

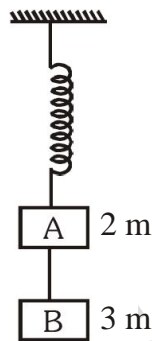
PRABAL TEST PAPER

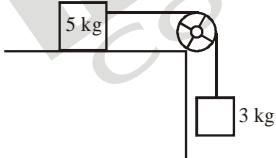
Time : 1 : 00 Hr.

Question : 50

PHYSICS

01. Two blocks A and B of masses $2m$ and $3m$ respectively are connected by a massless and inextensible string. The whole system is suspended by a massless spring as shown in figure. The magnitudes of acceleration of A and B immediately after the string is cut, are respectively :-

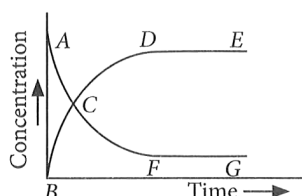
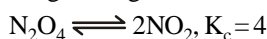


- (1) $\frac{5}{2} g, g$ (2) $\frac{3}{2} g, g$
 (3) $\frac{1}{2} g, g$ (4) none of these
02. In adjacent diagram, the surface is frictionless. The tension in string is
- 
- (1) $15g/8$ N (2) $15g/4$ N
 (3) $3g/8$ N (4) $3g/4$ N
03. Two astronauts are floating in gravitational free space after having lost contact with their spaceship. The two will:
- (1) Move towards each other
 (2) Move away from each other
 (3) Will become stationary
 (4) Keep floating at the same distance between them

04. A liquid drop of diameter D breaks into 27 small drops of equal size. If the surface tension of the liquid is σ , then change in surface energy is
 (1) $\pi D^2 \sigma$ (2) $2\pi D^2 \sigma$ (3) $3\pi D^2 \sigma$ (4) $4\pi D^2 \sigma$
05. **Assertion (A)** : Change of direction of light by atmospheric particles is called scattering of light.
Reason (R) : Clouds which have droplets of water with $\lambda >> \lambda$ are generally white.
 (1) Both A & R correct and 'R' is correct explanation of A
 (2) A & R are correct but 'R' is not explanation of A
 (3) A is correct R is wrong
 (4) Both A & R are wrong
06. Your friend is having eye sight problem. She is not able to see clearly a distant uniform window mesh and it appears to her as non-uniform and distorted. The doctor diagnosed the problem as:
 (1) Astigmatism
 (2) Myopia with Astigmatism
 (3) Presbyopia with Astigmatism
 (4) Myopia and hypermetropia
07. A simple telescope, consisting of an objective of focal length 60 cm and a single eye lens of focal length 5 cm is focussed on a distant object in such a way that parallel rays come out from the eye lens. If the object subtends an angle 2° at the objective, the angular width of the image
 (1) 10° (2) 24° (3) 50° (4) $1/6^\circ$
08. Three liquids of different densities ($\rho_1 > \rho_2 > \rho_3$) but having same surface tension and angle of contact are used one by one in an apparatus of capillary rise experiment. For the mass of liquid rise in capillary in three cases which of the following is correct.
 (1) $M_1 > M_2 > M_3$ (2) $M_1 < M_2 < M_3$
 (3) $M_1 = M_2 = M_3$ (4) $M_1 > M_2 = M_3$
09. A square wire frame of length l is dipped in a solution. When the frame is taken out, a liquid film is formed. What is the algebraic sum of all the forces acting on the frame due to surface tension of the liquid? (Given: σ = surface tension of the liquid).
 (1) $4 \sigma l$ (2) $8 \sigma l$ (3) $10 \sigma l$ (4) $12 \sigma l$

10. The focal lengths of the objective and eye-piece of a telescope are respectively 90 cm and 3 cm. The moon subtends an angle of 0.5° at the eye. If it is looked through the telescope, the angle subtended by the moon's image will be
 (1) 100° (2) 50°
 (3) 25° (4) 15°

11. Reversible reaction is studied graphically as shown in the given figure.



Select the correct statements out of I, II and III.

I. Reaction quotient has maximum value at point A.

II. Reaction proceeds left to right at a point when $[\text{N}_2\text{O}_4] = [\text{NO}_2] = 0.1 \text{ M}$.

III. $K_c = Q$ when point D or F is reached.

- (1) I, II (2) II, III
 (3) I, III (4) I, II, III
12. The equilibrium constants of the following are
 $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3; K_1$
 $\text{N}_2 + \text{O}_2 \rightleftharpoons 2\text{NO}; K_2$
 $\text{H}_2 + \frac{1}{2} \text{O}_2 \rightleftharpoons \text{H}_2\text{O}; K_3$
 The equilibrium constant (K) of the reaction:
 $2\text{NH}_3 + \frac{5}{2} \text{O}_2 \rightleftharpoons 2\text{NO} + 3\text{H}_2\text{O}$, will be
 (1) $K_2 K_3^3 / K_1$ (2) $K_2 K_3 / K_1$
 (3) $K_2^3 K_3 / K_1$ (4) $K_1 K_3^3 / K_2$
13. In which one of the following equilibria, $K_p \neq K_c$?
 (1) $\text{NO}_{2(g)} + \text{SO}_{2(g)} \rightleftharpoons \text{NO}_{(g)} + \text{SO}_{3(g)}$
 (2) $2\text{HI}_{(g)} \rightleftharpoons \text{H}_{2(g)} + \text{I}_{2(g)}$
 (3) $2\text{C}_{(s)} + \text{O}_{2(g)} \rightleftharpoons 2\text{CO}_{(g)}$
 (4) $2\text{NO}_{(g)} \rightleftharpoons \text{N}_{2(g)} + \text{O}_{2(g)}$
14. If the value of equilibrium constant K_c for the reaction, $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$ is 7. The equilibrium constant for the reaction, $2\text{N}_2 + 6\text{H}_2 \rightleftharpoons 4\text{NH}_3$ will be
 (1) 49 (2) 7 (3) 14 (4) 28
15. Calculate K_p for the equilibrium,
 $\text{NH}_4\text{HS}_{(s)} \rightleftharpoons \text{NH}_{3(g)} + \text{H}_2\text{S}_{(g)}$,
 if the total pressure inside the reaction vessel is 1.12 atm at 105°C is
 (1) 0.56 (2) 1.25 (3) 0.31 (4) 0.63

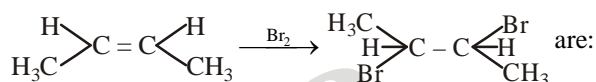
16. In which of the following, functional groups isomerism is not possible?

- (1) Alcohols (2) Aldehydes
 (3) Alkyl halides (4) Cyanides

17. Which one is the correct order of acidity?

- (1) $\text{HC} \equiv \text{CH} > \text{CH}_3 - \text{C} \equiv \text{CH} > \text{H}_2\text{C} = \text{CH}_2 > \text{CH}_3 - \text{CH}_3$
 (2) $\text{HC} \equiv \text{CH} > \text{H}_2\text{C} = \text{CH}_2 > \text{CH}_3 - \text{C} \equiv \text{CH} > \text{CH}_3 - \text{CH}_3$
 (3) $\text{H}_3\text{C} - \text{CH}_3 > \text{H}_2\text{C} = \text{CH}_2 > \text{CH}_3 - \text{C} \equiv \text{CH} > \text{HC} \equiv \text{CH}$
 (4) $\text{H}_2\text{C} = \text{CH}_2 > \text{CH}_3 - \text{CH} = \text{CH}_2 > \text{CH}_3 - \text{C} \equiv \text{CH} > \text{HC} \equiv \text{CH}$

18. Products of the reaction



- (1) mixture of racemic and meso compounds
 (2) meso-compounds
 (3) racemic mixtures
 (4) none of the above

19. The intermediate during the addition of HCl to propene in the presence of peroxide is:

- (1) $\text{CH}_3\dot{\text{C}}\text{HCH}_2\text{Cl}$ (2) $\text{CH}_3\overset{+}{\text{C}}\text{HCH}_3$
 (3) $\text{CH}_3\text{CH}_2\dot{\text{C}}\text{H}_2$ (4) $\text{CH}_3\text{CH}_2\overset{+}{\text{C}}\text{H}_2$

20. Propyne and propene can be distinguished by:

- (1) conc. H_2SO_4 (2) Br_2 in CCl_4
 (3) AgNO_3 in ammonia (4) dil. KMnO_4

21. The growth of the given system per unit time is expressed on a common basis, for example, per unit initial parameter is known as

- (1) Absolute growth rate
 (2) Relative growth rate
 (3) Both (1) and (2)
 (4) None of these

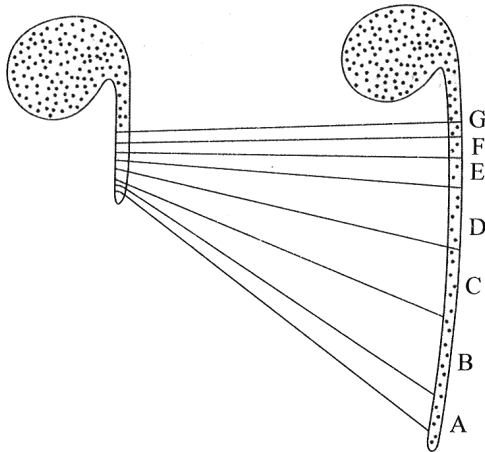
22. Cells proximal to the phase of elongation (farther away from apex) show

- (1) Meristematic phase
 (2) Maturation phase
 (3) Elongation phase
 (4) All of these

23. 2,4-dichlorophenoxyacetic acid is used to eliminate ____ weeds from a ____ crop field.

- (1) monocotyledonous; dicot
 (2) dicotyledonous; monocot
 (3) biennial; annual
 (4) biennial; perennial

24. The following figure shows



- (1) Growth of the pollen tube in terms of surface area
- (2) Detection of zone of elongation by the parallel line technique
- (3) Detection of zone of maturation by parallel line technique
- (4) Detection of zone of meristematic activity by the parallel line technique

25. Fill in the blanks:

1. Wheat, barley and rye have two kinds of varieties: winter and spring varieties. The 'spring' variety are normally planted ina..... and come to flower and produce grain before the end of growing season.
 2. 'Winter' varieties, however, if planted in ...b.... would normally fail to flower or produce mature grain within a span of flowering season.
 3. Hence 'Winter' Varieties are planted in ...c..... . They germinate, and overd..... come out as small seedlings resume growth in thee..... and are harvested usually around mid – summer.
- (1) a-spring, b-winter, c-spring, d-winter, e-spring
 - (2) a-winter, b-spring, c-winter, d-spring, e-winter
 - (3) a-spring, b-spring, c-autumn, d-winter, e-spring
 - (4) a-spring, b-winter, c-autumn, d-spring, e-winter

26. Mark the correct statement/s about arithmetic growth.

- (1) In mitosis, only one daughter cell continues to divide while the other differentiates and matures
- (2) $L_t = L_0 + rt$
- (3) The simplest expression of this growth is exemplified by a root elongating at a constant rate
- (4) All of the above

27. Cell recognition and adhesion are facilitated by components of plasma membrane. These components are generally

- (1) protein molecules alone
- (2) lipids alone
- (3) both lipids and proteins
- (4) glycolipids and glycoproteins

28. The fluid mosaic model explains which aspects of a cell membrane ?

- (1) Only structural aspects
- (2) Only functional aspects
- (3) Both structural and functional aspects
- (4) Only fluidity of membrane

29. **Assertion (A) :** The quasifluid nature of lipid enables lateral movement of proteins within the overall bilayer.

Reason (R) : This ability to move within the membrane is called fluidity and is important for cell growth.

- (1) Both A & R correct and 'R' is correct explanation of A
- (2) A & R are correct but 'R' is not explanation of A
- (3) A is correct R is wrong
- (4) Both A & R are wrong

30. Which of the following events does not occur in rough endoplasmic reticulum?

- (1) Protein folding
- (2) Protein glycosylation
- (3) Cleavage of signal peptide
- (4) Phospholipid synthesis

31. Fill in the blanks:

1. Ina..... growth, both the progeny cells following mitotic cell division retain the ability to divide and continue to do so.
 2. Inb.... growth, following mitotic cell division. only one daughter cell continues to divide while the other differentiates and matures.
 3. Arithmetic growth is mathematically expressed asc....
 4. The exponential growth can be expressed asd....
- (1) a-arithmetic, b-geometric, c- $W_1 = W_0 e^{rt}$, d- $L_t = L_0 + rt$
 - (2) a-arithmetic, b-geometric, d- $W_1 = W_0 e^{rt}$, c- $L_t = L_0 + rt$
 - (3) b-arithmetic, a-geometric, c- $W_1 = W_0 e^{rt}$, d- $L_t = L_0 + rt$
 - (4) b-arithmetic, a-geometric, d- $W_1 = W_0 e^{rt}$, c- $L_t = L_0 + rt$

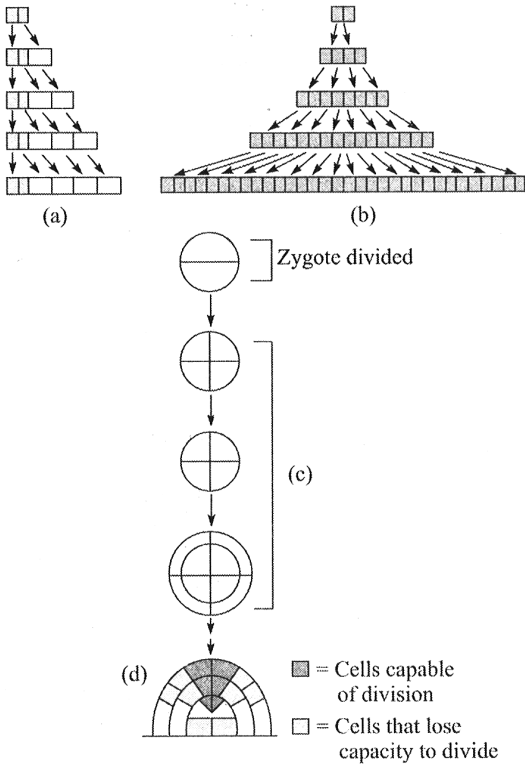
32. The phenomenon of dedifferentiation is.

- (1) regaining the capacity to divide mitotically by differentiated cells.
- (2) the event of losing the ability to divide by dedifferentiated cells.
- (3) regaining the capacity to divide meiotically by differentiated cells.
- (4) regaining the capacity to divide meiotically by redifferentiated cells.

33. Fill in the blanks:

- (1) Spraying sugarcane crop with ...a... increases in the length of the stem, thus increasing the yield by as much as ...b... tonnes per acre.
 - (2) ...c... does not occur naturally in plants.
 - (3) Search for natural substances with cytokinin like activities led to the isolation ofd... from corn kernels and coconut milk.
- (1) a-auxins, b-10, c-NAA, d-zeatin
 - (2) a-gibberellins, b-20, c-zeatin, d-kinetin
 - (3) a-gibberellins, b-10, c-zeatin, d-kinetin
 - (4) a-gibberellins, b-20, c-kinetin, d-zeatin

34. Recognise the figure and find out the correct labelling:



- (1) a and c-arithmetic, b-and d-geometric
 (2) a and c-geometric, b and d-arithmetic
 (3) a and d-geometric, b and c-arithmetic
 (4) a and d-arithmetic, b and c-geometric

35. Read the following statements-

- Polar molecules can not polar pass through non polar lipid bilayer.
- Diffusion of neutral solutes can be called as passive transport.
- Na^+/K^+ pump is an example of energy less transport.
- Water moves only through aquaporins.
- RBCs have 52% lipids and 40% protiens in their membrane.

Choose the correct option from the following.

- (1) Only 1, 2, 5 are correct
 (2) Only 3 and 5 are wrong
 (3) 1, 2, 3, 5 are correct
 (4) 3, 4, 5, are incorrect

36. Which of the following layers are present in adrenal cortex from inner to outer?

- (1) Zona reticularis, zona fasciculata and zona glomerulosa
 (2) Zona fasciculata, zona glomerulosa and zona reticularis.
 (3) Zona glomerulosa, zona reticularis and zona fasciculata.
 (4) Zona glomerulosa, zona fasciculata and zona reticularis.

37. Match the following columns.

	Column-I (Production site)		Column-II (Hormones)
(A)	Atrial wall	(1)	ANF
(B)	Thyroid gland	(2)	PTH
(C)	Parathyroid	(3)	T_3 , T_4 , TCT
(D)	GIT	(4)	CCK, GIP, gastrin and secretin

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

38. A temporary endocrine gland in the human body is:

- (1) Corpus cardiacum (2) Corpus luteum
 (3) Corpus allatum (4) Pineal gland

39. The given figure shows which type of symmetry?



- (1) Bilateral (2) Radial
 (3) Biradial (4) Asymmetry

40. Match the following columns.

	Column-I		Column-II
(A)	Sycon	(1)	Bath sponge
(B)	Spongilla	(2)	Scypha
(C)	Euspongia	(3)	Fresh water sponge

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

41. Body bears eight external rows of ciliated comb plates present in phylum _____.

- (1) Coelenterata (2) Porifera
 (3) Ctenophora (4) Platyhelminthes

42. The mouth containing file-like rasping organ for feeding called radula is found in

- (1) Mollusca (2) Hemichordata
 (3) Echinodermata (4) Arthropoda

43. Match the following.

	Column-I		Column-II
A.	Ascaris	1.	Intestinal roundworm
B.	Wuchereria	2.	Filarial worm
C.	Ancylostoma	3.	Hookworm
D.	Pheretima	4.	Earthworm

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

44. Unmasking of active site on actin is by
 (1) increase in Ca^{2+} level of sarcoplasm.
 (2) decrease in Ca^{2+} level of sarcoplasm.
 (3) increase in K^+ level of sarcoplasm.
 (4) decrease in K^+ level of sarcoplasm.
45. Which of the following is Incorrect about visceral muscles?
 (1) Non-striated muscle (smooth muscle).
 (2) Involuntary muscle.
 (3) Located in inner walls of hollow visceral organs of the body.
 (4) They are under voluntary control.
46. 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.
47. The number of vertebrae present in cervical, thoracic, lumbar, sacral and coccyx regions, respectively are
 (1) 12, 7, 5, 1 and 1 (2) 1, 7, 5, 12 and 1
 (3) 7, 5, 12 and 1 (4) 7, 12, 5, 1 and 1
48. An acromion process is characteristically found in mammals in their
 (1) pelvic girdle (2) pectorial girdle
 (3) skull (4) sternum
49. Which of the following statements about the joints is false?
 (1) Joints are essential for all types of movements involving bony parts.
 (2) Joints are contact between bones
 (3) Fibrous joints are immovable.
 (4) Cartilaginous joint permit great movement.
50. Select the correct statement regarding the specific disorder of muscular or skeletal system.

(1)	Muscular dystrophy	Age-related shortening of muscles
(2)	Osteoporosis	Decrease in bone mass and higher chance of fractures with advancing age
(3)	Myasthenia gravis	Autoimmune disorder which inhibits sliding of myosin filaments
(4)	Gout	Inflammation of joints due to extra deposition of calcium