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SKD New Standard Coaching Institute
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38 YEARS OF TEACHING EXCELLENCE

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SAMPLE PAPER - 61

Time : 1 : 15 Hr. **Question : 60**

PHYSICS

01. A boy walks to his school at a distance of 6 km with constant speed of 2.5 km/h and walks back with a constant speed of 4 km/h. His average speed for round trip expressed in km /h, is

(1) $\dfrac{24}{13}$ (2) $\dfrac{40}{13}$

(3) 3 (4) $\dfrac{1}{2}$

02. A train 200 m long crosses a bridge 400 m long. It enters the bridge with velocity $30\,\text{ms}^{-1}$ and leaves it with velocity $50\,\text{ms}^{-1}$. What is the time taken to cross the bridge ?
(1) 2.5 s (2) 7.5 s (3) 12.5 s (4) 15.0 s

03. A boy releases a ball from the top of a building. it will clear a window 2 m high at a distance 10 m below the top in nearly
(1) 1.3 s (2) 1 s
(3) 0.13 s (4) 0.6 s.

04. A particle located at x = 0 at time t = 0, starts moving along the positive x-direction with a velocity v that varies as $v = \alpha\sqrt{x}$. The displacement of the particle varies with time as
(1) t^3 (2) t^2
(3) t (4) $t^{1/2}$

05. With respect to a rectangular cartesian co-ordinate system three vectors are expressed as $\vec{a} = 4\hat{i} - \hat{j}$, $\vec{b} = -3\hat{i} + 2\hat{j}$ and $\vec{c} = -\hat{k}$ where $\hat{i}, \hat{j}, \hat{k}$ are unit vectors, along the x, y, z axes respectively. The unit vector along the direction of the sum of these vectors is

(1) $\hat{r} = \dfrac{1}{\sqrt{3}}(\hat{i} + \hat{j} - \hat{k})$ (2) $\hat{r} = \dfrac{1}{\sqrt{2}}(\hat{i} + \hat{j} - \hat{k})$

(3) $\hat{r} = \dfrac{1}{3}(\hat{i} - \hat{j} + \hat{k})$ (4) $\hat{r} = \dfrac{1}{\sqrt{3}}(\hat{i} + \hat{j} + \hat{k})$

06. Two equal forces (P each) act at a point inclined to each other at an angle of 120°. The magnitude of their resultant is
(1) P/2 (2) P/4 (3) P (4) 2P

07. If vectors P, Q and R have magnitude 5, 12 and 13 units and $\vec{P} + \vec{Q} = \vec{R}$, the angle between Q and R is

(1) $\cos^{-1}\dfrac{5}{12}$ (2) $\cos^{-1}\dfrac{5}{13}$

(3) $\cos^{-1}\dfrac{12}{13}$ (4) $\cos^{-1}\dfrac{7}{13}$

08. An aeroplane is flying horizontally with a velocity of 720 km/hr and at a height of 1960 m. When it is vertically above a point A on the ground, a bomb is released from it. The bomb strikes the ground at a point B. The distance AB is (ignoring air resistance)
(1) 2 km (2) 4 km
(3) 1 km (4) None of these

09. A cricketer can throw a ball to a maximum horizontal distance of 100 m. With the same speed how much high above the ground can the cricketer throw the same ball?
(1) 50 m (2) 100 m (3) 150 m (4) 200 m

10. A particle is projected from a horizontal plane with a velocity of $8\sqrt{2}$ m s^{-1} at an angle θ. At highest point its velocity is found to be 8 m s^{-1}. Its range will be
(g = 10 m s^{-2})
(1) 3.2 m (2) 4.6 m (3) 6.4 m (4) 12.8 m

11. At the uppermost point of a projectile its velocity and acceleration are at an angle of
(1) 180° (2) 90° (3) 60° (4) 45°

12. Two particles A and B get 4 m closer each second while travelling in opposite direction. They get 0.4 m closer every second while travelling in same direction. The speeds of A and B are respectively
(1) 2.2 m s^{-1} and 0.4 m s^{-1}
(2) 2.2 m s^{-1} and 1.8 m s^{-1}
(3) 4 m s^{-1} and 0.4 m s^{-1}
(4) 2.2 m s^{-1} and 4 m s^{-1}

13. The velocity of a moving point B relative to that of another point A, is obtained by compounding the real absolute velocity of point B with a velocity :
(1) equal to that of A
(2) opposite to that of A
(3) equal and opposite to that of A
(4) none of the above

14. A particle moves along a straight line such that its displacement s at any time t is given by
$s = t^3 - 6t^2 + 3t + 4$ metres.
The velocity, when the acceleration is zero, is
(1) 3 ms^{-1} (2) -12 ms^{-1}
(3) 42 ms^{-1} (4) -9 ms^{-1}

15. The displacement - time graph of a particle at time t makes angle $45°$ with the time axis. After two seconds, it makes an angle $60°$ with the time axis. What is the average acceleration of the particle?
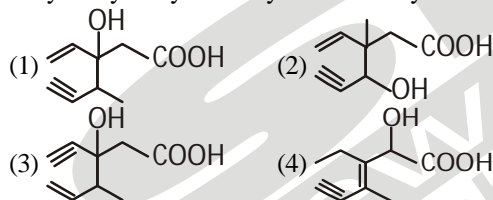
(1) $\dfrac{1}{2}$ (2) $\dfrac{\sqrt{3}}{2}$ (3) $\dfrac{(\sqrt{3}-1)}{2}$ (4) $\dfrac{(\sqrt{3}+1)}{2}$
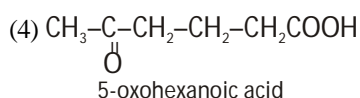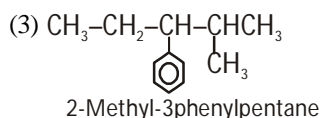
CHEMISTRY
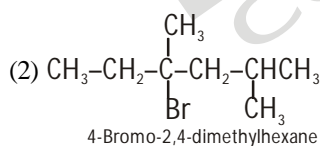
16. The pair of species having same percentage of carbon is-
(1) CH_3COOH and $C_6H_{12}O_6$
(2) CH_3COOH and C_2H_5OH
(3) $HCOOCH_3$ and $C_{12}H_{22}O_{11}$
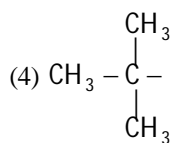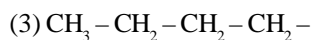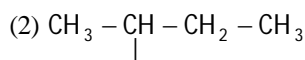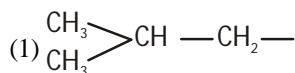(4) $C_6H_{12}O_6$ and $C_{12}H_{22}O_{11}$

17. Structure of the compound whose IUPAC name is 3-Ethyl-2-hydroxy-4-methylhex-3-en-5-ynoic acid is

(1) (2)

(3) (4)

18. Which nomenclature is not according to IUPAC system?
(1) $Br- CH_2-CH = CH_2$
1-Bromoprop-2-ene

(2) $CH_3-CH_2-\overset{\overset{CH_3}{|}}{C}-CH_2-CHCH_3$ with Br and CH_3
4-Bromo-2,4-dimethylhexane

(3) $CH_3-CH_2-CH-CHCH_3$ (phenyl, CH_3)
2-Methyl-3phenylpentane

(4) $CH_3-\overset{\overset{}{||}}{C}-CH_2-CH_2-CH_2COOH$ (O)
5-oxohexanoic acid

19. The structure of isobutyl group in an organic compound is
(1) $\overset{CH_3}{\underset{CH_3}{>}}CH-CH_2-$
(2) $CH_3-CH-CH_2-CH_3$ (|)
(3) $CH_3-CH_2-CH_2-CH_2-$
(4) $CH_3-\overset{\overset{CH_3}{|}}{\underset{CH_3}{C}}-$

20. The IUPAC name of the compound

 is ....
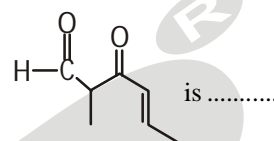
(1) 3-keto-2-methylhex-4-enal
(2) 5-formylhex-2-en-3-one
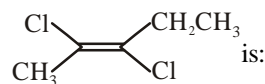(3) 5-methyl-4-oxohex-2-en-5-al
(4) 3-keto-2-methylhex-5-enal

21. Which of the following compounds will exhibit cis-trans (geometrical) isomerism?
(1) 1-Butanol   (2) 2-Butene
(3) 2-Butanol   (4) 2-Butyne

22. Which of the following is not chiral ?
(1) 2-Butanol   (2) 2,3-Dibromo pentane
(3) 3-Bromo pentane
(4) 2-Hydroxy propanoic acid

23. The IUPAC name of the following compound

 is:

(1) cis-2, 3-dichloro-2-pentene
(2) trans-2, 3-dichloro-2-pentene
(3) cis-3, 4-dichloro-3-pentene
(4) trans-3-4-dichloro-3-pentene

24. The number of structural isomers possible from the molecular formula C_3H_9N is :
(1) 2   (2) 3
(3) 4   (4) 5

25. Which of the following molecules respresnts the order of hybridisation sp^2, sp^2, sp, sp from left to right atoms?
(1) $CH_3 - CH = CH - CH_3$
(2) $CH_2 = CH - CH = CH_2$
(3) $CH_2 = CH - C \equiv CH$
(4) $HC \equiv C - C \equiv CH$

26. Which one of the following is not correct for long form of the periodic is table
   (1) It contains seven periods
   (2) It contains eighteen groups
   (3) v^{th} period contains 32 elements
   (4) Eighteenth group is known as group of inert gases

27. The second ionisation potentials of C, N, O and F are such that
   (1) $C > N > O > F$ (2) $O > N > F > C$
   (3) $O > F > N > C$ (4) $F > O > N > C$

28. Atomic number of few elements are given. Which of these belong to d block of elements?
   (1) 29 (2) 38 (3) 43 (4) 53
   Select the correct answer using the codes given below:
   (1) 1 and 2 (2) 1 and 3
   (3) 1, 2 and 3 (4) 2, 3 and 4

29. The electron gain enthalpy of the halogens are such that
   (1) $F > Cl > Br > I$ (2) $Cl > F > Br > I$
   (3) $I > Br > Cl > F$ (4) $Cl > F > I > Br$

30. Acidic oxide is formed by
   (1) only metals
   (2) only nonmetals
   (3) both metals and metalloids
   (4) both nonmetals and metalloids

BOTANY

31. Stomatal opening is under the control of
   (1) Epidermal cells (2) Palisade cells
   (3) Spongy parenchyma cells
   (4) Guard cells

32. The process of plasmolysis is usually
   (1) Reversible (2) Irreversible
   (3) Active (4) both 1 and 3

33. 0.1 M solution of solute (non-electrolyte) will have a water potential of
   (1) –2.3 bars (2) Zero
   (3) 2.3 bars (4) 22.4 bars

34. In the 24 hour average duration of cell cycle of a human cell, cell division properly lasts for about
   (1) 23 hours (2) One hour
   (3) Half an hour (4) 90 minutes

35. G_1, S and G_2 are stages of
   (1) Interphase (2) Prophase
   (3) Metaphase (4) Anaphase

36. The most dramatic period of the cell cycle is
   (1) M phase (2) G_1 phase
   (3) S phase (4) Interphase

37. Which of the following proteinaceous components of the cell cytoplasm help in the initiation of the assembly of mitotic spindle?
   (1) Microtubules (2) Microbodies
   (3) Centromeres (4) Kinetochores

38. Syncytium is seen in
   (1) Phycomycetous fungi
   (2) Ascomycetous fungi
   (3) Liquid endosperm of coconut
   (4) Mammalian RBCs

39. What is the significance of mitosis?
   (1) Growth (2) Repair
   (3) Replacement (4) All of the above

40. Shape of chromosome can be best observed during
   (1) Propahse (2) Metaphase
   (3) Anaphase (4) Telophase

41. What is the proper sequence in mitosis?
   (1) Metaphase, telophase, prophase and anaphase
   (2) Prophase, metaphase, anaphase and telophase
   (3) Anaphase, metaphase, telophase and prophase
   (4) Telophase, anaphase, metaphase and prophase

42. Most of the organelles duplication occurs during
   (1) P-phase (2) Interphase
   (3) Interkinesis (4) Cytokinesis

43. Cilium and flagellum emerge from centriole like structure called
   (1) Centrosome (2) Kinetochore
   (3) Basal body (4) Centromere

44. Flagella occur in
   (1) Eukaryotic cells (2) Prokaryotic cells
   (3) Viruses (4) Both (1) and (2)

45. Axoneme with 9+2 microtubular arrangement occurs in
   (1) Cilia (2) Flagella
   (3) Both (1) and (2) (4) Centriole

ZOOLOGY

46. In our body, the main glucocorticoid is
   (1) Adrenaline (2) Aldosterone
   (3) ADH (4) Cortisol

47. Prolactin secreted from anterior pituitary help in
   (1) Development of mammary gland
   (2) Synthesis of milk
   (3) Formation of graffian follicle
   (4) Both (1) and (2)

48. The size of cockroach ranges from
   (1) ¼" to 3" (2) 1 to 3"
   (3) 2 to 3" (4) ¼" to ¾"

49. In each segment, the exoskeleton has hardened plates in cockroach and it is known as
(1) Sclerites (2) Sternum
(3) Carapace   (4) All of these

50. The head of cockroach is formed by fusion of how many segments?
(1) 4   (2) 5   (3) 6   (4) 8

51. Cockroach has which type of mouth parts?
(1) Biting and chewing type
(2) Siphoning type
(3) Sponging type
(4) All of these

52. How many ganglia lie in thorax and abdomen of the cockroach?
(1) 3 and 6   (2) 6 and 3
(3) 2 and 1   (4) 1 and 2

53. How many oothecae are produced by female cockroach?
(1) 9–10   (2) 14–16
(3) 13   (4) 1–2

54. Male and female cockroach is morphologically distinguished by the presence of
(1) Anal cerci   (2) Anal style
(3) Compound eyes   (4) All of these

55. Mechanisms of breathing vary among different groups of animals depending mainly on their _____ and _____.
(1) Habitats
(2) Levels of organization
(3) Both (1) and (2)
(4) Mode of nutrition

56. The part starting with the external nostrils up to the terminal bronchioles constitute the
(1) Respiratory of respiratory system.
(2) Exchange part of respiratory system.
(3) Expiratory part
(4) Conducting part of respiratory system.

57. During inspiration, the diaphragm
(1) Relaxes to become dome-shaped.
(2) Contracts and flattens.
(3) Expands
(4) Shows no change.

58. On an average, a healthy human breathes how many times per minute?
(1) 20–40   (2) 72–75
(3) 3–5   (4) 12–16

59. Match the following.

	Column-I		Column-II
1.	Tidal volume	A.	2500-3000 ml of air
2.	Inspiratory reserve volume	B.	1000-1100 ml of air
3.	Expiratory reserve volume	C.	500 ml of air
4.	Residual volume	D.	3500-4600 ml of air
5.	Vital capacity	E.	1100-1200 ml of air

(1) 1–C, 2–D, 3–B, 4–A, 5–E
(2) 1–C, 2–A, 3–B, 4–E, 5–D
(3) 1–C, 2–A, 3–D, 4–E, 5–B
(4) 1–E, 2–A, 3–B, 4–E, 5–D

60. The vital capacity is equal to
(1) ERV + TV   (2) IRV + TV
(3) VC + RV   (4) ERV + TV + IRV