

1. The specific storage is :
- (A) storage coefficient/aquifer depth
  - (B) specific yield per unit area
  - (C) specific capacity per unit depth of aquifer
  - (D) porosity specific detention
2. The volume of water that can be extracted by force of gravity from a unit volume of aquifer material is called .....
- (A) specific retention
  - (B) specific yield
  - (C) specific storage
  - (D) specific capacity
3. The water held in soil pores due to the surface tension forces (against gravity) is called .....
- (A) Gravity water
  - (B) Capillary water
  - (C) Hygroscopic water
  - (D) None of these
4. A canal which carries water for two or more canals is known as .....
- (A) Irrigation canal
  - (B) Navigation canal
  - (C) Power canal
  - (D) Feeder canal

5. Intensity of irrigation is defined as .....

- (A) percentage of gross command area that can be irrigated
- (B) percentage of culturable command area that cannot be irrigated
- (C) percentage of culturable command area that can be irrigated
- (D) none of the above

6. If,  $D$  is duty (hectare/cumec),  $B$  is base period (in days) and  $\Delta$  is depth of water (in m), then the following relationship is correct :

- (A)  $B = 8.64 D/\Delta$
- (B)  $\Delta = 8.64 B/D$
- (C)  $\Delta = 8.64 D/B$
- (D) None of these

7. Dislodging of material particles by the flowing water is called .....

- (A) erosion
- (B) attrition
- (C) abrasion
- (D) none of these

8. For a most efficient rectangular channel, hydraulic radius is .....

- (A) Depth of channel/2
- (B) Depth of channel/3
- (C) Depth of channel/4
- (D) None of these

9. Suitable side slope for a channel excavated through loose sandy soil is .....
- (A) 2 : 1 (B) 1.5 : 1  
(C) 1 : 1 (D) None of these
10. Full supply level of off-taking channel at its head should be kept at least ..... lower than the water level of the parent channel.
- (A) 45 cm (B) 30 cm  
(C) 15 cm (D) None of these
11. When canal water flowing over a drain, such cross-drainage work is called .....
- (A) Level crossing (B) Aqueduct  
(C) Super passage (D) None of these
12. A silt ejector is provided at .....
- (A) Canal head regulator  
(B) Cross-drainage works  
(C) Down-stream of canal head regulator  
(D) None of the above

13. The ..... is defined as that portion of the fall structure in which surplus energy of water leaving the crest is dissipated and subsequent turmoil stilled, before the water passes into the lower level channel.

- (A) Super passage
- (B) Cistern element
- (C) Syphon aqueduct
- (D) None of the above

14. The ..... serves to (i) divert and regulate the supplies into the distributary from the parent channel, (ii) controls the silt entering the distributary from the parent channel and (iii) measures the discharge entering the distributary.

- (A) Canal head regulator
- (B) Fall
- (C) Distributary head regulator
- (D) None of the above

15. When a structure (without gate) is built across the river to raise water level in its upstream, it is called .....

- (A) Barrage
- (B) Weir
- (C) Silt excluder
- (D) None of these

16. In surveying, generally areas less than ..... are treated as plane.
- (A) 140 km<sup>2</sup> (B) 160 km<sup>2</sup>  
(C) 240 km<sup>2</sup> (D) 260 km<sup>2</sup>
17. In levelling, two staff readings are taken at .....
- (A) Benchmark (B) Change Point  
(C) Finishing Point (D) None of these
18. Horizontal distance between two consecutive contours is called .....
- (A) Contour interval (B) Horizontal equivalent  
(C) Contour gap (D) None of these
19. In Theodolite surveying, left face reading is called when .....
- (A) observer is standing left  
(B) person holding staff is standing left  
(C) in subsequent readings, staff man moves left  
(D) vertical circle of the instrument is on left

20. In a project planning, resource allocation is done by .....

(A) Resource smoothing

(B) Resource levelling

(C) Any one of the above

(D) Both (A) and (B)

21. Duration in which a project can be completed, is optimum when .....

(A) direct cost of the project is minimum

(B) indirect cost of the project is minimum

(C) both direct and indirect costs are minimum separately

(D) sum of direct and indirect costs is minimum

22. When the float for an activity is positive, demanding normal attention, but allowing some freedom of action, such activity is called .....

(A) Critical Activity

(B) Supercritical Activity

(C) Sub-critical Activity

(D) None of these

23. Total number of test strengths of samples required to constitute an acceptable record for calculation of standard deviation shall not be less than .....

- (A) 30 (B) 35  
(C) 40 (D) None of these

24. Unless more accurate calculations are warranted, the unit weight of plain concrete made with sand and gravel or crushed natural stone aggregate may be taken as .....

- (A) 24 kN/m<sup>3</sup> (B) 25 kN/m<sup>3</sup>  
(C) 26 kN/m<sup>3</sup> (D) None of these

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25. The surface width of cracks should not, in general exceed ..... in members where cracking is not harmful and does not have any serious adverse effects upon the preservation of reinforcing steel nor upon the durability of the structures.

- (A) 0 mm (B) 0.1 mm  
(C) 0.2 mm (D) 0.3 mm

0.3  
C. 0.3  
4) 0.3  
2) 0.3

26. In the uniform flow in a channel of small bed slope, the hydraulic grade line .....

- (A) coincides with the bed
- (B) is below the free surface
- (C) above the free surface
- (D) coincides with the free surface

Handwritten calculations for Q26:  
 $1.6 \times 1.66 = 2.656$   
 $\frac{36}{2.656} = 13.55$   
 $\frac{36}{1.66} = 21.68$   
 $\frac{36}{1.6} = 22.5$   
 $\frac{36}{5.00} = 7.2$   
 $\frac{36}{1.5} = 24$

27. The velocity and depth of flow in a 3.0 m wide rectangular channel are 2.0 m/s and 2.5 m respectively. If the channel has its width enlarged to 3.6 m at a section, the discharge past that section is .....

- (A) 1.71 m<sup>3</sup>/s
- (B) 4.29 m<sup>3</sup>/s
- (C) 10 m<sup>3</sup>/s
- (D) 15 m<sup>3</sup>/s

Handwritten calculation for Q27:  
 $(3 \times 2.5) \times 2 = (2.5 \times 3.6) \times v$   
 $7.5 \times 2 = 15$   
 $\frac{15}{3.6} = 4.16$

28. The two alternate depths in a 3.0 m wide rectangular channel are 3.86 m and 1.0 m respectively. The discharge in the channel (in m<sup>3</sup>/s) is .....

- (A) 3.27
- (B) 13.27
- (C) 18.27
- (D) 23.27

Handwritten calculations for Q28:  
 $3 \times 3.86 \times v = 3 \times 1 \times v_2$   
 $11.58 v = 3 v_2$   
 $v_2 = 3.86 v$   
 $Q = 3 \times 3.86 \times v = 11.58 v$   
 $Q = 3 \times 1 \times 3.86 v = 11.58 v$   
 $Q = 18.27$

29. A triangular channel of apex angle 120° carries a discharge of 1.573 m<sup>3</sup>/s. The critical depth (in m) of the channel is .....

- (A) 0.7
- (B) 0.8
- (C) 0.9
- (D) 1.0

Handwritten calculations for Q29:  
 $Q = \frac{5}{4} \times P_c^2 \times \sqrt{P_c}$   
 $1.573 = \frac{5}{4} \times P_c^2 \times \sqrt{P_c}$   
 $1.573 = 1.25 P_c^2 \sqrt{P_c}$   
 $1.573 = 1.25 P_c^{2.5}$   
 $P_c^{2.5} = \frac{1.573}{1.25} = 1.2584$   
 $P_c = 0.8$

Handwritten notes and calculations at the bottom of the page:  
 $1.573 = \frac{5}{4} \times P_c^2 \times \sqrt{P_c}$   
 $1.573 = 1.25 P_c^2 \sqrt{P_c}$   
 $1.573 = 1.25 P_c^{2.5}$   
 $P_c^{2.5} = \frac{1.573}{1.25} = 1.2584$   
 $P_c = 0.8$   
 $1.573 = 1.25 \times 0.8^2 \times \sqrt{0.8}$   
 $1.573 = 1.25 \times 0.64 \times 0.8944$   
 $1.573 = 0.7072$



30. In a wide rectangular channel, if the normal depth of water increased by 20%, the discharge would increase by .....
- (A) 11.3% (B) 15.5%  
(C) 20% (D) 33.3%
31. A hydraulically efficient trapezoidal channel has  $m = 2.0$ ,  $B/y_0$  for this channel is .....
- (A) 2.00  $B_2 \quad y_2 \quad 0.64$  (B) 1.236  $m \Rightarrow B/y_0$   
(C) 0.838  $m$  (D) 0.472  $y_2$
32. For an uncontrolled canal inlet at a reservoir, the discharge drawn .....
- (A) is fixed by the critical depth that occurs at the inlet  
(B) is determined by a control on the downstream end  
(C) depends on whether the channel is steep or otherwise  
(D) is a constant
33. Hydraulic jump is a phenomenon .....
- (A) in which the water surface connects the alternate depths  
(B) which occurs only in frictionless channels  
(C) which occurs only in rectangular channels  
(D) none of the above

34. The discharge  $Q$  in a triangular weir varies as :

(A)  $H^{0.5}$

(B)  $H^{1.5}$

(C)  $H^{2.5}$

(D)  $H^{1/2.5}$

35. The specific volume is expressed in .....

(A)  $m^3/kg$

(B)  $kg/m^3$

(C)  $N/m^3$

(D) None of these

36. Viscosity is measured in .....

(A)  $N.m^2/s$

(B)  $N.s/m^2$

(C)  $dyne.cm^2/s$

(D) none of these

37. If  $\mu$  is viscosity and  $t$  is temperature, then  $\mu = \mu_0 + \alpha T - \beta t^2$  is applicable for .....

(A) a gas

(B) liquids

(C) solids

(D) none of these

38. In case of stable equilibrium of a sub-merged body .....

(A) Centre of gravity should be below centre of buoyant force

(B) Centre of gravity should be above centre of buoyant force

(C) Centre of gravity should coincide with centre of buoyant force

(D) None of the above

$\frac{1}{\rho} = \frac{m^3}{kg}$

39. If  $C_d$ ,  $C_v$  and  $C_c$  are coefficients of discharge, velocity and contraction respectively, then .....
- (A)  $C_d = C_v \times C_c$  (B)  $C_c = C_d \times C_v$   
 (C)  $C_v = C_c \times C_d$  (D) None of these
40. In case of Cipolletti weir, the inclination of each side with vertical should be .....
- (A)  $14^\circ 2'$  (B)  $16^\circ 2'$   
 (C)  $18^\circ 2'$  (D) None of these
41. When power transmission takes place through pipes, then condition for maximum transmission of power is .....
- (A) head loss due to friction = Total head available at inlet of pipe/3  
 (B) head loss due to friction = Total head available at inlet of pipe/4  
 (C) head loss due to friction = Total head available at inlet of pipe/5  
 (D) None of the above
42. The relationship between efficiencies of a turbine is .....
- (A) Overall efficiency = Mechanical efficiency  $\times$  Hydraulic efficiency  
 (B) Overall efficiency = Volumetric efficiency  $\times$  Hydraulic efficiency  
 (C) Overall efficiency = Mechanical efficiency  $\times$  Volumetric efficiency  
 (D) None of the above

$H_f = \frac{P_{\text{mech}}}{12 \text{ water}}$  / overall =  $\frac{\text{shaft}}{12 \text{ water}}$

43. If at the inlet of a turbine, the energy available is only kinetic energy, the turbine is known as .....

(A) Reaction turbine

~~(B) Impulse turbine~~

(C) Either (A) or (B)

(D) None of these

44. Pelton wheel turbine is a .....

(A) tangential flow reaction turbine

(B) radial flow impulse turbine

~~(C) tangential flow impulse turbine~~

(D) axial flow impulse turbine

45. For large discharge at low head, one should use .....

(A) ~~Centrifugal pump~~ ✓  $H \rightarrow$

~~(B) Reciprocating pump~~

(C) ~~Either (A) or (B)~~

(D) None of these

46. In a water supply system, pipes of more than 30 cm diameter are designed for .....

~~(A) 25 to 50 years~~

(B) 20 to 25 years

(C) 10 to 15 years

(D) None of these

$d = 30$   
15 - Jan  
2023

47. A ..... is one which rests on an impervious (i.e. mota) layer and draws its supply from the pervious formation lying below the mota layer, through a bore hole made into the mota layer.

(A) shallow well

(B) deep well

(C) either (A) or (B)

(D) None of these

48. .... is used for pumping of sewage containing solids and other impurities.

(A) Open impeller Centrifugal pump

(B) Closed impeller Centrifugal pump

(C) Either (A) or (B)

(D) None of the above

49. Sanitary sewage consists of .....

(A) domestic sewage

(B) industrial sewage

(C) domestic sewage + industrial sewage

(D) none of the above

50. Pumping plant in a Sewerage scheme is designed for .....

- (A) 40 to 50 years (B) 20 to 40 years  
(C) 15 to 20 years (D) 5 to 10 years

51. Match List-I with List-II of the lakes of Himachal Pradesh and their alt and choose the correct answer from the options given below :

**List-I**

**(Lake)**

(a) Manimahesh Lake

(b) Chandrakup Lake

(c) Prashar Lake

(d) Bhrigu Lake

**List-II**

**(Altitude in meters)**

(i) 4235 meters

(ii) 2743 meters

(iii) 3450 meters

(iv) 3950 meters

**Codes :**

(a) (b) (c) (d)

(A) (iii) (iv) (i) (ii)

(B) (ii) (i) (iv) (iii)

(C) (iv) (iii) (ii) (i)

(D) (i) (iii) (ii) (iv)

52. Which of the following statements is correct about Lahaul-Spiti ?

(A) The valley of the river Bhaga is locally called Gara

(B) Sissu is in Spiti

(C) The valley of the Pin river joins the main Spiti Valley at Keylong

(D) The Baralacha pass lies between Lahaul & Spiti and Shimla districts

53. Which of the following is not matched correctly with the Sector-wise outlay of Annual Plan 2018-19 in Himachal Pradesh ?

(A) Rural Development - 1.88 p.c.

(B) Irrigation and Flood Controls - 6.44 p.c.

(C) Science, Technology & Environment - 0.54 p.c.

(D) Energy - 12.50 p.c.

54. Which of the following districts of Himachal Pradesh is matched correctly with its Registered Taxpayers of GST upto 31.03.2020 ?

(A) Hamirpur - 6300

(B) Kinnaur - 1539

(C) Mandi - 12000

(D) Sirmaur - 5231

55. What was the rank of Himachal Pradesh by population and territory, as per the Census- 2011 ?

(A) 21

(B) 17

(C) 25

(D) 23

56. Consider the following about the Himachal Pradesh Budget for 2023-24 :

(i) It has projected a fiscal deficit of 4.61 p.c. of the gross State Domestic Product.

(ii) It has announced the Him-Ganga Scheme to boost the milk and fish economy.

(iii) It has proposed more money for scheduled caste development than the tribal development.

24% SC, 8% ST

(iv) It has announced more than sixty new schemes for the welfare of rural areas.

Choose your correct answer for the following codes :

21.6

(A) (i), (iv) ✓

(B) (iii), (i) }

(C) (ii), (iii) }

(D) (iv), (ii) ✓

P.T.O.



57. Consider the following about the Himachal Pradesh Water-Cess on Hydropower Generation Bill, 2023 :

- (i) It aims at imposing a water-cess on hydropower projects by at least Re. 1 per unit. ~~Re. 1 per unit.~~
- (ii) This water-cess is likely to fetch more than Rs. 15,000 crore revenue annually to the state.
- (iii) No beneficiary state which uses water and electricity from Himachal Pradesh is riparian. ✓
- (iv) The hydropower projects in Himachal Pradesh has a total power generation capacity of about 10991 MW. ✓

Choose the correct answer from the following codes : Handwritten

- (A) (i), (iii) ✓
- (B) (ii), (iv)
- (C) (iii), (ii)
- (D) (iv), (i) ✓

58. Which of the following districts of Himachal Pradesh is *not* matched correctly with its total number of Tehsils and Sub-Tehsils as on 31.03.2021 ?

	Tehsils	Sub-Tehsils
(A) Lahaul-Spiti	02	01
(B) Solan	07	06
(C) Kullu	06	03
(D) Kangra	22	14

59. Which of the following statements is correct about the largest production of the following principal crop in the year 2019-20 in Himachal Pradesh ?

(A) Wheat

(B) Maize

(C) Barley

(D) Rice

36% wheat  
22% rice

60. Which of the following Shimla Hill States had the highest revenue in 1946 ?

(A) Dhadi

(B) Ratesh

(C) Delath

(D) Darkoti

61. Which of the following is the correct number of women, who won the Himachal Pradesh Assembly Election, held in 2022 ?

(A) One

(B) Two

(C) Three

(D) Four

62. In order to strengthen its aerial defence in Himachal Pradesh in view of increasing Chinese threat, where has the Defence Ministry of India directed the Himachal Pradesh Government to build an airstrip ?

(A) Keylong in Lahaul

(B) Darcha in Spiti

(C) Rangrik in Spiti Valley

(D) Trilokpur in Lahaul

63. Which of the following Wildlife Sanctuaries is *not* matched correctly with its district ?

Sanctuary	District
(A) Rupi Bhaba	Kinnaur
(B) Tirthan	Kullu
(C) Shilli	Solan
(D) Simbalbara National Park (Sanctuary)	Shimla

64. Which of the following statements is correct about the place and its location in the district of Himachal Pradesh ?

- (A) Chango is in Lahaul-Spiti (B) Jaitak is in Sirmaur  
(C) Katra is in Kinnaur (D) Kugti is in Kangra

65. Which of the following bridges has been built over the Ravi River in Himachal Pradesh ?

- (A) Wangtoo (B) Kandroul  
(C) Rakh (D) Luhri

66. Which of the following pair of districts are associated with the dances of Japi, Banyangchu, Jhanjar and Kayang ?

(A) Kinnaur and Chamba

(B) Lahaul-Spiti and Mandi

(C) Kinnaur and Hamirpur

(D) Chamba and Una

67. The owners of which of the following cricket team picked up Repuka Thakur of Himachal Pradesh for the Women Premier League, 2023 ?

(A) Mumbai Indians

(B) Gujarat Giants

(C) Delhi Capitals

(D) Royal Challengers, Bangalore

68. Consider the following and select the correct statement about the Rural Female population of Scheduled Castes of a district of Himachal Pradesh according to Census-2011 :

(A) Kullu - 6080

(B) Mandi - 5835

(C) Sirmaur - 5213

(D) Hamirpur - 1639

69. Which of the following statements is proposed in Himachal Pradesh Budget-2022-23 for the Revenue Expenditure ?

- (A) General Services - 40 p.c. (B) Economic Services - 19 p.c.  
(C) Social Services - 35 p.c. (D) Education - 10 p.c.

70. Which of the following statements about the eligibility of physically charged persons for their relief amount is correct, according to the communication of Himachal Pradesh Social Justice Deptt. April, 2022 ?

- (A) All such persons over 60 years, should be 65 p.c. or more physically charged  
(B) All should be 75 p.c. or more physically charged  
(C) All such persons over 60 years with 70 p.c. or more physically charged  
(D) All 55 p.c. or more physically charged persons

71. Which of the following statements is correct ?

- (A) The river systems of India can be classified into ten groups  
(B) In the Deccan region, most of the major river systems flowing generally in the east fall into the Bay of Bengal  
(C) The Godavari river is the 6th largest river of the Southern Peninsula  
(D) Mahanadi is the major east flowing river in the Deccan region

72. Which of the following amendments of Indian Constitution amended Art. 240 and the First Schedule in order to include the areas of Dadra and Nagar Haveli as a Union Territory ?
- (A) The Tenth Constitution Amendment Act, 1961 ✓  
(B) The Eighth Amendment Act, 1960  
(C) The Eleventh Amendment Act, 1961  
(D) The Thirteenth Amendment Act, 1962
73. The Union Budget of India, 2023-24, has proposed to enhance the Railway Budget by :
- (A) About 39.8 p.c.  
(B) About 60.00 p.c.  
(C) About 25.00 p.c.  
(D) About 48.6 p.c.
74. Consider the following about women literacy rate of North-Eastern States in census-2011 :
- (i) Assam has the lowest at 56 p.c.  
(ii) Sikkim has 70.10 p.c.  
(iii) Nagaland has 76.69 p.c.  
(iv) Mizoram has 89.40 p.c. ✓
- Choose the correct answer from the following codes :
- (A) (i) and (ii) ✓  
(B) (ii) and (iii)  
(C) (iii) and (iv)  
(D) (iv) and (i)

75. In which country, Mir Barkat Ali Khan, also known as Makarram Jab Bahadur, the last titular Nawab of Hyderabad, died in January, 2023 ?

- (A) Turkey (B) India  
(C) Indonesia (D) Saudi Arabia

76. Which of the following Prime Minister/President has not been matched correctly with his country ?

- (A) Emmanuel Macron — France  
(B) Anthony Albanese — Australia  
(C) Chris Hipkins — Netherlands  
(D) Fumio Kishida — Japan

77. When was Crimea annexed from Ukraine by Russia ?

- (A) 2018  
(B) 2010  
(C) 2022  
(D) 2014

78. Choose from the below given pair of countries which became the champion and runner-up in FIFA World Cup Football (final) in 2022 :
- (A) France and England                      (B) Argentina and France  
(C) Argentina and Germany                (D) Argentina and Italy
79. Which of the following is the longest river ? Also give the name of its country/continent :
- (A) Mississippi-Missouri — USA  
(B) Yangtze Kiang — China  
(C) Ob, Irtysh — Russia  
(D) Amazon — South America
80. The name of the person and his/her country, who won the Nobel Prize - 2021 in literature is :
- (A) Annie Ernaux of France  
(B) Carolyn Bertozzi of USA  
(C) Anton Zelinger of Germany  
(D) B. Sharpless of Canada



300 Yr. 10  
2

81. A watershed has an area of 300 hectare. Due to a 10 cm rainfall event over the watershed a stream flow is generated and at the outlet of the watershed it lasts for 10 hours. Assuming a runoff/rainfall ratio of 0.16 for this event, the average stream flow rate at the outlet in this period of 10 hours is :

- (A) 1.33 m<sup>3</sup>/s
- (B) 16.7 m<sup>3</sup>/s
- (C) 100 m<sup>3</sup>/minute
- (D) 60,000 m<sup>3</sup>/h

82. Rainfall of intensity of 20 mm/h occurred over a watershed of area 100 hectare for a duration of 6 hours. Measured direct runoff volume in the stream draining the watershed was found to be 70,000 m<sup>3</sup>. The precipitation not available to runoff in this case is :

- (A) 9 cm
- (B) 7 cm
- (C) 17.5 mm
- (D) 5 cm

70000  
20 x 6  
1200  
1200

83. A catchment of area 100 km<sup>2</sup> has three distinct zones as below :

Zone	Area (km <sup>2</sup> )	Annual runoff (cm)
A	51	52
B	29	42
C	20	32

The annual runoff from the catchment is :

- (A) 36.2 cm
- (B) 42.1 cm
- (C) 45.1 cm
- (D) 43.3 cm

Runoff =  $\frac{SR}{ST} \times A$   
52 + 42 + 32  
126  
100

84. Variability of annual rainfall in India is :

(A) least in regions of scanty rainfall

(B) largest in regions of high rainfall

(C) largest in coastal areas

(D) least in regions of high rainfall

85. When specific information about the density of snowfall is not available, water equivalent of snowfall is taken as :

(A) 90%

(B) 50%

(C) 30%

(D) 10%

86. An isohyets is a line joining points having :

(A) equal evaporation value ✓

(B) equal barometric pressure ✓

(C) equal height above the mean sea level

(D) equal rainfall depth in a given duration

87. A canal is 80 km long and has an average surface width of 15 m. If the evaporation measured in a BIS pan is 0.5 mm/day, the volume of water evaporated in a month of 30 days is (in  $m^3$ ) :

(A) 14,400

(B) 18,000

(C) 1,80,000

(D) 1,44,000

88. Evapotranspiration is confined :

(A) to daylight hours

(B) to night-time only

(C) to land surface only

(D) none of these

89. The rainfall on five successive days on a catchment was 2, 6, 9, 5 and 3 cm.

If the  $\phi$ -index for the storm can be assumed to be 3 cm/day, the total direct runoff from the catchment is :

(A) 20 cm

(B) 11 cm

(C) 10 cm

(D) 22 cm

90. The following is not a direct stream flow determination technique :

(A) Dilution method

(B) Ultrasonic method

(C) Area-velocity method

(D) Slope-area method

91. In a triangular channel the top width and depth of flow are 2.0 m and 0.9 m respectively. Velocity measurements on the centre line at 18 cm and 72 cm below water surface indicates velocities of 0.6 m/s and 0.4 m/s respectively. The discharge in the channel is ( $m^3/s$ ) :

- (A) 0.90 (B) 1.80  
(C) 0.45 (D) None of these

$b = 2r$   
 $d = 0.5$   
10

92. The dilution method of stream gauging is ideally suited for measuring discharges in :

- (A) a large alluvial river  
(B) flood flow in a mountain stream  
(C) steady flow in a small turbulent stream  
(D) a stretch of river having industrial pollution loads

~~(2x18) (0.6x0.4)~~  
~~(2x0.18) x 0.6~~  
0.9 x 0.4

93. A hydrograph is a plot of :

- (A) rainfall intensity against time  
(B) stream discharge against time  
(C) cumulative rainfall against time  
(D) cumulative runoff against time

$\Rightarrow 0.36 \times 0.6$   
 $\Rightarrow \frac{36}{100} \times 0.6$   
 $\Rightarrow \frac{21.6}{100}$   
 $\Rightarrow 0.216$

72  
72  
9648

=)

2.16  
- 0.64  
1.52  
P.T  
25

94. The flow-mass curve is an integral curve of :

- (A) the hydrograph
- (B) the hyetograph
- (C) the flow duration curve
- (D) the S-curve

95. A  $90 \text{ km}^2$  catchment has the 4-h unit hydrograph, which can be approximated as a triangle. If the peak ordinate of this unit hydrograph is  $10 \text{ m}^3/\text{s}$ , the time base is :

- (A) 50 hour
- (B) 64 hour
- (C) 80 hour
- (D) none of these

96. A unit hydrograph has one unit of :

- (A) peak discharge
- (B) rainfall duration
- (C) the time base of direct runoff
- (D) direct runoff

*flow = base \* R*

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

- (A)  $5000 \text{ km}^2$
- (B)  $500 \text{ km}^2$
- (C)  $10^6 \text{ km}^2$
- (D) 5000 hectare

98. A linear reservoir is one in which the :

- (A) volume varies linearly with elevation
- (B) storage varies linearly with the outflow rate
- (C) storage varies linearly with time
- (D) storage vary linearly with the inflow rate

99. The wedge storage in a river reach during the passage of a flood wave is :

- (A) a constant
- (B) negative during rising phase
- (C) positive during rising phase
- (D) positive during falling phase

100. A geological formation which is essentially impermeable for flow of water even though it may contain water in its pores is called :

- |                |                 |
|----------------|-----------------|
| (A) aquifer ✓  | (B) aquifuge ✓  |
| (C) aquitard ✓ | (D) aquiclude ✓ |