the **value** of cohesion of the clay is :

- (A) 2.3 kg/cm^2 (B) 0.23 kg/cm^2
(C) 23 kg/cm^2 (D) 230 kg/cm^2

65. An earth-retaining structure may be subjected to the **following** lateral earth pressures :

- (1) Earth pressure at rest
(2) Passive earth pressure
(3) Active earth pressure

The correct sequence of the increasing order of the magnitudes of these pressures is :

- (A) (3) (2) (1)
(B) (1) (3) (2)
(C) (1) (2) (3)
(D) (3) (1) (2)

66. A saturated clay layer with double drainage takes 4 years to attain 90% degree of consolidation under a structure. If the same layer were to be single drained, what would be the time (in years) required to attain the same consolidation under the same loading conditions ?

- (A) 8 (B) 16
(C) 25 (D) 64

67. σ_z is the vertical stress at a depth equal to Z in the soil mass due to a surface point load Q . The vertical stress at depth equal to $2Z$ will be :

- (A) $0.25 \sigma_z$ (B) $0.50 \sigma_z$
(C) $1.0 \sigma_z$ (D) $2.0 \sigma_z$

68. Match List-I (Test) with List-II (Property) and select the correct answer using the codes given below the lists :

List I (Test)	List II (Property)
(a) Proctor Test	(1) Grain Size Analysis
(b) Vane Test	(2) Shear Strength
(c) Penetration Test	(3) Bearing Capacity
(d) Hydrometer Test	(4) Compaction

Codes :

- (a) (b) (c) (d)
(A) (2) (4) (1) (3)
(B) (4) (2) (1) (3)
(C) (4) (2) (3) (1)
(D) (2) (4) (3) (1)

69. A clay soil sample is tested in a triaxial apparatus in consolidated-drained conditions at a cell pressure of 100 kN/m^2 . What will be the pore water pressure at a deviator stress of 40 kN/m^2 ?

- (A) 0 kN/m^2 (B) 30 kN/m^2
(C) 40 kN/m^2 (D) 80 kN/m^2

70. Which of the following is the main cause of occurrence of quick sand condition ?
- (A) when the void ratio of the soil becomes 1.0
 - (B) when the upward seepage pressure in soil becomes zero
 - (C) when the upward seepage pressure in soil becomes equal to the saturated unit weight of the soil
 - (D) when the upward seepage pressure in soil becomes equal to submerged unit weight of the soil
71. The minimum factor of safety against rotational failure for permanent slopes under long-term, non-seismic conditions influencing occupied structures is closest to :
- (A) 1.0
 - (B) 1.1
 - (C) 1.5
 - (D) 3.0
72. A mortar for which both cement and lime are mixed is called :
- (A) Lime mortar
 - (B) Cement-lime mortar
 - (C) Gauged mortar
 - (D) Hydraulic mortar
73. Expected project duration generally follows :
- (A) Normal distribution curve
 - (B) β -distribution curve
 - (C) Binomial distribution curve
 - (D) None of these
74. For a circular curve of radius 200 m, the coefficient of lateral friction of 0.15 and the design speed is 40 kmph. The equilibrium superelevation (for equal pressure on inner and outer wheel) would be ?
- (A) 21.3
 - (B) 6.3
 - (C) 7.0
 - (D) 4.6

75. In an area of heavy rainfall, a state highway of high-type bituminous surface with four lanes (14.0 m wide) is to be constructed. What will be the height of the crown of the road relative to the edges for a composite camber (i.e. middle half as parabolic and rest as straight lines) ?
- (A) 14 cm (B) 21 cm
(C) 28 cm (D) 7 cm
76. If a two-lane national highway and a two-lane state highway intersect at right angles, the number of potential conflict points at the intersection, assuming that both the roads are two-way is :
- (A) 11 (B) 17
(C) 24 (D) 32
77. In signal design as per Indian Roads Congress specifications, if the sum of the ratios of normal flows to saturation flow of two directional traffic flow is 0.50 and the total lost time per cycle is 10 seconds, the optimum cycle length in seconds is :
- (A) 100 (B) 80
(C) 60 (D) 40
78. A roundabout is provided with an average entry width of 8.4 m, width of weaving section as 14 m, and length of the weaving section between channelizing islands as 35 m. The crossing traffic and total on the weaving section are 1000 and 2000 PCU per hour respectively. The nearest rounded capacity of the roundabout (in PCU per hour) is :
- (A) 3100 (B) 3700
(C) 4200 (D) 5000
79. The shape of the STOP sign according to IRC : 67-2001 is :
- (A) Circular (B) Triangular
(C) Octagonal (D) Rectangular

80. Which one of the following defects indicates progressive disintegration of bituminous premix carpet surfacing by loss of aggregates ?
- (A) Pot holes (B) Ravelling
(C) Edge breaking (D) Rutting
81. When was Rajiv Gandhi Gramin Vidyutikaran Yojna launched in HP ?
- (A) 2001 (B) 2003
(C) 2004 (D) 2005
82. How many villages of Amb Block of Una District are covered under the Tribal Development Programme of Nabard ?
- (A) Two (B) Four
(C) Six (D) Eight
83. At which place in Shimla District of HP is powder milk plant ?
- (A) Purag (B) Vikasnagar
(C) Duttnagar (D) Baral
84. At which place has the Govt. of India sanctioned a model school in the educationally backward block in Sirmaur District of HP ?
- (A) Rajgarh (B) Paonta Sahib
(C) Dadahu (D) Shillai
85. According to CAG's report what was the approximate quantity of pulses which were found with alive or dead insects (distributed by HP State Civil Supplies Cooperation during 2010-2014) ?
- (A) One thousand quintal (B) Two thousand quintal
(C) Three thousand quintal (D) None of these

86. Who is the author of *Shashi Vansh Vinod* which contains an account of Bilaspur princely state ?
(A) Mian Goverdhan Singh (B) Dr. Bansi Ram
(C) Ganesh Singh (D) Manik Chand
87. On which day is Sair festival celebrated in HP ?
(A) First day of Bhadon (B) First day of Sawan
(C) First day of Asanj (D) First day of Kartik
88. Who was the first Speaker of HP Vidhan Sabha ?
(A) Desraj Mahajan (B) Vidya Stokes
(C) Vidya Dhar (D) Pandit Jaiwant Ram
89. When was Pashudhan Bima Yojna introduced in HP ?
(A) 2006 (B) 2008
(C) 2009 (D) 2010
90. In which District of HP is Thirot hydel power project ?
(A) Shimla (B) Kullu
(C) Lahul Spiti (D) Chamba
91. Which state of India has got highest number of cities included in the first list of smart cities released in January, 2016 ?
(A) Madhya Pradesh (B) Maharashtra
(C) Gujarat (D) Uttar Pradesh
92. When was Make in India campaign launched ?
(A) August 2014 (B) September 2014
(C) October 2014 (D) November 2014
93. In which state of India is Karwar naval base ?
(A) Kerala (B) Goa
(C) Karnataka (D) Maharashtra

94. In which state of India is Shani Shinghanpur temple ?
(A) Maharashtra (B) Gujarat
(C) Odisha (D) Tamil Nadu
95. With which Indian city is Biryani associated ?
(A) Ajmer (B) Aligarh
(C) Hyderabad (D) Patna
96. Who got the 2015 Nobel Prize in Economics ?
(A) Angus Deaton (B) Marlon James
(C) C. Venkatraman (D) M. Sirinivas
97. Paul Roderiques, the President of Cuba in Fedel Castro's :
(A) Brother (B) Cousin
(C) Son (D) Grand-son
98. What is the approximate number of Indian origin MPs in the British Parliament who won in May 2015 elections ?
(A) Five (B) Ten
(C) Fifteen (D) Twenty
99. What is the proposed venue of 2019 South Asian Games ?
(A) Islamabad (B) Kabul
(C) Kathmandu (D) Shillong
100. When will the names of Presidential candidates in the United States be announced by the Republican and Democratic Parties ?
(A) July 2016 (B) August 2016
(C) September 2016 (D) None of these