

1.

**Function of protoderm is to form**

1. pith
2. vascular bundles
3. ground tissues
4. epidermis

2.

**Which among the following is not a secondary or lateral meristem**

1. intercalary meristem
2. fascicular vascular cambium
3. inter fascicular cambium
4. cork cambium

3.

**During the formation of leaves and elongation of stem, some cells 'left behind' from shoot apical meristem, it constitute**

1. apical bud
2. terminal bud
3. axillary bud
4. secondary Meristem

4.

**Match the column I with column II**

	Column I		Column II
a.	Xylem parenchyma	(i)	Absent in most of the monocots
b.	Sclereids	(ii)	Long cylindrical tube-like structure
c.	Phloem parenchyma	(iii)	Food and tannins
d.	Vessel	(iv)	Fruit walls of nuts

1. a(i), b(ii), c(iii), d(iv)
2. a(iii), b(iv), c(i), d(ii)
3. a(ii), b(iv), c(iii), d(i)
4. a(iii), b(ii), c(i), d(iv)

5.

**Lenticels present in woody trees help in**

1. Exchange of gases and transpiration.
2. Exchange of gases and guttation.

4. Only exchange of gases.
5. Elimination of exudates.

6.

**Which of the following is not correctly matched?**

1. Companion cell – Albuminous cells in gymnosperm
2. Companion cell – Associated with sieve cells
3. Companion cell – Nucleated structure and its nucleus controls sieve tube
4. Companion cell – Helps in maintaining the pressure gradient in sieve tube

7.

Correct statements among the following is/are

- a) different organs in plant show differences in their internal structure
  - b) monocots and dicots are anatomically similar
  - c) internal structures shows adaptations to diverse environments
  - d) apical meristem produce only dermal tissues not vascular tissues
1. a and c
  2. b and d
  3. a and d
  4. b and c

8.

**Identify the correct label in given diagram.**



1. A-axillary bud, B-shoot apical meristem, C-vascular tissues
2. A-intercalary meristem, B-axillary bud, C-vascular tissues
3. A-vascular tissues, B-shoot apical meristem, C-leaf primordium
4. A-leaf primordium, B-shoot apical meristem, C-axillary bud

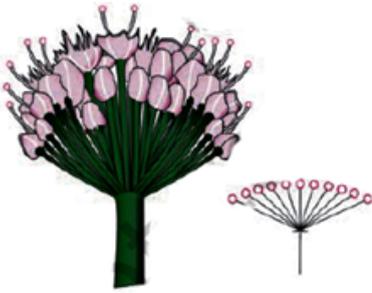
9.

**Meristem in grass which regenerate parts removed by grazing herbivores**

1. intercalary meristem in shoot apex
2. intercalary meristem in root
3. is secondary in origin
4. intercalary meristem between mature tissues

10.

Inflorescence in given belong to which family



- 1.Brassicaceae
- 2.Solanaceae
- 3.Fabaceae
- 4.Liliaceae

11.

Match the following:

Column I

Column II

a) Tulip

i) mitotic poison

b) Aloe

ii) vegetable

c) Asparagus

iii) medicine

d) Colchicine

iv) ornamental

(a)	(b)	(c)	(d)
1. i	ii	iii	iv
2. ii	i	iv	iii
3. iv	iii	ii	i
4. iii	iv	i	ii

12.

The bulliform cells in grasses

1. Are present on the upper epidermis of leaves.
2. Become turgid and cause the leaves to curl inwards under stress.
3. Are small resin filled cells.
4. Help in transpiration.

13.

Find the incorrect pair w.r.t. fruit

- 1.Liliaceae – capsule, rarely berry
- 2.Solanaceae – Caryopsis

3.Fabaceae – Legume

4.Brassicaceae – Siliqua, Silicula

14.

Non endospermic seed occur in all except

- 1.Gram
- 2.Soyabean
- 3.Tomato
- 4.Ground nut

15.

Unilocular ovary occur in

- 1.*Trifolium*
- 2.Brinjal
- 3.Belladonna
- 4.*Gloriosa*

16.

Match the following w.r.t. placentation.

Column I

Column II

a) Tulip

i) Axile

b) Sunflower

ii) Parietal

c) Pulses

iii) Marginal

d) Mustard

iv) Basal

(a)	(b)	(c)	(d)
1. i	ii	iii	iv
2. iv	iii	ii	i
3. ii	iii	iv	i
4. i	iv	iii	ii

17.

Leaves in this family are mostly basal, alternate linear, exstipulate with parallel venation. It is

- 1.Liliaceae
- 2.Solanaceae
- 3.Fabaceae
- 4.Brassicaceae

18.



Choose correct option w.r.t. given floral diagram

1. flower is unisexual
2. vexillary aestivation in calyx
3. valvate aestivation in corolla
4. epiphyllous condition

19.

Gynoecium is bicarpellary obliquely placed ovary, placenta swollen with many ovules. These characters are applicable to

1. Solanaceae
2. Liliaceae
3. Fabaceae
4. Brassicaceae

20.

Which of the following character is not related to family of given plant



1. pulvinate leaf base
2. reticulate venation
3. zygomorphic flower
4. vexillary aestivation in calyx

21.

Meaning of which of the following symbol is not correctly written:

1. Br → Bracteolate flower
2. P → Perianth
3. G → Superior Ovary
4. A → Actinomorphic flower

22.

Inflorescence in which main axis continues to grow and flowers are borne laterally in acropetal succession is

1. uniparous cymose
2. biparous cymose
3. multiparous cymose
4. racemose

23.

In cymose inflorescence

1. main axis terminate in a flower
2. there is only one flower
3. flower arrangement is centripetal
4. flower arrangement is acropetal

24.

All flowers are actinomorphic except

1. Mustard
2. Datura
3. Chilli
4. Pea

25.

In Cassia symmetry of flower is

1. radial
2. actinomorphic
3. similar to Canna
4. zygomorphic

26.

In given figure



1. gynoecium occupies highest position
2. ovary is perigynous
3. ovary is half inferior
4. margin of thalamus enclose ovary completely

27.

**Ovary is superior in**

1. mustard, china rose and brinjal
2. plum, rose and peach
3. ray floret of sunflower
4. guava and cucumber

28.

**In citrus**

1. Monoadelphous condition is present
2. Diadelphous condition is present
3. Polyadelphous condition is present
4. Syngenesious condition is present.

29.

Sepals or petals in a whorl just touch one another at margin without overlapping. It is \_\_\_\_\_ aestivation.

1. Vexillary
2. Valvate
3. Twisted
4. Imbricate

30.

**In bean**

1. anterior petal is largest
2. lateral petal overlap posterior petal
3. keel is largest petal
4. lateral petals are two in number

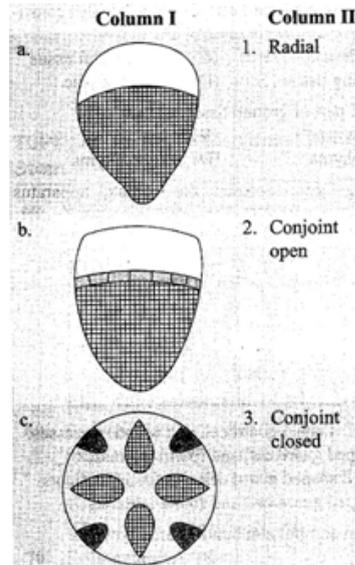
31.

**Which of the following is not a part of epidermal tissue system?**

1. Trichomes
2. Passage cells
3. Guard cells
4. Subsidiary cells

32.

**Match the columns I and II, and choose the correct combination from the options given below.**



1. a - 1 - b - 2 - c - 3
2. a - 2 - b - 3 - c - 1
3. a - 3 - b - 2 - c - 1
4. a - 3 - b - 1 - c - 2

33.

**All tissues except epidermis and vascular bundles constitute the**

1. Dermal tissue
2. Ground tissue
3. Conducting tissue
4. Vascular tissue

34.

**Pith is made up of**

1. Collenchyma
2. Parenchyma
3. Chlorenchyma
4. Sclerenchyma

35.

**Separate xylem and phloem bundles are known as**

1. Radial
2. Amphivasal
3. Collateral
4. Bicollateral

36.

**The tangential as well as radial walls of the endodermal cells have a deposition of water impermeable waxy material in the form of**

1. Starch sheath
2. Casparian strips
3. Conjunctive tissue
4. Bundle sheath

37. **Polyarch and exarch condition is found in**  
1. Monocot stem  
2. Monocot root  
3. Dicot root  
4. Dicot stem
38. **In roots, lateral branches grow from**  
1. Epiblema  
2. Pericycle  
3. Cortex  
4. Endodermis
39. **Monocot root has**  
1. Vascular bundles two to four, pith is large and well developed  
2. Radial vascular bundles, polyarch xylem, no secondary growth  
3. Usually more than six xylem bundles, pith is small or inconspicuous  
4. Both 2 and 3
40. **Endodermis is a part of**  
1. Epidermal system  
2. Intrastelar tissue  
3. Extrastelar tissue  
4. Vascular tissue
41. **Monocot root differs from dicot root in having**  
1. Open vascular budles  
2. Scattered vascular bundles  
3. Well developed pith  
4. Radial vascular bundles
42. **Endodermis of dicot stem is also called**  
1. Bundle sheath  
2. Starch sheath  
3. Mesophyll  
4. Water sheath
43. **A closed collateral bundle is one which is**  
1. Xylem and phloem occur on different radii  
2. Collateral bundle without cambium  
3. Xylem and phloem are separated by cambium  
4. Collateral bundle with cambium
- 44.
- What masks the active sites for myosin head present on the actin myofilaments?  
1. Light meromyosin  
2. Heavy meromyosin  
3. G – actin  
4. Troponin
45. A motor unit consists of:  
1. A motor neuron and all the muscle fibers innervated by it  
2. All the motor neurons innervating one muscle fiber  
3. All the muscle fibers in a fasciculus  
4. All the muscle fibers in a skeletal muscle
46. The muscle can directly use which of the following as a source of energy?  
1. Creatine phosphate  
2. Glucose  
3. ATP  
4. Fatty acids
47. With respect to the red muscle fiber, the white muscle fiber has higher:  
1. Density of capillary network  
2. Number of mitochondria  
3. Amount of sarcoplasmic reticulum  
4. Glycogen reserve
48. Myasthenia gravis is an autoimmune disease in which antibodies are formed against:  
1. Myelin sheath  
2. Articular cartilage  
3. Neuro-muscular junctions  
4. Thyroid follicle
49. A glenoid cavity is seen in:  
1. Scapula  
2. Coxa  
3. Humerus  
4. Clavicle
50. Which of the following statement is incorrect?  
1. Diffusion is a slow process and not dependent upon a living system.  
2. Diffusion across the membrane depends upon its solubility in lipids.  
3. Porins are proteins that forms huge pores, in the inner membrane of the plastids, mitochondria and some bacteria.  
4. Water channels are made up of eight different aquaporins.
51. In a herbaceous plant the amount of dry matter as a fresh weight is?  
1. 5 – 10 %  
2. 10 – 15 %

3. 15 – 20%  
4. 20 – 25%
- 52.
- In plants short distance transport can take place by?
1. Diffusion
  2. Cytoplasmic streaming
  3. Active transport
  4. All the above
- 53.
- Direction of transport in plants can be multidirectional for?
1. Organic nutrients
  2. Mineral nutrients
  3. PGR
  4. Both 1. and 2.
- 54.
- Following are two statements, find the correct option  
(I) In a flowering plant there is a complex traffic of compounds moving in different directions.  
(II) Each organ of plant receives some substance and gives out some  
Options:  
1. Both (I) and (II) are correct  
2. Only (I) is correct  
3. Only (II) is correct  
4. Neither (I) nor (II) is correct
- 55.
- If the external solution balances the osmotic pressure of the cytoplasm it is said to be?
1. Isotonic
  2. Hypotonic
  3. Hypertonic
  4. Plantonic
- 56.
- Various ions from the soil are transported by the means of
1. Facilitated Transport
  2. Plasmolysis
  3. Active transport
  4. Imbibition
- 57.
- Which of the following statements are not incorrect?
- a. Root pressure only provide a modest push in the overall process of water transport
- b. Root Pressure obviously does not play a major role in water movement up tall trees
- c. The greatest contribution of root pressure may be to re-establish the continuous chains of water molecules in the xylem which often break under the enormous tensions created by transpiration
- d. Most of the plants meet their need by transpiratory pull
- e. The exudate of guttation has pure water only
1. a,b,d,e
  2. a,b,c,d
  3. b,c,d,e
  4. c,d,e
- 58.
- Which of the following is not correct for imbibitions?
1. Imbibition plays very important role in emergence of seedling.
  2. In imbibition movement of solvent is against the gradient.
  3. Water potential gradient is essential for imbibition.
  4. Affinity between liquid and solid is pre-requisite for imbibitions.
- 59.
- In a plant water potential is measured at four different points A, B, C and D. At A it is – 7 Pa at B it is – 5 Pa at C it is – 10 Pa and at D it is – 2 Pa. Which one the following can be water potential of leaf?
1. A
  2. B
  3. C
  4. D
- 60.
- How many of the following statement are correct?  
(a) Vacuolar sap contributes to the solute potential of cell.  
(b) The net direction and rate of osmosis depends upon pressure gradient and concentration gradient.  
(c) Osmotic pressure is function of the solute concentration.  
(d) Osmotic pressure is the positive pressure while osmotic potential is negative.  
Options:  
1. 4  
2. 3  
3. 2  
4. 1
- 61.
- Bulk flow of substance can be achieved through?
1. Positive hydrostatic pressure gradient
  2. Negative hydrostatic pressure gradient
  3. Both 1. and 2.
  4. Atmospheric pressure gradient
- 62.
- The depression on the os coxa where the head of

the femur articulates is the

1. acetabulum.
2. auricular surface.
3. iliac fossa.
4. ischial tuberosity.

63.

The ability of a muscle fiber action potential to cause an increase in cytosolic calcium concentration is dependent upon

1. The conduction of action potentials down T-tubules which are in intimate contact with the sarcoplasmic reticulum.
2. The presence of the voltage sensitive protein called the ryanodine receptor in the T-tubule membrane
3. The calcium channel protein called the dihydropyridine receptor which is located in the sarcoplasmic reticulum membrane
4.  $Ca^{++}$ -ATPase pumps in the sarcoplasmic reticulum

64.

When a skeletal muscle shortens during contraction which of these statements is false?

1. The I-band shortens
2. The A-band shortens
3. The H-zone becomes narrow
4. The sarcomeres shorten

65.

Which of the following is not the feature of red muscle fibres

1. They have plenty of mitochondria
2. They have high content of Myoglobin
3. They have high amount of Sarcoplasmic reticulum
4. They are called aerobic muscles

66.

During resting stage the binding site of actin for myosin remains masked by

1. Troponin
2. Gactin
3. Tropomyosin
4. Meromyosin

67.

Calcium is important in skeletal muscle contraction because it

1. Detaches the myosin head from the actin filament
2. Activates the myosin ATPase by binding to it
3. Binds to troponin to remove the masking of active sites on actin for myosin
4. Prevents the formation of bonds between the myosin cross bridges and the actin filament

68.

A motor unit consists of:

1. A motor neuron and all the muscle fibers innervated by it
2. All the motor neurons innervating one muscle fiber
3. All the muscle fibers in a fasciculus
4. All the muscle fibers in a skeletal muscle

69.

The muscle can directly use which of the following as a source of energy?

1. Creatine phosphate
2. Glucose
3. ATP
4. Fatty acids

70.

Myasthenia gravis is an autoimmune disease in which antibodies are formed against:

1. Myelin sheath
2. Articular cartilage
3. Neuro-muscular junctions
4. Thyroid follicle

71.

A glenoid cavity is seen in:

1. Scapula
2. Coxa
3. Humerus
4. Clavicle

72.

The first carpo-metacarpal joint is a/an:

1. Saddle joint
2. Ellipsoidal joint
3. Pivot joint
4. Fibrous joint

73.

Osteoporosis in a post-menopausal woman is most directly due to the deficiency of:

1. Progesterone
2. Estrogen
3. LH
4. FSH

74.

The central part of the thick myofilaments, not overlapped by thin filaments, is called the:

1. Z line
2. M line
3. I band
4. H zone

75.

Vertebrochondral ribs attach to the seventh rib with the help of:

1. Elastic cartilage
2. Hyaline cartilage
3. Fibrous cartilage
4. White fibrous tissue

76.

The human ribs are termed as bicephalic because they have:

1. Two articulation surfaces on its dorsal end
2. Two articulation surfaces on its ventral end
3. One articulation surface on its dorsal and one on its ventral side
4. No articulation surfaces

77.

Myosin head cleaves ATP for:

1. Formation of cross bridges
2. Breaking of cross bridges
3. Both 1 and 2
4. Neither 1 nor 2

78.

Vitamin D deficiency in an adult causes the condition known as

1. rickets
2. osteoporosis
3. osteomalacia
4. giantism

79.

Match items in column I with those in column II

Column I		Column II	
A. Coralloid roots		1. Cycas	
B. Monoxylic wood		2. Mass of seeds dispersed	
C. Schizogenous canals		3. Single cambium ring	
D. Sulphur shower		4. Stores resin	
		5. Mass of pollen	

	A	B	C	D
1.	1	3	5	4
2.	1	2	4	5
3.	3	4	1	5
4.	1	3	4	5

80.

Sweet potato is a modified

1. Rhizoid
2. Stem
3. Root
4. Leaf

81.

Syngeneis condition means

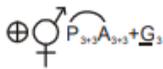
1. anthers fused filaments free
2. both anthers and filaments fused
3. filaments fused and anthers free
4. filaments fused with carpels

82.

Consider the following four statements A, B, C and D and select the right option for two correct statements.

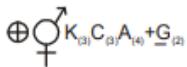
(A) In vexillary aestivation, the large posterior petal is called standard, two lateral ones are wings and two small anterior petals are termed keel

(B) The floral formula for Lillaceae is



(C) In pea flower the stamens are monadelphous

(D) The floral formula for Solanaceae is

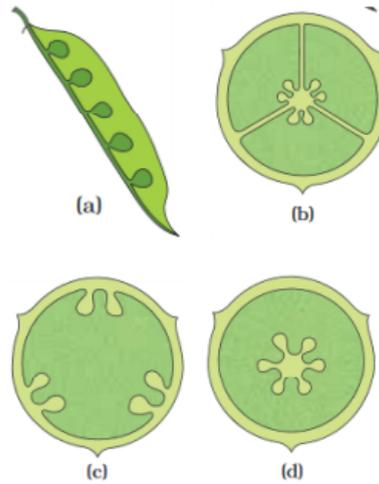


The correct statements are

1. (A) and (C)
2. (A) and (B)
3. (B) and (C)
4. (C) and (D)

83.

Placentations given below in the diagrams are



1. a - Basal, b- Axile, c- Free central, d - Parietal
2. a - Marginal, b- Axile, c- Basal, d - Superficial
3. a - Marginal, b- Free central, c- Basal, d - Axile
4. a - Marginal, b- Axile, c- Parietal, d - Free central

84.

What type of inflorescence is found in Ficus?

1. Cyathium
2. Umbel
3. Hypanthodium
4. Racemose

85.

Coir of coconut is obtained from

1. Endocarp
2. Mesocarp
3. Pericarp
4. Placenta

86.

The fruit of wheat is a

1. Nut
2. Caryopsis
3. Pome
4. Cypsella

87.

In pea and bean flowers, the \_\_\_\_\_ petal overlaps the two \_\_\_\_\_ petals which in turn overlap the two \_\_\_\_\_ petals.

1. Largest, anterior, lateral.
2. Posterior, keel, smallest.
3. Posterior, wings, anterior.
4. Anterior, lateral, smallest.

88.

In racemose type of inflorescence

1. Main axis does not terminate in a flower.
2. Flowers are borne in a basipetal order.
3. Main axis shows limited growth.
4. Both (a) and (b).

89.

Following are the floral diagrams of different families select the correct option with respect to their character



(i)



(ii)



(iii)



(iv)

**Options**

1. (i) Epiphyllous, (ii) Epipetalous, (iii) Diadelphous,

(iv) Tetradyamous.

2. (i) Epipetalous, (ii) Epiphyllous, (iii) Diadelphous, (iv) Tetradyamous.

3. (i) Tetradyamous, (ii) Diadelphous, (iii) Epiphyllous, (iv) Epipetalous.

4. (i) Diadelphous, (ii) Tetradyamous, (iii) Epiphyllous, (iv) Epipetalous.

90.

Find odd one out with respect to position of ovary

1. Guava
2. Cucumber
3. Brinjal
4. Sunflower ray florets

91.

The colour of  $\text{KMnO}_4$  is due to

1. d-d transition
2. Charge transfer spectra
3. Polarisation of ion
4. p-d transition

92.

Which of the following element does not show the variable oxidation state?

1. Fe
2. Mn
3. Cu
4. Zn

93.

With F highest stable oxidation state of Mn is

1. +6
2. +4
3. +7
4. +3

94.

$\text{Cr}_2\text{O}_7^{2-} + \text{X} \xrightarrow{\text{H}^+} \text{Cr}^{3+} + \text{H}_2\text{O} + \text{oxidized product of X}$ , X in the above reaction cannot be

1.  $\text{C}_2\text{O}_4^{2-}$
2.  $\text{Fe}^{2+}$
3.  $\text{SO}_4^{2-}$
4.  $\text{S}^{2-}$

95.

In dichromate dianion

1. 4Cr-O bonds are equivalent
2. 6Cr-O bonds are equivalent
3. All Cr-O bonds are equivalent
4. All Cr-O bonds are non equivalent

96.

The basic oxide is:

1. CrO
2. Cr<sub>2</sub>O<sub>3</sub>
3. CrO<sub>3</sub>
4. Cr<sub>2</sub>O<sub>4</sub>

97.

The pair having similar magnetic moment is

1. Ti<sup>3+</sup>, V<sup>3+</sup>
2. Cr<sup>3+</sup>, Mn<sup>2+</sup>
3. Mn<sup>2+</sup>, Fe<sup>3+</sup>
4. Fe<sup>2+</sup>, Mn<sup>2+</sup>

98. Heating of ammonium dichromate produces

- (1) NH<sub>3</sub>, Cr<sub>2</sub>O<sub>3</sub> and H<sub>2</sub>O
- (2) N<sub>2</sub>, Cr<sub>2</sub>O<sub>3</sub> and H<sub>2</sub>O
- (3) NO, CrO<sub>3</sub> and H<sub>2</sub>O
- (4) N<sub>2</sub>O, CrO<sub>3</sub> and H<sub>2</sub>O

99.

Which one of the following is an inner orbital complex as well as diamagnetic in behaviour -

1. [Zn (NH<sub>3</sub>)<sub>6</sub>]<sup>2+</sup>
2. [Ni (NH<sub>3</sub>)<sub>6</sub>]<sup>2+</sup>
3. [Cr (NH<sub>3</sub>)<sub>6</sub>]<sup>3+</sup>
4. [Co (NH<sub>3</sub>)<sub>6</sub>]<sup>3+</sup>

100.

Which one of the following is expected to exhibit optical isomerism ? (en = ethylenediamine)

1. cis - [Pt(NH<sub>3</sub>)<sub>2</sub>Cl<sub>2</sub>]
2. cis - [Co(en)<sub>2</sub>Cl<sub>2</sub>]
3. trans - [Co(en)<sub>2</sub>Cl<sub>2</sub>]
4. trans - [Pt(NH<sub>3</sub>)<sub>2</sub>Cl<sub>2</sub>]

101.

Which of the following is not a mineral of aluminium?

1. Bauxite

2. Cryolite

3. Gibbsite

4. Malachite

102.

Serpek's method involves the heating of bauxite with

1. NaOH
2. Na<sub>2</sub>CO<sub>3</sub>
3. N<sub>2</sub> + C
4. CaCO<sub>3</sub>

103.

In the metallurgy of copper, the slag is

1. FeSiO<sub>3</sub>
2. CaCO<sub>3</sub>
3. CaSiO<sub>3</sub>
4. CaO

104.

Galena Contains ZnS with PbS. Which of the following is used as depressant to stop ZnS to come with foam?

1. NaCN
2. Aniline
3. Pine Oil
4. H<sub>2</sub>O

105.

In Ellingham diagrams of Δ<sub>f</sub>G oxide formation V<sub>S</sub>T, which of the following graphs has negative slope?

1. C → CO
2. Fe → Fe<sub>2</sub>O<sub>3</sub>
3. Mg → MgO
4. All of these

106.

Which of the following is leached with NaCN?

1. Ore of Al
2. Ore of Cu
3. Ore of Ag
4. Ore of Zn

107.

Vapour phase refining can be carried out in case of

1. Ni
2. Zr
3. Ti

4. All of these
108. In the metallurgy of copper, matte contains
1.  $\text{Cu}_2\text{S} + \text{Cu}_2\text{O}$
  2.  $\text{Cu}_2\text{S} + \text{FeS}$
  3.  $\text{FeS} + \text{FeO}$
  4.  $\text{Cu}_2\text{O} + \text{FeO}$
109. How many hydrate isomers are possible for the molecular formula  $\text{CoCl}_3 \cdot 6\text{H}_2\text{O}$ ?
1. One
  2. Two
  3. Three
  4. Four
110. If excess  $\text{AgNO}_3$  of solution is added to 100ml of 0.024M solution of dichlorobis (ethylene diamine) cobalt (III) Chloride, how many moles of  $\text{AgCl}$  will be precipitated?
1. 0.0012
  2. 0.0016
  3. 0.0024
  4. 0.0048
111. The shape of  $[\text{NiCl}_4]^{2-}$  and  $[\text{PtCl}_4]^{2-}$  respectively are
1. Square planar, Square planar
  2. Tetrahedral, Tetrahedral
  3. Tetrahedral, Square planar
  4. Square planar, Tetrahedral
112. Which of the following compounds exhibit geometrical isomerism?
1.  $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$
  2.  $[\text{Zn}(\text{NH}_3)_2\text{Cl}_2]$
  3.  $[\text{Pt}(\text{NH}_3)_3\text{Cl}]$
  4. All of these
113.  $\pi$  bonding is not involved in
1. Ferrocene
  2. Dibenzene Chromium
  3. Zeise's Salt
4. Grignard Reagent
114. The co-ordination number of Fe in Ferrocene is
1. 2
  2. 5
  3. 6
  4. 10
115. The number of geometrical isomers possible for a square planar complex  $[\text{Mabcd}]^{\pm n}$  are
1. 2
  2. 3
  3. 4
  4. 5
116. EAN of Fe in  $\text{K}_3[\text{Fe}(\text{CN})_6]$  is
1. 34
  2. 35
  3. 36
  4. 47
117. Which of the following is not an ambidentate ligand?
1.  $\text{CN}^-$
  2.  $\text{NO}_2^-$
  3.  $\text{SCN}^-$
  4.  $\text{NH}_3$
118.  $[\text{Cr}(\text{en})_2\text{Br}_2]^+$  can show
1. Optical isomerism
  2. Geometrical isomerism
  3. Both (1) and (2)
  4. Neither (1) nor (2)
119. Which of the following has square planar structure?
1.  $[\text{NiCl}_4]^{2-}$
  2.  $[\text{Ni}(\text{CO})_4]$
  3.  $[\text{Ni}(\text{CN})_4]^{2-}$
  4. None of these
- 120.

To an acidic solution of an anion, a few drop of  $\text{KMnO}_4$  solution are added. Which of the following if present, will not decolourise  $\text{KMnO}_4$  solution?

1.  $\text{CO}_3^{-2}$
2.  $\text{NO}_2^-$
3.  $\text{S}^{-2}$
4.  $\text{Cl}^-$

121.

Which of the following can exhibit geometrical isomerism?

1.  $[\text{MnBr}_4]^{-2}$
2.  $[\text{Pt}(\text{NH}_3)_3\text{Cl}]^+$
3.  $[\text{PtCl}_2(\text{PPh}_3)_2]$
4.  $[\text{Fe}(\text{H}_2\text{O})_5\text{NO}]^{+2}$

122.

$4f^{14}$  configuration is observed in :-

1. Dy & Pm
2. Ln & La
3. Yb & Lu
4. Tm & Lu

123.

Select the incorrect statement about the complex  $[\text{Fe}(\text{H}_2\text{O})_5\text{NO}]^{+2}$  formed in the brown ring test for nitrates is ?

1. Colour change in due to charge transfer.
2. It has iron in +1 oxidation state & nitrosyl as  $\text{NO}^+$ .
3. It has magnetic moment of 3.87 B.M. confirming three unpaired electrons in Fe.
4. Colour change is due to d-d-transition.

124.

Which metal carbonyl will react fastest with sodium metal?

1.  $\text{Ni}(\text{CO})_4$
2.  $\text{Cr}(\text{CO})_6$
3.  $\text{Fe}(\text{CO})_5$
4.  $\text{V}(\text{CO})_6$

125.

Which of the following d-block elements has the least enthalpy of atomisation?

1. Cr
2. Zn

3. Mn

4. V

126.

Which of the following lanthanide ions is paramagnetic?

1.  $\text{Ce}^{4+}$
2.  $\text{Lu}^{3+}$
3.  $\text{Yb}^{2+}$
4.  $\text{Pm}^{2+}$

127.

$(\text{NH}_4)_2\text{Cr}_2\text{O}_7$  (Ammonium dichromate) is used in fire works. The green coloured powder blown in air is:-

1.  $\text{Cr}_2\text{O}_3$
2.  $\text{CrO}_2$
3.  $\text{Cr}_2\text{O}_4$
4.  $\text{CrO}_3$

128.

The color of  $\text{KMnO}_4$  is due to

1.  $M \rightarrow L$  charge transfer transition
2. d-d transition
3.  $L \rightarrow M$  charge transfer transition
4.  $\sigma - \sigma^*$  transition

129.

An octahedral complex of  $\text{Co}^{3+}$  is diamagnetic. The hybridisation involved in the formation of the complex is:

1.  $sp^3 d^2$
2.  $dsp^2$
3.  $d^2 sp^3$
4.  $sp^3 d$

130.

The correct statement about the magnetic properties of  $[\text{Fe}(\text{CN})_6]^{3-}$  and  $[\text{FeF}_6]^{3-}$  is ( $Z=26$ ):

1. both are paramagnetic.
2. both are diamagnetic.
3.  $[\text{Fe}(\text{CN})_6]^{3-}$  is diamagnetic,  $[\text{FeF}_6]^{3-}$  is paramagnetic.
4.  $[\text{Fe}(\text{CN})_6]^{3-}$  is paramagnetic,  $[\text{FeF}_6]^{3-}$  is diamagnetic.

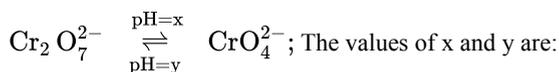
131.

Which of the following is not oxidised by  $\text{O}_3$  gas?

1. KI

2.  $\text{FeSO}_4$
3.  $\text{KMnO}_4$
4.  $\text{K}_2\text{MnO}_4$

132.



1. 2, 10
2. 8, 4
3. 4, 8
4. 8, 10

133.

In which of the following coordination compounds, does the central metal obeys the EAN rule?

1.  $\text{K}_3[\text{Fe}(\text{CN})_6]$
2.  $\text{K}_4[\text{Fe}(\text{CN})_6]$
3.  $[\text{Cu}(\text{NH}_3)_4]\text{SO}_4$
4. All of these

134.

Which of the following is wrong?

1.  $[\text{Ni}(\text{CO})_4]$  and  $[\text{NiCl}_4]^{2-}$  are tetrahedral
2.  $[\text{Ni}(\text{CN})_4]^{2-}$  and  $[\text{Cu}(\text{CN})_4]^{2-}$  are square planar
3.  $[\text{NiCl}_4]^{2-}$  and  $[\text{Cu}(\text{CN})_4]^{2-}$  are paramagnetic
4.  $[\text{Ni}(\text{CN})_4]^{2-}$  and  $[\text{Ni}(\text{CO})_4]$  are paramagnetic

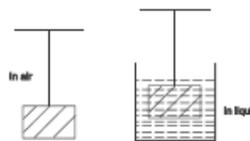
135.

Geometrical shape of the complexes formed by the reaction of  $\text{Ni}^{2+}$  with  $\text{Cl}^-$ ,  $\text{CN}^-$  and  $\text{H}_2\text{O}$  are respectively:

1. octahedral, tetrahedral, square planar
2. tetrahedral, square planar, octahedral
3. square planar, tetrahedral, octahedral
4. octahedral, square planar, tetrahedral

136.

When a body of mass 'm', density  $d_B$  is suspended from a wire, its elongation is 'e' when the body is in-air. If the body is completely immersed in non-viscous liquid of density  $d_l$  then its elongation is



$$1. e \left( 1 - \frac{d_l}{d_B} \right) \quad 2. e \left( 1 - \frac{d_B}{d_l} \right)$$

$$3. e \left( \frac{d_B}{d_l} - 1 \right) \quad 4. e \left( \frac{d_B}{d_l} \right)$$

137.

A cubical vessel of height 1m is full of water. Find the work done in pumping out whole water.

1. 49 J
2. 490 J
3. 4900 J
4. 49000 J

138.

The flow rate from a tap of diameter 1.25 cm is 3 lit/min. The coefficient of viscosity of water is  $10^{-3}$  Pas. The nature of flow is

1. Turbulent
2. Laminar
3. Neither laminar nor turbulent
4. data inadequate

139.

Water flowing from a hose pipe fills a 15 litre container in one minute. The speed of water from the free opening of radius 1 cm is ( in  $\text{ms}^{-1}$ )

$$1. 2.5 \quad 2. \frac{\pi}{2.5}$$

$$3. \frac{2.5}{\pi} \quad 4. 5\pi$$

140.

Work of  $6.0 \times 10^{-4}$  joule is required to be done in increasing the size of a soap film from 10cm x 6 cm to 10cm x 11 cm. The surface tension of the film is

1.  $5 \times 10^{-2} \text{N/m}$
2.  $6 \times 10^{-2} \text{N/m}$
3.  $1.5 \times 10^{-2} \text{N/m}$
4.  $1.2 \times 10^{-1} \text{N/m}$

141.

When a cylindrical tube is dipped vertically into a liquid, the angle of contact is  $140^\circ$ . When the tube is further dipped, several spherical drops of a liquid each of radius  $r$  coalesce to form a single drop of radius  $R$ . If  $T$  is the surface tension, then the energy liberated will be -

1.  $100^\circ$
2.  $140^\circ$
3.  $180^\circ$
4.  $60^\circ$

1.  $4pR^3T \left( \frac{1}{r} - \frac{1}{R} \right)$
2.  $2pR^3T \left( \frac{1}{r} - \frac{1}{R} \right)$
3.  $\frac{4}{3}pr^2T \left( \frac{1}{r} - \frac{1}{R} \right)$
4.  $2pRT \left( \frac{1}{R} - \frac{1}{r} \right)$

142.

Two liquid drops have their diameters as 1 mm and 2 mm. The ratio of excess pressure in them is

1. 1:2
2. 2:1
3. 4:1
4. 1:4

143.

**If a soap bubble of radius 3 cm coalesce with another soap bubble of radius 4 cm under isothermal conditions, the radius of the resultant bubble formed is in cm**

1. 7
2. 1
3. 5
4. 12

144.

Water flows through a non – uniform tube of area of cross section A, B, and C whose value are 25, 15, and 35  $\text{cm}^2$  respectively. The ratio of the velocities of water at the sections A, B, and C is

1. 5:3:7
2. 7:3:5
3. 21:35:15
4. 1:1:1

145.

W is the work done in forming a bubble of radius  $r$ , the work is done in forming a bubble of radius  $2r$  will be:-

1.  $4W$
2.  $3W$
3.  $2W$
4.  $W$

146.

147.

A sample of metal weighs 210 g in air, 140 g in water and 120 g in an unknown liquid. Then -

1. The density of the metal is  $3 \text{ g/cm}^3$
2. The density of the metal is  $7 \text{ g/cm}^3$
3. The density of the metal is 4 times the density of unknown liquid
4. The metal still float in water

148.

Bernoulli's theorem based upon

1. Conservation of momentum
2. Conservation of energy
3. Conservation mass
4. None of these

149.

The rate of flowing of water from the orifice in a wall of a tank will be more if the orifice is

1. Near the bottom
2. Near the upper end
3. Exactly in the middle
4. Does not depend upon the position of orifice

150.

The energy needed in breaking of a drop of liquid of radius  $R$  into  $n$  drops of radius  $r$  is giving by ( $T$  is surface tension and  $p$  is atmospheric pressure)

1.  $(4\pi r^2 n - 4\pi R^2)T$
2.  $(4/3\pi r^2 n - 4/3\pi R^3)T$
3.  $(4\pi R^2 n - 4\pi r^2)T$
4.  $(8\pi r^2 n - 8\pi R^2)T$

151.

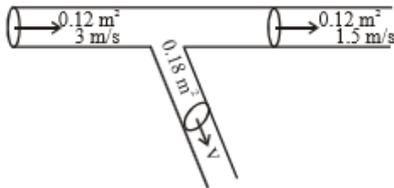
A tank is filled with water upto a height  $H$ . A hole

is made at a depth  $h$  below the free surface of water in the tank. The water coming out of the orifice strikes at a distance  $S$  from the walls of the tank. Then  $S$  is given by

- (1)  $\sqrt{2g(H - h)}$
- (2)  $\sqrt{g(H - h)}$
- (3)  $\sqrt{2gh}$
- (4)  $\sqrt{4h(H - h)}$

152.

An incompressible liquid travels as shown in figure. The speed of the fluid in the lower branch will



- (1) 1 m/s
- (2) 1.5 m/s
- (3) 2.25 m/s
- (4) 3 m/s

153. Pressure at bottom of a tank of water is  $3P$ , where  $P$  is atmospheric pressure. If the water is drawn out till the level of water is lowered by one fifth, then the pressure at the bottom of the tank is

1.  $2P$
2.  $13P/5$
3.  $8P/5$
4.  $4P/5$

154.

When a tube is dipped in liquid, the angle of contact is  $79^\circ$ . When tube is dipped at angle of  $60^\circ$  with the vertical then angle of contact will be

1.  $60^\circ$
2.  $79^\circ$
3.  $54^\circ$
4.  $120^\circ$

155.

The surface tension of pure water is  $0.061 \text{ N/m}$ , the rise of water in the capillary of diameter  $1 \text{ mm}$  is ( $\cos \theta = 1$ )

1.  $1.22 \text{ cm}$
2.  $2.44 \text{ cm}$
3.  $3.12 \text{ cm}$
4.  $3.86 \text{ cm}$

156.

Weight of a body is  $8 \text{ N}$  in the air and  $3 \text{ N}$  in

the water. The buoyant force acting on the body in water is

1.  $11 \text{ N}$
2.  $3 \text{ N}$
3.  $8 \text{ N}$
4.  $5 \text{ N}$

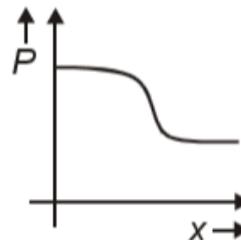
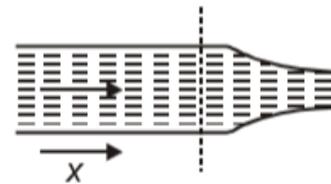
157.

There is a hole of area  $A$  at the bottom of cylindrical vessel, water is filled up to height  $h$  and water flow out in  $t$  second. If water is filled to a height  $4h$ , water will flow out in time equal to

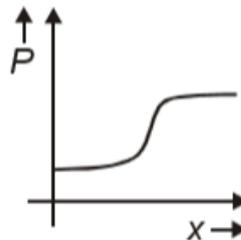
1.  $t$
2.  $\frac{t}{4}$
3.  $2t$
4.  $4t$

158.

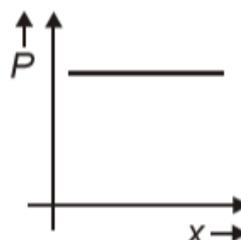
Water flows through a frictionless tube with varying cross-section as shown in figure. The variation of pressure is best represented by



1.

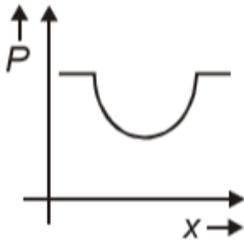


2.



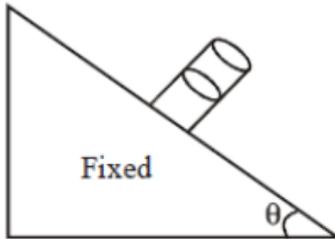
3.

4.



159.

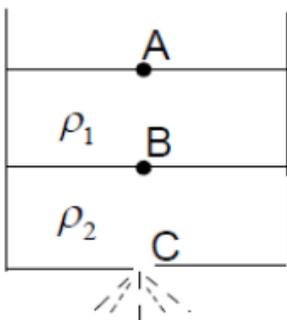
A cylindrical vessel filled with water is released on an inclined surface of angle  $\theta$  as shown in figure. The friction coefficient of surface with vessel is  $\mu (< \tan \theta)$ . Then the constant angle made by the surface of water with the incline will be-



1.  $\tan^{-1} \mu$
2.  $\theta - \tan^{-1} \mu$
3.  $\theta + \tan^{-1} \mu$
4.  $\cot^{-1} \mu$

160.

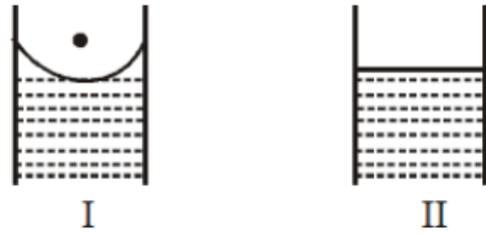
A large tank is filled with two immiscible liquids of densities  $\rho_1$  and  $\rho_2$  as shown in figure. A small hole is made at the bottom of tank from which liquid of density  $\rho_2$  is start flowing out. Bernoulli's equation can be applied between points :



1. A and C
2. A and B
3. B and C
4. A, B and C

161.

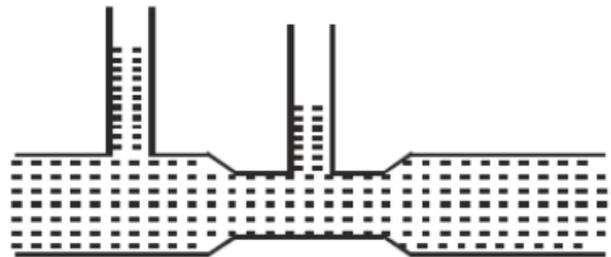
Shape of the meniscus formed by two liquids when capillaries are dipped in them are shown. In I it is hemispherical where as in II it is flat. Pick correct statement regarding contact angle formed by the liquids in both situations-



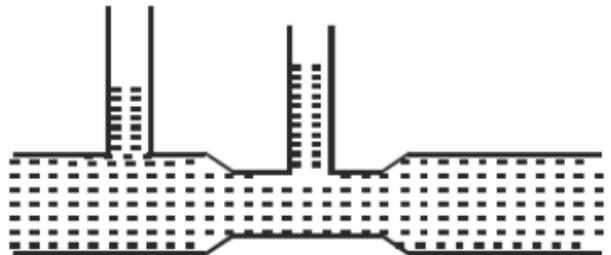
1. It is  $180^\circ$  in I and  $90^\circ$  in II
2. It is  $0^\circ$  in I and  $90^\circ$  in II
3. It is  $90^\circ$  in I and  $0^\circ$  in II
4. It is greater than  $90^\circ$  in I and equal to  $90^\circ$  in II

162.

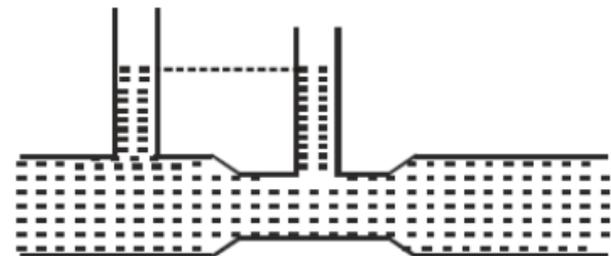
For a fluid which is flowing steadily, the level in the vertical tubes is best represented by-



1.

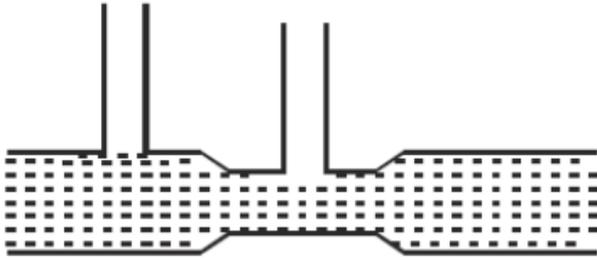


2.



3.

4.



163.

If the Reynold number of water flowing in a pipe in CGS units is 1000, then the Reynold number of water in SI units will be :

1.  $10^2$
2.  $10^4$
3.  $10^6$
4.  $10^3$

164.

A block of silver of mass 4 kg. hanging from a string is immersed in a liquid of relative density 0.72. If relative density of silver is 10, then tension in the string will be [take  $g=10m/s^2$ ]

1. 37.12 N
2. 42 N
3. 73 N
4. 21 N

165.

A block of iron is kept at the bottom of a bucket full of water  $2^\circ C$ . The water exerts buoyant force on the block. If the temperature of water is increased by  $1^\circ C$  the temperature of iron block also increases by  $1^\circ C$ . The buoyant force on the block by water-

1. will increase
2. will decrease
3. will not change
4. many decrease or increase depending on the values of their coefficient of expansion

166.

A rectangular vessel when full of water takes 10 minutes to be emptied through an orifice in its bottom. How much time will it take to be emptied when half filled with water ?

1. 9 minutes
2. 7 minutes
3. 5 minutes
4. 3 minutes

167.

The coefficient of viscosity  $\eta$  of a liquid is defined as the tangential force on a layer in that liquid per unit area per unit velocity gradient across it. Then a sphere of radius 'a', moving through it under a constant force F attains a constant velocity 'V' given by - (where K is a numerical constant)

1.  $KFa\eta$
2.  $K\frac{F}{a}\eta$
3.  $K\frac{F}{a\eta}$
4.  $K\eta\frac{a}{F}$

168.

Consider the following statements :

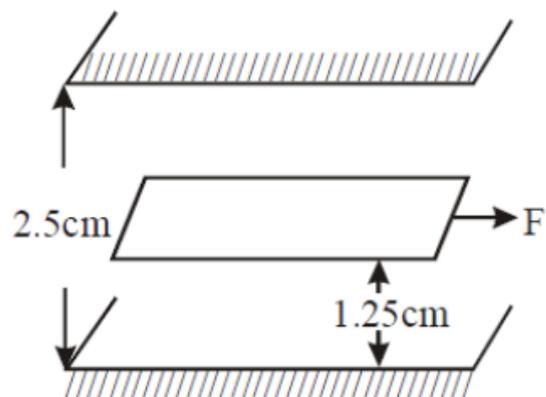
- (i) Young's modulus is numerically equal to the stress which will double the length of a wire.
- (ii) Viscosity of gases is greater than that of liquids.
- (iii) The surface tension of a liquid decreases due to the presence of insoluble contamination.

The number of statements that are true is -

1. one
2. two
3. three
4. zero

169.

A space 2.5 cm. wide between two large plane surfaces is filled with oil. Force required to drag a very thin plate of area  $0.5m^2$  just midway the surfaces at a speed of 0.5 m/sec. is 1N. The coefficient of viscosity in  $kg\text{-sec}/m^2$  is-



1.  $5 \times 10^{-2}$
2.  $2.5 \times 10^{-2}$
3.  $1 \times 10^{-2}$
4.  $7.5 \times 10^{-2}$

170.

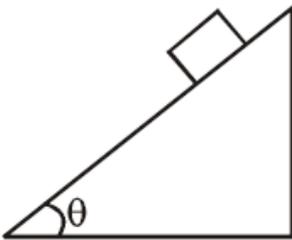
A tank is filled upto a height 2H with a liquid and is placed on a platform of height H from the ground. The distance x from the

ground where a small hole is punched to get the maximum range R is:

1. H
2. 1.25 H
3. 1.5 H
4. 2 H

171.

A cubical block of side 'a' and density ' $\rho$ ' slides over a fixed inclined plane with constant velocity 'v'. There is a thin film of viscous fluid of thickness 't' between the plane and the block. Then the coefficient of viscosity of the thin film will be-



1.  $\frac{\rho a g t \sin \theta}{v}$
2.  $\frac{\rho g t \sin \theta}{a v}$
3.  $\frac{v}{\rho a g t \sin \theta}$
4. None of these

172.

A rain drop of radius r has a terminal velocity v m/s in air. The viscosity of air is  $\eta$  poise. The viscous force on it is F. If radius of drop be 2r and the drop falls with terminal velocity in same air, the viscous force on it will be:

1. F
2. F/2
3. 4F
4. 8F

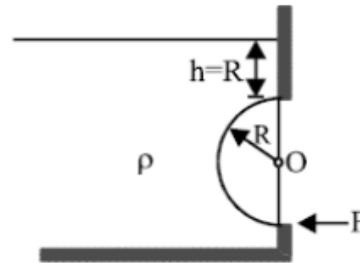
173.

An open tank 10m long and 2m deep is filled up to 1.5 height of oil of specific gravity 0.82. The tank is uniformly accelerated along its length from rest to a speed of 20 m/sec horizontally. The shortest time in which the speed may be attained without spilling any oil is [ $g=10\text{m/sec}^2$ ]

1. 20 sec
2. 18 sec
3. 10 sec
4. 5 sec

174.

The figure shows a semi cylindrical massless gate pivoted at the point O holding a stationary liquid of density  $\rho$ . A horizontal force F is applied at its lowest position to keep it stationary. The magnitude of the force is :



1.  $\frac{9}{2} \rho g R^2$
2.  $\frac{3}{2} \rho g R^2$
3.  $\rho g R^2$
4. none of these

175.

A capillary tube of radius 0.20 mm is dipped vertically in water. The height of the water column raised in the tube, will be (surface tension of water = 0.075 N/m and density of water = 1000 kg/m<sup>3</sup>. Taking  $g=10\text{m/s}^2$  and contact angle  $0^\circ$ ).

1. 7.5 cm.
2. 6 cm
3. 5 cm
4. 3 cm

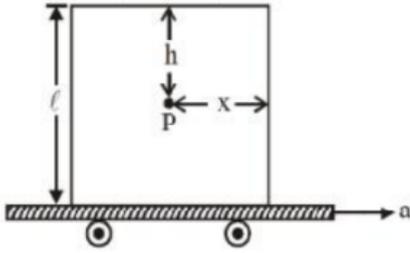
176.

An air bubble of volume  $v_0$  is released by a fish at a depth h in a lake. The bubble rises to the surface. Assume constant temperature and standard atmospheric pressure above the lake. The volume of the bubble just before touching the surface will be (density of water is  $\rho$ ) :

1.  $v_0$
2.  $v_0(\rho g h / p)$
3.  $\frac{v_0}{\left(1 + \frac{\rho g h}{p}\right)}$
4.  $v_0 \left(1 + \frac{\rho g h}{p}\right)$

177.

A cart supports a cubic tank (side 'l') filled with a liquid (density  $\rho$ ) up to the top of the tank. The cart moves with a constant acceleration 'a' in the horizontal direction. The tank is tightly closed. The pressure at a point P at a depth 'h' and distance 'x' from the front wall (see figure) is:-



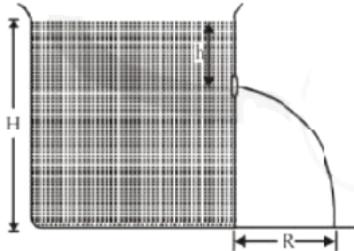
4.  $40950 \text{ N/m}^2$

**Fill OMR Sheet**

1.  $h\rho g$
2.  $h\rho g+(1-x)\rho a$
3.  $h\rho g+x\rho a$
4.  $h\rho g+1\rho a$

178.

A tank is filled with water up to a height  $H$ . Water is coming out of a hole in the wall of the container at a depth  $h$  below the free surface of water. If water strikes the ground at a distance  $R$  from the wall of the container, then the value of  $R$  is:-



1.  $h$
2.  $H$
3.  $2\sqrt{h(H-h)}$
4.  $\sqrt{h(H-h)}$

179.

A capillary tube is dipped vertically in liquid. If the liquid surface is hemispherical, then the angle of contact  $\theta$  is :-

1.  $\theta = 90^\circ$
2.  $\theta = 0^\circ$
3.  $\theta > 90^\circ$
4.  $0 < \theta < 90^\circ$

180.

Air is streaming past a horizontal aeroplane wing such that its speed is  $120 \text{ m/s}$  over the upper surface and  $90 \text{ m/s}$  at the lower surface. If the density of air is  $1.3 \text{ kg/m}^3$  and the wing is  $10 \text{ m}$  long and has an average width of  $2 \text{ m}$ , then the difference of the pressure on the two sides of the wing is :-

1.  $40.59 \text{ N/m}^2$
2.  $409.5 \text{ N/m}^2$
3.  $4095 \text{ N/m}^2$