SSC - JEn 2012 (Objective Paper)

1. Which of the following is not a non-dimensional parameter? **[SSC-2012]**

(a) Chezy's coefficient

(b) Darcy-Weisbach friction factor

(c) Froude number

(d) Mach number

2. The best alignment for a canal is when it is aligned along **[SSC-2012]**

(a) valley line (b) stream line

(c) contour line (d) ridge line

3. If D is the depth of the scour below original bed, then the width of bunching apron is generally taken as **[SSC-2012]**

(a) 1.5 D (b) 2.5 D

(c) 1.2 D (d) 2.0 D

4. When the bituminous surfacing is done on already existing black top road or over existing cement concrete road, the type of treatment to be given is **[SSC-2012]**

(a) Tack coat (b) Spray of emulsion

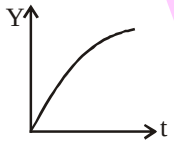
(c) Seal coat (d) Prime coat

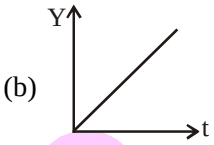
5. Bottommost layer of pavement is known as **[SSC-2012]**

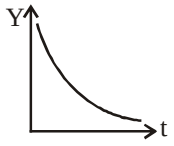
(a) Sub base course (b) Sub grade

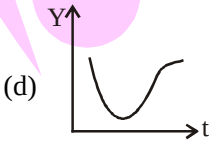
(c) Wearing course (d) Base course

6. The correct graphical representation of BOD (Y) and time (t) is given by **[SSC-2012]**

(a) 

(b) 

(c) 

(d) 

7. The most suitable solid waste disposal method for rural areas is **[SSC-2012]**

(a) land filling (b) deep well injection

(c) composting (d) incineration

8. The population of a town as per census records were 2,00,000; 2,10,000 and 2,30,000 for the year 1981, 1991 and 2001 respectively. Find the population of the town in the year 2011 using arithmetic mean method. The answer is **[SSC-2012]**

(a) 250000 (b) 255000

(c) 240000 (d) 245000

9. Hooke's law is valid up to **[SSC-2012]**

(a) Limit of proportionally

(b) Ultimate point

(c) Elastic limit

(d) Yield point

10. The ability of a material to absorb energy till the elastic limit is known as **[SSC-2012]**

(a) Resilience (b) Ductility

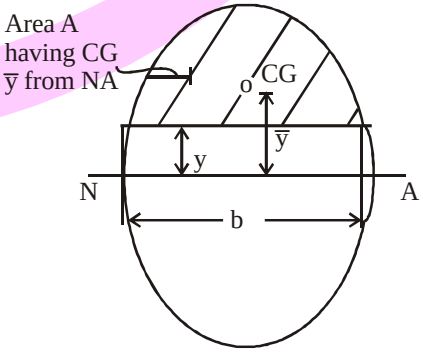
(c) Elasticity (d) Malleability

11. Out of the following, which is least elastic? **[SSC-2012]**

(a) Silver (b) Rubber

(c) Iron (d) Copper

12. Shear stress at y distance above neutral axis (NA) on a prismatic beam due to shear force V is given by **[SSC-2012]**



(a) $V A\bar{y} / (Ib)$ (b) $VI / (bA\bar{y})$

(c) $VA\bar{y}b / I$ (d) $Vb / (A\bar{y}I)$

13. For a given shear force across a symmetrical 'I' section the intensity of shear stress is maximum at the **[SSC-2012]**

(a) at the junction of the flange and the web, but on the web

(b) at the junction of the flange and the web, but on the flange

(c) extreme fibres

(d) centroid of the section

14. The equivalent length of a column of length L having both ends fixed is given by **[SSC-2012]**

(a) L/2 (b) $\frac{L}{\sqrt{2}}$

(c) 2L (d) L

15. For a given stress, the ratio of moment of resistance of a beam of square cross-section when placed with its two sides horizontal to the moment of resistance with its diagonal horizontal is given by **[SSC-2012]**

(a) $\frac{1}{\sqrt{2}}$ (b) $\sqrt{2}$

(c) $\frac{1}{2}$ (d) 1

16. A bar, L metre long and having its area of cross-section A, is subjected to gradually applied tensile load W. The strain energy stored in the bar is given by **[SSC-2012]**

(a) $\frac{W^2L}{AE}$ (b) $\frac{W^2L}{2AE}$

(c) $\frac{WL}{2AE}$ (d) $\frac{WL}{AE}$

17. The predominant effect of an axial tensile force on a helical spring is **[SSC-2012]**

(a) Compression (b) Twisting

(c) Bending (d) Tension

18. Slope at the supports of a simply supported beam of effective span L with a central point load W is given by **[SSC-2012]**

(a) $WL^2/16EI$ (b) $WL^2/24EI$

(c) $WL^2/8EI$ (d) $WL^2/12EI$

19. If a circular shaft is subjected to a torque T and bending moment M, the ratio of maximum bending stress and maximum shear stress is given by **[SSC-2012]**

(a) $\frac{M}{T}$ (b) $\frac{2T}{M}$

(c) $\frac{2M}{T}$ (d) $\frac{M}{2T}$

20. Two beams, one of circular cross section and the other of square cross section, have equal areas of cross section. If subjected to bending, then **[SSC-2012]**

(a) Both sections are equally economical

(b) Both sections are equally stiff

(c) Circular cross section is more economical

(d) Square cross section is more economical

21. The point of contraflexure is a point where **[SSC-2012]**

(a) Shear force is maximum

(b) Bending moment is maximum

(c) Shear force changes sign

(d) Bending moment changes sign

22. A rectangular log of wood is floating in water with a load of 100 N at its centre. The maximum shear force in the wooden log is **[SSC-2012]**

(a) 100 N at the centre (b) zero shear all through

(c) 50 N at each end (d) 50 N at the centre

23. Point out the correct matching: **[SSC-2012]**

(a) Cantilever beam under point load at tip (W) – $\frac{WL^3}{48EI}$

(b) Cantilever beam under udl (W) – $\frac{Wl^4}{8EI}$

(c) Simply supported beam under central point load (W) – $\frac{WL^3\delta_{max}}{8EI}$

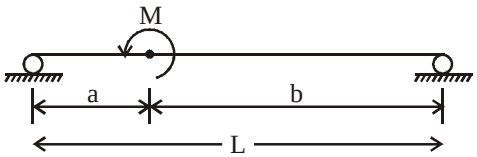
(d) Simply supported beam under udl (W) – $\frac{3Wl^4}{384EI}$

24. In a beam at a section carrying a shear force F, the shear stress is maximum at **[SSC-2012]**

(a) Bottommost fibre (b) Mid depth

(c) Neutral surface (d) Topmost fibre

25. The shear force at the point of contraflexure in the following beam is : **[SSC-2012]**



(a) $\frac{M}{b}$ (b) $\frac{M}{L}$

(c) 0 (d) $\frac{M}{a}$

26. Strain energy per unit volume of a solid circular shaft ϕ under axial tension is **[SSC-2012]**

(a) $\frac{\sigma^2}{8E}$ (b) $\frac{\sigma^2}{16E}$

(c) $\frac{\sigma^2}{2E}$ (d) $\frac{\sigma^2}{4E}$

27. For a cantilever beam of length L carrying a triangular load of intensity 'w' at the support and zero at the free end, the slope of the free end is given by **[SSC-2012]**

(a) $\frac{WL^3}{24EI}$ (b) $\frac{WL^3}{48EI}$

(c) $\frac{WL^3}{8EI}$ (d) $\frac{WL^3}{12EI}$

28. The allowable stress in a long column can be increased by increased by increasing the **[SSC-2012]**

(a) slenderness ratio (b) length of the column

(c) radius of gyration (d) eccentricity

29. For a pin jointed plane structure to be statically determinate, the necessary condition is, where **[SSC-2012]**

m = number of unknown member force

r = number of unknown reaction

j = number of joints

(a) m + r = 2j (b) 3m + r = 2j

(c) m + r = 3j (d) m + 2r = 3j

30. The simplest geometrical form of a truss is a **[SSC-2012]**

(a) Trapezium (b) Square

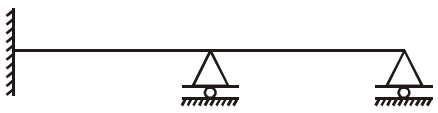
(c) Triangle (d) Parallelogram

31. For a beam carrying a uniformly distributed load, the strain energy will be maximum in case the beam is **[SSC-2012]**

(a) Propped cantilever (b) Fixed at both ends

(c) Cantilever (d) Simply supported

32. The beam shown below is indeterminate of degree_____ **[SSC-2012]**



(a) 3 (b) 4

(c) 1 **(d) 2**

33. The angle of twist of a closely helical spring under an axial torque is given by **[SSC-2012]**

(a) $\frac{64Tdn}{ED^4}$ (b) $\frac{32Tdn}{ED^4}$

(c) $\frac{32TDn}{Ed^4}$ (d) $\frac{64TDn}{Ed^4}$

34. 28 day crushing strength of cement is tested on 70.7 mm size cubes of mortar having cement to sand proportion of **[SSC-2012]**

(a) 1 : 5 (b) 1 : 6

(c) 1 : 3 (d) 1 : 4

35. For Portland cement of 43 grade 28 day mean compressive strength should exceed **[SSC-2012]**

(a) 43 MPa (b) 43.5 MPa

(c) 33 MPa (d) 38.5 MPa

36. Minimum grade of concrete for moderate environment exposure condition should be **[SSC-2012]**

(a) M25 (b) M30

(c) M15 (d) M20

37. The characteristic strength of concrete is defined as that compressive strength below which NOT more than **[SSC-2012]**

(a) 2% of results fall (b) none of these

(c) 10% of results fall (d) 5% of results fall

38. Workability of concrete is directly proportional to **[SSC-2012]**

(a) Grading of aggregate

(b) Water : Cement ratio

(c) Aggregate : Cement ratio

(d) Time of transit

39. The bottom diameter, top diameter and the height of the steel mould used for slump test are respectively **[SSC-2012]**

(a) 20 cm, 30 cm & 10 cm

(b) 10 cm, 30 cm & 20 cm

(c) 20 cm, 10 cm & 30 cm

(d) 10 cm, 20 cm & 30 cm

40. Los Angeles test for aggregates is made to determine the **[SSC-2012]**

(a) Abrasion resistance (b) Water absorption

(c) Crushing strength (d) Impact value

41. Out of the constituents of cement namely, tri calcium silicate (C_3S), dicalcium silicate (C_2S), tri calcium aluminate (C_3A) and tetracalcium alumino ferrite (C_4AF) the first to set and harden is **[SSC-2012]**

(a) C_3A (b) C_4AF

(c) C_3S (d) C_2S

42. The addition of $CaCl_2$ in concrete results in **[SSC-2012]**

(i) increased shrinkage

(ii) decreased setting time

(iii) decreased shrinkage

(iv) increased setting time **[SSC-2012]**

(a) only (i) (b) only (i) and (ii)

(c) only (i) and (iv) (d) only (iv)

43. The concrete mix design is conducted as per **[SSC-2012]**

(a) IS : 10262 (b) IS : 13920

(c) IS : 383 (d) IS : 456

44. The modulus of elasticity of concrete in N/mm^2 can be assumed as follows where f_{ck} is the characteristic cube compressive strength of concrete in N/mm^2 **[SSC-2012]**

(a) $4000\sqrt{f_{ck}}$ (b) $5000\sqrt{f_{ck}}$

(c) $2000\sqrt{f_{ck}}$ (d) $3000\sqrt{f_{ck}}$

45. The horizontal distance between parallel main reinforcements in RC slab shall not be more than **[SSC-2012]**

(a) 4 times effective depth of slab

(b) 5 times effective depth of slab

(c) 3 times effective depth of slab

(d) 2 times effective depth of slab

46. In limit state method of design, for HYSD bars the values of bond stress shall be **[SSC-2012]**

(a) increased by 60% (b) decreased by 60%

(c) increased by 50% (d) decreased by 50%

47. Critical sectrion for calculating bending moment for a spread concrete footing of effective depth d is given by the plane at **[SSC-2012]**

(a) (d/2) from column face

(b) d from column face

(c) column face

(d) 75 mm from column face

48. If L is the effective length of a column and B is the least lateral dimension, then the column will be treated as short column if the ratio of L/B is equal to or less than **[SSC-2012]**

(a) 14 (b) 12

(c) 18 (d) 16

49. The factored loads at the limit state of collapse for DL + LL, DL + WL and DL + LL + WL combinations, according to IS : 456 – 2000 are respectively **[SSC-2012]**

(a) 1.2 DL + 1.2 LL, 1.5 DL + 1.5 WL, 1.5 DL + 1.5 LL + 1.5 WL

(b) 1.5 DL + 1.5 LL, (0.9 or 1.5) DL + 1.5 WL, 1.2 DL + 1.2 LL + 1.2 WL

(c) 1.5 DL + 1.5 LL, 1.2 DL + 1.2 WL, 1.5 DL + 1.5 LL + 1.5 WL

(d) (0.9 or 1.5) DL + 1.5 LL, 1.5 DL + 1.5 WL, 1.2 DL + 1.2 LL + 1.2 WL

50. A compression member in terms as column or strut if the ratio of its effective length to the least lateral dimension is more than **[SSC-2012]**

(a) 3 (b) 5

(c) 1 (d) 2

51. Minimum percentage of tension steel in an RCC beam for Fe 500 steel is **[SSC-2012]**

(a) 0.22 (b) 0.80

(c) 0.12 (d) 0.17

52. In reinforced and plain concrete footing resting on soils, the thickness at edge shall not be bess than **[SSC-2012]**

(a) 30 cm (b) 50 cm

(c) 15 cm (d) 25 cm

53. Bending moment co-efficients and shear co-efficients for contiuous beams of uniform cross-section as per IS 456 (tab-12 and 13) may be used only when spans do not differ to the longest span by **[SSC-2012]**

(a) 15% (b) 20%

(c) 10% (d) 12%

54. A slender section buckle locally **[SSC-2012]**

(a) after reaching yield moment

(b) as soon as it reaches ultimate moment

(c) before reaching yield moment

(d) as soon as it reaches yield moment

55. The slenderness ratio $\left(\frac{l}{r}\right)$ of a lacing bar should be less than **[SSC-2012]**

(a) 250 (b) 350

(c) 145 (d) 180

56. The member of roof truss which supports the purlins is called as **[SSC-2012]**

(a) sag rod (b) main strut

(c) principal rafter (d) principal tie

57. The effective length of a steel column, effectively held in position and restrained against rotation at both ends is **[SSC-2012]**

(a) 0.80 L (b) 1.0 L

(c) 0.5 L (d) 0.65 L

58. Which one of the following factors does not affect the lateral buckling strength of a steel 1 section undergoing bending about its major axis? **[SSC-2012]**

(a) Laterally unsupported length of the compression flange

(b) Radius of gyration about the major axis of the section

(c) Boundary conditions at the ends

(d) Radius of gyration about the minor axis of the section

59. The water absorption for good brick should not be more than **[SSC-2012]**

(a) 10% of its dry weight

(b) 15% of its dry weight

(c) 10% of its saturated weight

(d) 15% of its saturated weight

60. The disease of dry rot in timber is caused by **[SSC-2012]**

(a) complete submergence in water

(b) none of these

(c) alternate wet and dry conditions

(d) lack of ventilation

61. Clay bricks are made of earth having **[SSC-2012]**

(a) nearly equal proportion of silica and alumina

(b) nearby equal proportions of alumina, silica and lime

(c) 35 – 70% silica and 10 – 20% alumina

(d) 10 – 20% silica and 35 – 70% alumina

62. The compound first to settle in cement is **[SSC-2012]**

(a) tricalcium silicate

(b) tetra calcium alumino-ferrite

(c) tricalcium aluminate

(d) dicalcium silicate

63. The age of trees can be understand by **[SSC-2012]**

(a) measuring the diameter of pith

(b) the thickness of bark

(c) counting number of rings

(d) length of medullary rays

64. Putty is made up of **[SSC-2012]**

(a) red lead and linsed oil

(b) zinc oxide and boiled linsed oil

(c) white lead and turpentine

(d) powdered chalk and raw linsed oil

65. Which of the following Bouge's compounds of cement liberates maximum heat of hydration? **[SSC-2012]**

(a) C_3S (b) C_4AF

(c) C_3A (d) C_2S

66. As per IS : 456-2000, the organic content of water used for making concrete should NOT be more than **[SSC-2012]**

(a) 200 mg/L (b) 250 mg/L

(c) 100 mg/L (d) 150 mg/L

67. Which of the following is the hardest wood? **[SSC-2012]**

(a) Babul (b) Chir

(c) Teak (d) Shisham

68. Doglegged stairs are **[SSC-2012]**

(a) quarter turn stairs (b) three quarter turn stairs

(c) half turn stairs (d) straight stairs

69. If d is the constant distance between the sections, then the correct prosmoidal formula for volume is **[SSC-2012]**

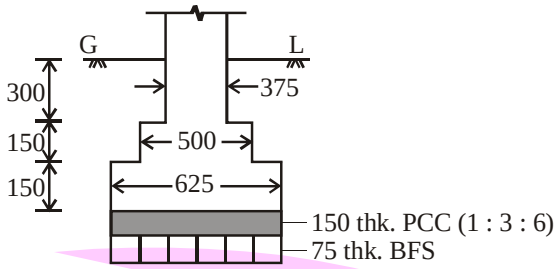
(a) $\frac{d}{3}$ [first area + last area + 4 Σ Even area + 2 Σ odd areas]

(b) $\frac{d}{6}$ [first area + last area + 2 Σ Even area + 4 Σ odd areas]

(c) d [first area + last area + Σ Even area + 2 Σ odd areas]

(d) $\frac{d}{3}$ [first area + last area + 2 Σ Even area + 4 Σ odd areas]

70. The cross-section of a strip footing is shown below: **[SSC-2012]**



The quantity of 150 thick PCC (1 : 3 : 6) per metre length of footing is

(a) 0.094 sq.m (b) 0.094 cu.m
(c) 0.0625 sq. m (d) 0.0625 cu.m

71. The measurement is NOT made in square metres in case of **[SSC-2012]**

(a) Damp proof course (b) Forms works
(c) Concrete Jaffries (d) R.C. Chhajja

72. For one sq.m. single brick flat soiling (conventional size), the number of brick required is **[SSC-2012]**

(a) 54 (b) 62
(c) 32 (d) 44

73. The number of bricks (conventional size) required for one square metre of brick on edge soiling is: **[SSC-2012]**

(a) 54 (b) 64
(c) 34 (d) 44

74. For 1 sq. m of 7.5 cm thick lime terracing in roof with brick khoa, surki, lime (2 : 2 : 7) including finishing, the quantity of surki requried is **[SSC-2012]**

(a) 0.023 cu. m (b) 0.025 cm.m
(c) 0.019 cu. m (d) 0.022 cu. m

75. In straight line method, the annual depreciation of the property is **[SSC-2012]**

(a) $\frac{\text{Original cost} - \text{Annual sinking fund}}{\text{Life in years}}$

(b) $\frac{\text{Life in years}}{\text{Original cost} + \text{Scrap value}}$

(c) $\frac{\text{Original cost} - \text{Scrap value}}{\text{Life in years}}$

(d) $\frac{\text{Original cost} + \text{Scrap value}}{\text{Life in years}}$

76. The quantity of brickwork in foundation and plinth per day per mason should be **[SSC-2012]**

(a) 1.75 cu. m (b) 2.5 cu. m
(c) 1.0 cu.m (d) 1.25 cu.m

77. Which of the following scales is the smalles one? **[SSC-2012]**

(a) 4 : 200000 (b) 1 cm = 5000 m
(c) 1 cm = 50 m (d) RF = 1/50000

78. When the curvature of earth is taken into account, the surveying is called **[SSC-2012]**

(a) Plane surveying (b) Preliminary surveying
(c) Grodetic surveying (d) Hydrographic surveying

79. Detailed plotting in plane table surveying is generally done by **[SSC-2012]**

(a) resection (b) both (a) and (d)
(c) travelling (d) radiation

80. Theodolite is an instrument used for measurement of **[SSC-2012]**

(a) both horizontal and vertical angles
(b) distance only
(c) horizontal angles only
(d) vertical angles only

81. IF the magnetic bearing of the Sun at a place at noon in southern hemisphere is 167°, the magnetic declination at that place is **[SSC-2012]**

(a) 13°E (b) 13°W
(c) 77°N (d) 23°S

82. The angles between the prolongation of the preceding line and the forward line of a traverse is called **[SSC-2012]**

(a) direct angle (b) excluded angle
(c) deflection angle (d) included angle

83. If the end points of a line are free from local attraction, the difference between fore bearing and back bearing of the line should be **[SSC-2012]**

(a) 180° (b) 120°
(c) 360° (d) 90°

84. For a tacheometer, the additive and multiplying constants are respectively **[SSC-2012]**

(a) 100 and 0 (b) 0 and 100
(c) 0 and 0 (d) 100 and 100

85. The fore bearing of a line CD is 324° 45'. The back bearing of the line is **[SSC-2012]**
(a) 144° 45' (b) 54° 45'
(c) 234° 45' (d) 35°

86. The principle of working of optical square is based upon **[SSC-2012]**
(a) double reflection (b) double refraction
(c) reflection (d) refraction

87. If the plasticity index of a soil mass is zero, the soil is **[SSC-2012]**
(a) clay (b) clayey silt
(c) sand (d) silt

88. Water content of soil can **[SSC-2012]**
(a) be less than 0%
(b) be greater than 100%
(c) never be greater than 100%
(d) take values only from 0% to 100%

89. The coefficient of active earth pressure for a loose sand haveing an angle of internal friction 'ϕ' is **[SSC-2012]**
(a) $\frac{1-\sin\frac{\phi}{2}}{1+\sin\frac{\phi}{2}}$ (b) $\frac{1+\sin\frac{\phi}{2}}{1-\sin\frac{\phi}{2}}$
(c) $\frac{1-\sin\phi}{1+\sin\phi}$ (d) $\frac{1+\sin\phi}{1-\sin\phi}$

90. A plate load test is useful to estimate **[SSC-2012]**
(a) Both bearing capacity and settlement of foundation
(b) Consolidation of soil
(c) Bearing capacity of foundation
(d) Settlement of foundation

91. The unit of the coefficient of consolidation is **[SSC-2012]**
(a) gm/cm^2/sec (b) gm–cm/sec
(c) cm^2/sec (d) cm^3/sec

92. The characteristic of an ideal fluid is **[SSC-2012]**
(a) one which satisfies continuity equation
(b) one which flows with least friction
(c) one which obeys Newton's Law of Viscosity
(d) frictionless and incompressible

93. The discharge through a rectangular orifice is given by the expression as indicated below : **[SSC-2012]**
(a) $Q=\frac{2}{3}C_d b\sqrt{2g}\left(H_2^{1/2}-H_1^{1/2}\right)$
(b) $Q=\frac{2}{3}C_d b\sqrt{2g}\left(H_2^{2}-H_1^{2}\right)$
(c) $Q=\frac{2}{3}C_d b\sqrt{2g}\left(H_2-H_1\right)$
(d) $Q=\frac{2}{3}C_d b\sqrt{2g}\left(H_2^{3/2}-H_1^{3/2}\right)$

94. A rectangular plate 1.25 m × 2.4 m is immersed in a liquid of relative density 0.85 with its 1.25 m side horizontal and just at the water surface. If the plane of the plate makes an angle of 60° with the horizontal, the pressure force on one side of the plate is **[SSC-2012]**
(a) 30.6 kN (b) 26.0 kN
(c) 15.0 kN (d) 30.0 kN

95. The ratio of specific weight of a liquid to the specific weight of pure water at a standard temperature is called **[SSC-2012]**
(a) compressibility of liquid
(b) surface tension of liquid
(c) density of liquid
(d) specific gravity of liquid

96. In the Bernoulli's equation written as $\frac{p}{r}+\frac{v^2}{2g}+z=$ constant, each of the term represents energy per unit **[SSC-2012]**
(a) weight (b) length of flow
(c) mass (d) volume

97. The term 'alternate depths' in open channel flow refers to the **[SSC-2012]**
(a) depths having the same specific energy for a given discharge
(b) depths before and after the passage of the surge
(c) depths having the same kinetic energy for a given discharge
(d) depths on either side of a hydraulic jump

98. The length of a pipe is 1000 m and its diameter is 20 cm. If the diameter of an equivalent pipe is 40 cm, then its length is **[SSC-2012]**
(a) 4000 m (b) 32000 m
(c) 20000 m (d) 8000 m

99. In series-pipe problems **[SSC-2012]**

(a) the discharge is same through each pipe

(b) the discharge through each pipe is added to obtain total discharge

(c) the head loss is same through each pipe

(d) the Reynold's number for each pipe is same

100. An air vessel is provided at the summit in a syphon to **[SSC-2012]**

(a) increase velocity

(b) maintain pressure difference

(c) avoid interruption in the flow

(d) increase discharge

Answer Key

1		2		3		4		5	
6		7		8		9		10	
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