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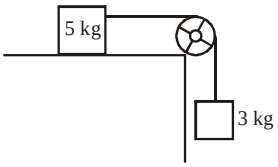
PRABAL TEST PAPER

Time : 1 : 00 Hr. **Question : 50**

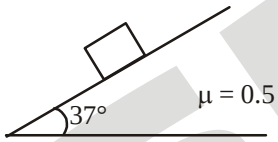
PHYSICS

01. In adjacent diagram, the surface is frictionless. The tension in string is



(1) 15 g/8 N (2) 15 g/4 N
(3) 3 g/8 N (4) 3 g/4 N

02. Find acceleration of block slidding on inclined plane ($g = 10\ ms^{-2}$)

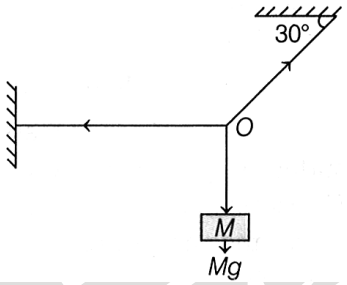


(1) 2 ms^{-2} (2) 3 ms^{-2}
(3) 5 ms^{-2} (4) 4 ms^{-2}

03. The mass of a lift is 500kg. if the lift in moving upward with an acceleration of $2m/s^2$, the tension in the string of the lift will be-
(1) zero (2) 3900 N
(3) 4900 N (4) 5900 N

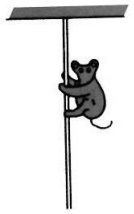
04. A smaller and a bigger iron ball are dropped from a small height on a glass plate placed on a table. Only bigger ball breaks the glass plate, because
(1) bigger ball transfers greater momentum than smaller
(2) bigger ball transfers lesser momentum than smaller
(3) bigger ball transfer equal momentum as smaller
(4) None of the above

05. A mass M is hung with a light inextensible string as shown in the figure. Find the tension of the horizontal string.



(1) $\sqrt{2}$ Mg (2) $\sqrt{3}$ Mg
(3) 2 Mg (4) 3 Mg

06. A monkey of mass m stays on a massless rope (with breaking strength greater than weight of monkey). In which of the cases the rope can break?

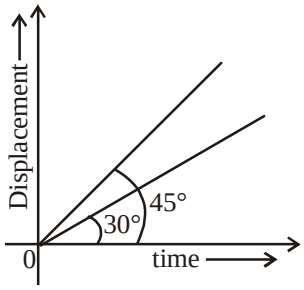


(1) The monkey climbs up with an acceleration.
(2) The monkey descends with an acceleration
(3) The monkey climbs up with a uniform speed.
(4) The monkey falls down the rope freely under gravity.

07. A small block slides down on a smooth inclined plane, starting from rest at time t = 0. Let S_n be the distance travelled by the block in the interval t = n – 1 to t = n. Then, the ratio $\frac{S_{n+1}}{S_n}$ is

(1) $\frac{2n}{2n-1}$ (2) $\frac{2n-1}{2n}$
(3) $\frac{2n-1}{2n+1}$ (4) $\frac{2n+1}{2n-1}$

08. The displacement-time graphs of two moving particles make angles of 30° and 45° with the x-axis as shown in the figure. The ratio of their respective velocity is :



(1) 1 : 1 (2) 1 : 2 (3) 1 : $\sqrt{3}$ (4) $\sqrt{3}$: 1

09. **Assertion :** For motion along a straight line and in the same direction, the magnitude of average velocity is equal to the average speed.
Reason : For motion along a straight line and in the same direction, the magnitude of displacement is equal to the path length.
(1) Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.
(2) Both Assertion and Reason are correct but Reason is not the correct explanation of Assertion.
(3) Assertion is correct but Reason is incorrect
(4) Assertion is incorrect but Reason is correct

10. A stone is dropped from the top of a tall cliff and n seconds later another stone is thrown vertically downward with a velocity u. Then, the second stone overtakes the first, below the top of the cliff at a distance given by

(1) $\frac{g}{2}\left[\frac{n\left(u-\frac{gn}{2}\right)}{(u-gn)}\right]^2$ (2) $\frac{g}{2}\left[\frac{n\left(\frac{u}{2}-gn\right)}{(u-gn)}\right]^2$

(3) $\frac{g}{2}\left[\frac{n\left(\frac{u}{2}-gn\right)}{\left(\frac{u}{2}-gn\right)}\right]^2$ (4) $\frac{g}{2}\left[\frac{(u-gn)}{n\left(\frac{u}{2}-gn\right)}\right]^2$

CHEMISTRY

11. The first ionisation potential of Na, Mg, Al and Si are such that
(1) Na < Mg < Al > Si
(2) Na < Al < Mg < Si
(3) Na > Mg > Al > Si
(4) Na < Al < Si < Mg

12. Electron gain enthalpy of which has higher negative value?
(1) F (2) Cl
(3) Br (4) I

13. For the second period elements the correct increasing order of first ionisation enthalpy is:
(1) Li < Be < B < C < N < O < F < Ne
(2) Li < B < Be < C < O < N < F < Ne
(3) Li < B < Be < C < N < O < F < Ne
(4) Li < Be < B < C < O < N < F < Ne

14. Which of the following orders of ionic radii is correctly represented?
(1) $H^- > H^+ > H$ (2) $Na^+ > F^- > O^{2-}$
(3) $F^- > O^{2-} > Na^+$ (4) None

15. Identify the wrong statement in the following.
(1) Amongst isoelectronic species, smaller the positive charge on the cation, smaller is the ionic radius.
(2) Amongst isoelectronic species, greater the negative charge on the anion, larger is the ionic radius.
(3) Atomic radius of the elements increases as one moves down the first group of the periodic table.
(4) Atomic radius of the elements decreases as one moves across from left to right in the 2nd period of the periodic able.

16. The electronegativities of N, Si, C and P are such that
(1) P < Si < C < N (2) Si < P < N < C
(3) Si < P < C < N (4) P < Si < N < C

17. The electronic configuration of the atom having maximum difference in the first and the second ionization enthalpies is
(1) $1s^2 2s^2 2p^6 3s^1$ (2) $1s^2 2s^2 2p^6 3s^2$
(3) $1s^2 2s^2 2p^1$ (4) $1s^2 2s^2 2p^6 2s^2$

18. The flask A and B of equal size contain 2 g of H_2 and 2 g of N_2 respectively at the same temperature. The number of molecules in flask A is
(1) same as those in flask B
(2) less than those in flask B
(3) greater than those in flask B
(4) exactly half than those in flask B

19. Insulin contains 3.0% sulphur. What will be the minimum molecular weight of insulin?
(1) 94.117 (2) 100
(3) 1000 (4) 976

20. Number of carbon atoms in 0.2 mol of $C_6H_{12}O_6$ is
(1) 0.2 N_A (2) 1.2 N_A
(3) 2.4 N_A (4) 3.2 N_A

BOTANY

21. Which of the following is an incorrect representation of algae?
(1) They are chlorophyll bearing autotrophs
(2) They are simple thalloid forms that are aquatic
(3) Some algae occur in association with fungi and animals
(4) Zoospores are non-flagellated spores that aid in asexual reproduction

22. Which of the following species contain pyrenoids in chloroplasts?
(1) Gracillaria (2) Chara
(3) Porphyra (4) Laminaria

23. Which of the following characteristics are shown by algae and bryophytes?
(1) Presence of root-like, stem like and leaf like structures
(2) Presence of a thallus-like plant body, absence of vascular tissue and heterotrophic nutrition
(3) Having thallus-like plant body, the presence of vascular tissues and autotrophic nutrition
(4) Having roots and relying on heterotropic nutrition

24. Consider the following characteristics.
I. Main plant body is sporophytic.
II. Sporophytes bear sporangia subtended by leaf-like appendages or sporophylls.
III. Gametophytes bear archegonia and antheridia.
IV. Non-photosynthetic, thalloid gametophyte.
How many of the above features represent Equisetum?
(1) Two (2) Four
(3) One (4) Three

25. In plants like *Pinus*, the multicellular female gametophyte is retained within
(1) microsporangium (2) megasporangium
(3) male gametophyte (4) archegonia

26. Potato is stem because it
(1) possesses axillary buds (eyes)
(2) lacks chlorophyll
(3) does not bear roots
(4) contains reserve food

27. A flower is zygomorphic when
(1) Any transverse section divides it into two equal halves
(2) Only one transverse section divides it into two equal halves
(3) Every vertical section passing through its centre divides it into two equal halves
(4) Only one vertical section passing through its centre divides it into two equal halves

28. Match the Columns I, II and III and choose the correct combination from the options given.

	Column-I		Column-II		Column-III
a.	If a pair of leaves arise at each node and lie opposite to each other	1.	Alternate phyllotaxy	K.	Alstonia
b.	If more than two leaves arise at a node	2.	Opposite phyllotaxy	L.	China rose
c.	If a single leaf arise at each node	3.	Whorled phyllotaxy	M.	Guava

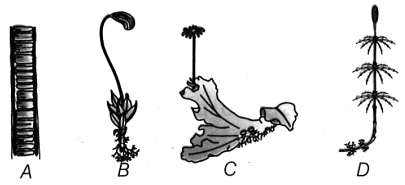
(1) a-1-L, b-3-M, c-2-K (2) a-2-M, b-1-N, c-3-K
(3) a-3-K, b-2-L, c-1-M (4) a-2-M, b-3-K, c-1-L

29. In coconut fruit, the hard shell is
(1) Endocarp
(2) Fused structure of mesocarp and endocarp
(3) Fused structure of epicarp and mesocarp
(4) Epicarp

30. Most advance family of dicot is
(1) Orchidaceae (2) Magnoliaceae
(3) Asteraceae (4) Fabaceae

31. Identify the correct statement.
I. More weightage is given to reproductive characters as compared to other characters in numerical taxonomy.
II. Only gross superficial morphological characters are used in Linnaeus classification of plants.
III. In numerical taxonomy, hundreds of characters can be considered at same time.
IV. Cytotaxonomy is based on cytological information like chromosome number, structure, behaviour, whereas chemotaxonomy uses the chemical constituents of plant.
V. Natural classification system was given by G Bentham and JD Hooker and based on natural affinities among the organisms.
Choose the correct answer from the options given below.
(1) I, II and III (2) I, III and V
(3) II, IV and V (4) II, III, IV and V

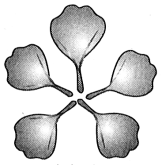
32. Consider the given figure A - D.



Which of the above four will show sporophytic generation in dominant phase?
(1) B (2) C
(3) D (4) A

33. Given below are two statements about bryophytes.
Statement I The sporophyte of liverworts is differentiatied into a foot, seta and capsule.
Statement II The spores are produced within the capsule after meiosis.
(1) Both statement I and statement II are incorrect
(2) Statement I is correct, but statement II is incorrect
(3) Statement I is incorrect, but statement II is correct
(4) Both statement I and statement II are correct

34. Read the following statements and find out the incorrect statement(s).
a. Mustard has hypogynous, actinomorphic flower, parietal placentation, syncarpous gynoecium and belongs to family Brassicaceae.
b. China rose has superior ovary, twisted aestivation, monoadephous stamens and axile placentation.
c. Pea has bilateral symmetry, vexillary aestivation, diadelphous stamens, marginal placentation and belongs to family fabaceae.
d. Chilli has radial symmetry, epipetalous stamen, swollen placenta, monocarpellary gynoecium and belongs to family solanaceae.
e. Lily has actinomorphic flower, axile placentation, imbricate aestivation, tricarpellary and trilocular gynoeciom belonging to family liliaceae.
(1) 3 (2) 1 (3) 4 (4) 2

35. Recognise the figure and find out the correct matching.
1.  2.  3.  4. 
(1) Gynoecium-1, Calyx-3, Corolla-2, Androecium-4
(2) Gynoecium-2, Calyx-3, Corolla-1, Androecium-4
(3) Gynoecium-1, Calyx-4, Corolla-2, Androecium-3
(4) Gynoecium-2, Calyx-4, Corolla-1, Androecium-3

ZOOLOGY

36. Maximum amount (70-75%) of carbon dioxide is transported as:
(1) Dissolved in plasma
(2) Carbamino-haemoglobin complex
(3) Bicarbonate
(4) None of the above

37. Respiration involves following phenomenon, choose correct order for completion of respiration.
(i) Breathing or pulmonary ventilation by which atmospheric air is drawn in and CO_2 rich alveolar air is released out.
(ii) Transport of gases by the blood.
(iii) Diffusion of O_2 and CO_2 between blood and tissues.
(iv) Diffusion of gases (O_2 and CO_2) across alveolar membrane.
(v) Utilisation of O_2 by the cells for catabolic reactions and resultant release of CO_2.
(1) (i), (ii), (iv), (v), (iii) (2) (i), (ii), (iii), (iv), (v)
(3) (i), (iv), (iii), (ii), (v) (4) (i), (iv), (ii), (iii), (v)

38. Match the following and mark the correct options animal respiratory organ:
(A) Earthworm (i) Moist cuticle
(B) Arthropods (ii) Gills
(C) Fishes (iii) Lungs
(D) Birds/Reptiles (iv) Trachea
(1) (A)-(ii), (B)-(i), (C)-(iv), (D)-(iii)
(2) (A)-(i), (B)-(ii), (C)-(iii), (D)-(iv)
(3) (A)-(i), (B)-(iv), (C)-(ii), (D)-(iii)
(4) (A)-(i), (B)-(ii), (C)-(iv), (D)-(iii)

39. Trachea divides at:
(1) 5^{th} cervical vertebra into right and left secondary bronchi
(2) 7^{th} thoracic vertebra into secondary bronchi
(3) 5^{th} thoracic vertebra into right and left primary bronchi
(4) 7^{th} thoracic vertebra into primary bronchi

40. The greatest quantity of air that can be expired after a maximum inspiratory effort is its:
(1) Residual volume (2) Tidal volume
(3) Vital capacity (4) Lung volume

41. Match the List-I with List-II.

	List-I		List-II
A.	Inspiration capacity	I.	TV + ERV
B.	Expiration capacity	II.	TV + IRV
C.	Vital capacity	III.	ERV + RV
D.	Functional residual capacity	IV.	ERV + TV + IRV

Choose the correct answer from the options given below.
(1) A-II, B-I, C-IV, D-III
(2) A-II, B-I, C-III, D-IV
(3) A-1, B-II, C-IV, D-III
(4) A-I, B-II, C-III, D-IV

42. **Statement I:** Lungs are situated in thoracic chamber which is anatomically an air-tight chamber.
Statement II: Change in the volume of thoracic cavity does not affect the pulmonary cavity.
(1) Both statement I and statement II are incorrect
(2) Statement I is correct, but statement II is incorrect
(3) Statement I is incorrect, but statement II is correct
(4) Both statement I and statement II are correct A

43. CO_2 dissociates from carbaminohaemoglobin when
(1) pCO_2 is high and pO_2 is low
(2) pO_2 is high and pCO_2 is low
(3) pCO_2 and pO_2 are equal
(4) None of the above

44. Read the following four statements (A-D) :
(A) All four chambers of heart are in relaxed state
(B) Tricuspid and Bicuspid valves are open
(C) Blood from the pulmonary veins and vena cava flows into the left and the right ventricle respectively through the left and right atria
(D) The semilunar valves are closed
How many statements are correct about Joint Diastole ?
(1) Two (2) Three
(3) Four (4) One

45. When the heart is not pumping the blood effectively enough to meet the needs of the body is called
(1) Heart attack (2) Heart failure
(3) Angina (4) Cardiac arrest

46. What would be the cardiac output of a person having 72 heart beats per minute and a stroke volume of 50 mL?
(1) 360 mL (2) 3600 mL
(3) 7200 mL (4) 5000 mL

47. Read the assertion and reason carefully to mark the correct option out of the option given below:
Assertion: Human heart is myogenic.
Reason: The contraction is initiated by a specialized patch of modified heart muscles without requiring stimulation from nerve cells.
(1) Assertion and the reason are true and the reason is a correct explanation of the assertion
(2) Assertion and reason are true but the reason is not a correct explanation of the assertion
(3) Assertion is true but the reason is false
(4) Assertion and reason are false

48. Which of the following is a cell fragment ?
(1) Blood platelets (2) Bone cells
(3) Lymphocytes (4) Leucocytes

49. Which of the following option contain wrong statement regarding exchange of gases?
(i) Alveoli are the primary sites of exchange of gases.
(ii) Exchange of gases also occurs between blood and tissues.
(iii) Exchange of O_2 and CO_2 are mainly based on pressure/concentration gradient.
(iv) Solubility of the gases as well as the thickness of the membranes involved in diffusion are also some important factors that can affect the rate of diffusion.
(v) Solubility of CO_2 is 20-25 times lower than that of O_2.
(vi) The amount of CO_2 that can diffuse through the diffusion membrane per unit difference in partial pressure is much lower compared to that of O_2.
(1) (ii), (iii), (vi) (2) (iii), (v), (vi)
(3) (iv), (v) (4) (v), (vi)

50. Which of the following statements are correct w.r.t. humans?
I. Binding of oxygen with haemoglobin is primarily related to partial pressure of O_2.
II. Respiratory rhythm centre is located in pons region of hindbrain.
III. Every 100 mL of oxygenated blood can deliver 8 mL of oxygen to the tissue normal physiological conditions.
IV. A sigmoid curve is obtained when percentage saturation of haemoglobin with O_2 is plotted against the pO_2.
V. O_2 is higher at the alveolar level.
Choose the correct answer from the options given below.
(1) II and IV (2) I, II and V
(3) I, IV and V (4) II, IV and V