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SKD New Standard Coaching Institute
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39 YEARS OF TEACHING EXCELLENCE

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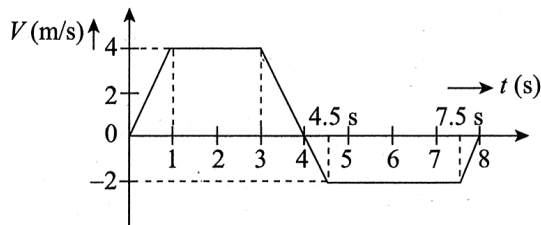## // PRABAL TEST PAPER //

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

// PHYSICS //

01. The velocity (V) - time (t) graph for the linear motion of an object is shown in the figure. The displacement and distance after 8 s, respectively, are

(1) 5 m, 19 m   (2) 16 m, 22 m
(3) 8 m, 19 m   (4) 6 m, 5 m

02. A particle is released from a height H. At certain height, its kinetic energy is two times its potential energy. Height and speed of the particle at that instant, respectively, are

(1) $\dfrac{H}{3}, \sqrt{\dfrac{2gH}{3}}$ (2) $\dfrac{H}{3}, 2\sqrt{\dfrac{gH}{3}}$

(3) $\dfrac{2H}{3}, \sqrt{\dfrac{2gH}{3}}$ (4) $\dfrac{H}{3}, \sqrt{2gH}$

03. Match the two lists :

| List-I	List-II
P. Adiabatic process	A. No work done by or on gas
Q. Isochoric process	B. Some amount of heat given is converted into internal energy
R. Isobaric process	C. No heat exchange
S. Isothermal process	D. No change in internal energy

(1) P-A, Q-B, R-C, S-D   (2) P-A, Q-C, R-D, S-B
(3) P-C, Q-A, R-B, S-D   (4) P-B, Q-D, R-C, S-A

04. A plane electromagnetic wave of frequency 50 MHz travels in free space along the positive x-direction. At a particular point in space and time, $\vec{E} = 6.3\hat{j}\ V/m$. The corresponding magnetic field $\vec{B}$, at that point will be:

(1) $18.9 \times 10^{-8}\ \hat{k}\ T$ (2) $6.3 \times 10^{-8}\ \hat{k}\ T$
(3) $2.1 \times 10^{-8}\ \hat{k}\ T$ (4) $18.9 \times 10^{8}\ \hat{k}\ T$

05. A uniform rod of length l is free to rotate in a vertical plane about a fixed horizontal axis through O. The rod is allowed to rotate from rest from its unstable vertical position. Then, the angular velocity of the rod when it has turned through an angle θ is
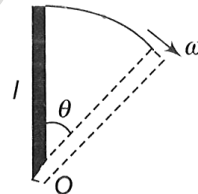

(1) $\sqrt{\dfrac{3g}{l}}\ \sin(\theta/2)$ (2) $\sqrt{\dfrac{6g}{l}}\ \sin(\theta/2)$

(3) $\sqrt{\dfrac{3g}{l}}\ \cos(\theta/2)$ (4) $\sqrt{\dfrac{6g}{l}}\ \cos(\theta/2)$

06. If a proton is projected in a direction perpendicular to a uniform magnetic field with velocity v and an electron is projected along the lines of field, what will happen to proton and electron?
(1) The electron will travel along a circle with constant speed and the proton will move along a straight line
(2) Proton will move in a circle with constant speed and there will be no effect on the motion of electron
(3) There will not be any effect on the motion of electron and proton
(4) The electron and proton both will follow the path of a parabola

07. Two spherical shells are as shown in figure.
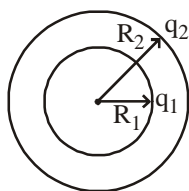
Let r be the distance of a point from their common centre. Then, match the following columns and mark the correct choice from the given codes.

	Column-I		Column-II
i.	electric field for $r < R_1$	p.	is constant for q_2 and vary for q_1.
ii.	electric potential for $r < R_1$	q.	is zero for q_2 and vary for q_1
iii.	electric potential for $R_1 < r < R_2$	r.	is constant
iv.	electric field for $R_1 < r < R_2$	s.	is zero

(1) i–s, ii–r, iii–p, iv–q   (2) i–q, ii–p, iii–r, iv–s
(3) i–p, ii–q, iii–r, iv–s   (4) i–r, ii–s, iii–p, iv–q

08. Two concentric coils each of radius equal to 2π cm are placed at right angles to each other. 3 ampere and 4 ampere are the currents flowing in each coil respectively. The magnetic induction in Weber/m^2 at the centre of the coils will be ($\mu_0 = 4\pi \times 10^{-7}$ Wb/A.m)
(1) 5×10^{-5} (2) 7×10^{-5} (3) 12×10^{-5} (4) 10^{-5}

09. There are three sources of sound of equal intensity with frequency 400, 401 and 402 vibration s^{-1}. The number of beats heard per second is
(1) 0   (2) 1   (3) 2   (4) 3

10. In the Wheatstone's bridge (shown in figure) X = Y and A > B. The direction of the current between ab will be
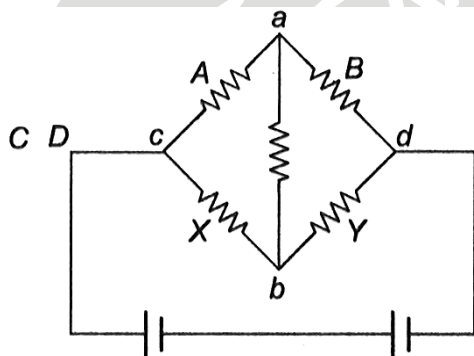
(1) From a to b
(2) From b to a
(3) From b to a through c
(4) From a to b through c

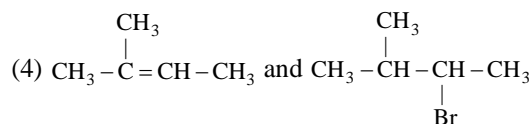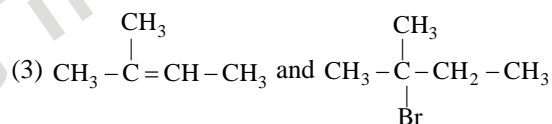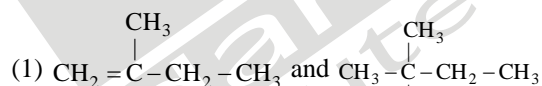11. Which of the following is correct with respect to ionization enthalpy?
(1) Li > Na > K > Rb > Cs
It is because of dominance of size over nuclear charge.
(2) Li < B < Be
It is because Be has $2s^2$ pair of electrons in valence shell.
(3) C < O < N
It is because of 3-unpaired electrons in 2p, that give extra stability to N-atom.
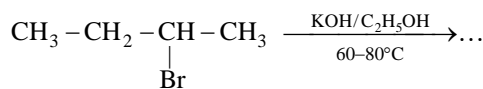(4) All are correct

12. In the following reactions

$$CH_3 - \underset{\underset{OH}{|}}{\overset{\overset{CH_3}{|}}{CH}} - CH - CH_3$$

$\xrightarrow{H^+/\Delta}$ (A) + (B)
$\underset{\text{(major)}}{}$
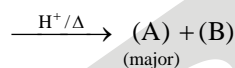
(A) $\xrightarrow[\text{No peroxide}]{\text{HBr/Dark}}$ (C) + (D). The major products (A) and (C) are respectively:

(1) $CH_2 = \underset{|}{\overset{\overset{CH_3}{|}}{C}} - CH_2 - CH_3$ and $CH_3 - \underset{\underset{Br}{|}}{\overset{\overset{CH_3}{|}}{C}} - CH_2 - CH_3$

(2) $CH_2 = \overset{\overset{CH_3}{|}}{C} - CH_2 - CH_3$ and $CH_2 - \underset{\underset{Br}{|}}{\overset{\overset{CH_3}{|}}{CH}} - CH_2 - CH_3$

(3) $CH_3 - \overset{\overset{CH_3}{|}}{C} = CH - CH_3$ and $CH_3 - \underset{\underset{Br}{|}}{\overset{\overset{CH_3}{|}}{C}} - CH_2 - CH_3$

(4) $CH_3 - \overset{\overset{CH_3}{|}}{C} = CH - CH_3$ and $CH_3 - \overset{\overset{CH_3}{|}}{CH} - \underset{\underset{Br}{|}}{CH} - CH_3$
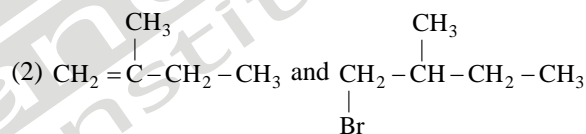
13. In the following reaction the major product is:

$CH_3 - CH_2 - \underset{\underset{Br}{|}}{CH} - CH_3 \xrightarrow[60-80°C]{KOH/C_2H_5OH} \ldots$

(1) $CH_3 - CH_2 - CH = CH_2$
(2) $CH_3 - CH = CH - CH_3$
(3) $CH_3 - CH_2 - \underset{\underset{OH}{|}}{CH} - CH_3$
(4) $CH_3 - CH_2 - CH_2 - CH_2 - OH$

14. Identify the product (E) in the following sequence of reaction:

(1)

(2)

(3)

(4)
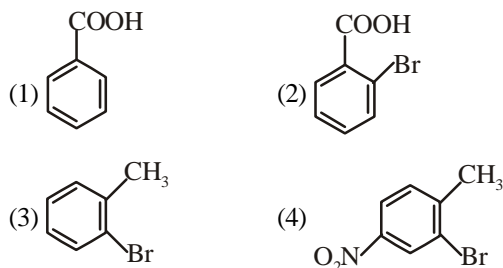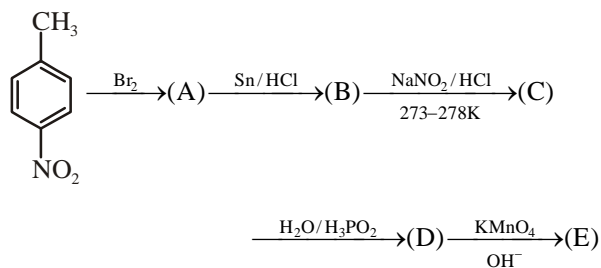
15. Acetone is treated with excess of ethanol in the presence of hydrochloric acid. The product obtained is:

(1) $CH_3 - CH_2 - CH_2 - \overset{\overset{O}{\parallel}}{C} - CH_3$

(2) $CH_3 - CH_2 - CH_2 - \overset{\overset{O}{\parallel}}{C} - CH_2 - CH_2 - CH_3$

(3) $(CH_3)_2 C \overset{OH}{\underset{OC_2H_5}{<}}$

(4) $(CH_3)_2 C \overset{OC_2H_5}{\underset{OC_2H_5}{<}}$
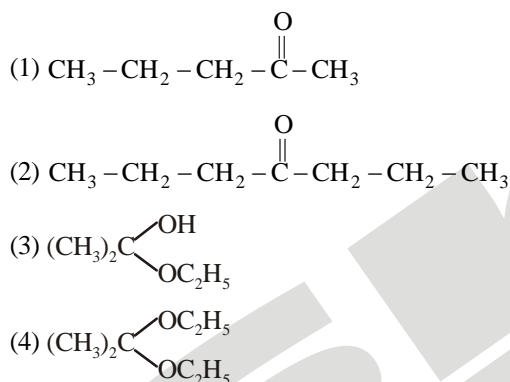
16. If a system absorb 100 J of heat and does 60 J of work, then the internal energy change for the system is
   (1) 160 J   (2) –40 J
   (3) –160 J   (4) 40 J

17. Rutherford's concludes scattering experiment
   (1) Most of the space in an atom is occupied by electrons
   (2) Most of the space in an atom is occupied by nucleus
   (3) Radius of atom is 10^{-15} m
   (4) None of these

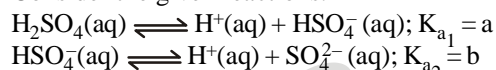18. Identify the chiral molecule among the following:

   (1)   (2)

   (3)   (4) all are chiral
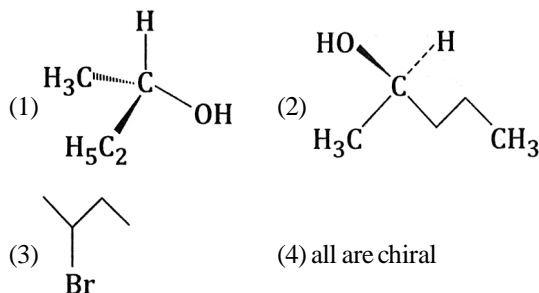
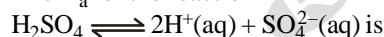19. Consider the Arrhenius equation given below and mark the correct option,

$$k = Ae^{-E_a/RT}$$

(1) Rate constant increase exponentially with increasing activation energy and decreasing temperature
(2) Rate constant decrease exponentially with increasing activation energy and decreasing temperature
(3) Rate constant increase exponentially with decreasing activation energy and decreasing temperature
(4) Rate constant increase exponentially with decreasing activation energy and increasing temperature

20. Consider the given reactions.
$H_2SO_4(aq) \rightleftharpoons H^+(aq) + HSO_4^-(aq); K_{a_1} = a$
$HSO_4^-(aq) \rightleftharpoons H^+(aq) + SO_4^{2-}(aq); K_{a_2} = b$
The K_a for the reaction
$H_2SO_4 \rightleftharpoons 2H^+(aq) + SO_4^{2-}(aq)$ is

(1) a + b   (2) ab   (3) a – b   (4) $\dfrac{a}{b}$

BOTANY

21. Major pigment of *Chlamydomonas* –
   (1) Chlorophyll a, b
   (2) Chlorophyll a, c
   (3) Chlorophyll a, d
   (4) Fucoxanthin, phycoerythrin

22. Respiration organs for plants are-
   (1) Lenticels
   (2) Stomata
   (3) WoodyBark
   (4) Both of the above 1 and 2

23. Length of DNA is usually defined as-
   (1) Number of nucleotides present in it
   (2) Number of pair of nucleotides present in it
   (3) Number of base pairs present in it
   (4) All of these

24. The bacteria involved in Hershey & chase experiment of 1952 was-
   (1) Bacteriophage
   (2) E. coli
   (3) S. pneumoniae
   (4) C. butyliwm

25. George Gamow argued-
   (1) There are only 5 bases and if they have code for 20 amino acid the code should constitute a combination of bases
   (2) There are only 4 bases and if they have code for 20 amino acid the code should constitute a combination of bases
   (3) Genetic code is triplet
   (4) (2) and (3)

26. Mark the incorrect statement about nucleus.
(1) Nucleus controls the activities of eukaryotic cells.
(2) Nucleus as a cell organelle was first described by Robert Brown as early as 1831.
(3) In higher organism, the well-organised nucleus contains a definite number of chromosomes of definite size and shape.
(4) All cells have nucleus without exception.

27. Plants offer rewards to animals in the form of pollen and nectar and the animals facilitate the pollination process. This is an example of :
(1) Amensalism   (2) Competition
(3) Commensalism   (4) Mutualism

28. Match the following and choose the correct option.

	List-I		List-II
(A)	Narrowly utilitarian argument	(i)	Conserving biodiversity for major ecosystem services
(B)	Broadly utilitarian argument	(ii)	Conserving biodiversity for philosophical or spiritual need to realise that every species has intrinsic value and moral duty to pass our biological legacy in good order to future generation.
(C)	Ethical argument	(iii)	Conserving biodiversity for direct economic benefits like food, medicine, industrial products etc.

(1) (A)-(i), (B)-(ii), (C)-(iii)
(2) (A)-(iii), (B)-(i), (C)-(ii)
(3) (A)-(ii), (B)-(i), (C)-(iii)
(4) (A)-(i), (B)-(iii), (C)-(ii)

29. The Cichlid species of Lake Victoria were driven to, or nearly to, extinction by the introduction of _____.
(1) North American sturgeon
(2) Nile perch
(3) Eels
(4) Bass

30. Each trophic level has a certain mass of living material at a particular time is known as
(1) catabolism
(2) standing crop
(3) humification
(4) primary productivity

31. Which enzyme catalyses the first step of TCA cycle?
(1) CitrateSynthase
(2) CitrateReductase
(3) CitrateOxidase
(4) Noneoftheabove

32. A - Stability as a property of genetic material was very evident in Griffith's transforming principle.
R - Heat can kill the bacteria and completely destroy the properties of genetic material
(1) Both A and R are true and R is correct explanation for A
(2) Both A and R are true but R is not correct explanation for R
(3) A is true but R is false
(4) Both A and R are false

33. Label A, B, C, D, E of given diagram.
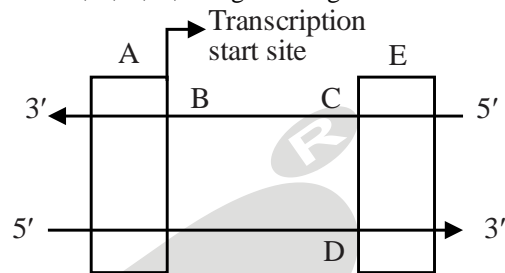
|	a	b	c	d	e
(1)	Promoter	Structural gene	Template strand	Coding strand	Terminator
(2)	Terminator	Structural gene	Coding strand	Template strand	Promoter
(3)	Promoter	Template strand	Coding strand	Structural gene	Terminator
(4)	None of these				

34. (1) Characterisation, identification, classification and nomenclature are the processes basic to taxonomy.
(2) Linnaeus used systema naturae as title of his publication.
(3) Taxonomic groups are morphological aggregates and not merely distinct biological entities.
(4) Lower the taxa, less are the characteristics that the members within the taxon share
(5) Lower the category, lesser is the difficulty of determining the relationship to other taxa at same level.
Which of the above statements incorrect.
(1) 1, 3 & 5
(2) 4 & 5
(3) 3 & 4
(4) 3 only

35. Match the following:

	List-I		List-II
(A)	Zygomorphic	(i)	Mustard
(B)	Hypogynous	(ii)	Plum
(C)	Perigynous	(iii)	Cassia
(D)	Epigynous	(iv)	Cucumber

(1) (A)-(i), (B)-(ii), (C)-(iv), (D)-(iii)
(2) (A)-(i), (B)-(ii), (C)-(iii), (D)-(iv)
(3) (A)-(iv), (B)-(i), (C)-(iii), (D)-(ii)
(4) (A)-(iii), (B)-(i), (C)-(ii), (D)-(iv)

36. Identify A, B, C, D and E in the given figure related with mouth parts of the cockroach.
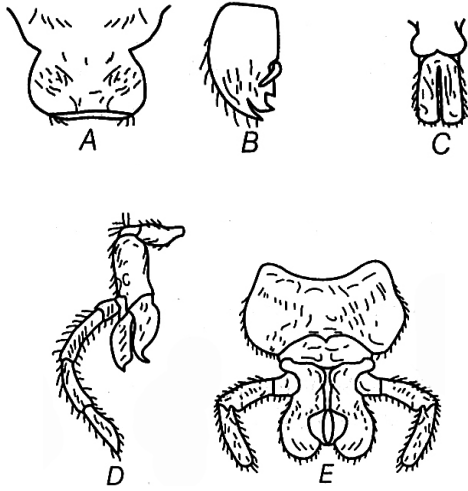
(1) A-Mandible, B-Labium, C-Labrum, D-Maxilla, E-Hypopharynx

(2) A-Labium, B-Labrum, C-Mandible, D-Hypopharynx, E-Maxilla

(3) A-Labrum, B-Mandible, C-Hypopharynx, D-Maxilla, E-Labium

(4) A-Hypopharynx, B-Maxilla, C-Labium, D-Labrum, E-Mandible

37. Which of the following statements about enzymes are correct?

I. Enzymes do not alter the overall change in free energy for a reaction.

II. Enzymes are highly specific for reactions.

III. The energy input needed to start a chemical reaction is called activation energy.

IV. Enzymes are proteins whose three dimensional shape is key to their functions.

(1) I and V   (2) I, II and V

(3) II and V   (4) All of these

38. Glycogen is a homopolymer made of

(1) glucose units   (2) galactose units

(3) ribose units   (4) amino acids

39. Identify the synovial joints among the given options.

I. Ball and socket   II. Hinge joint

III. Pivot joints   IV. Sutures of skull

V. Vertebral joints

Select the correct option.

(1) I, II, III and IV   (2) I, III, IV and V

(3) II, III, IV and V   (4) I, II and III

40. Match the following columns.

Column I	Column II
A. Golden rice	1. Armyworm
B. Bt toxin	2. Rich in vitamin-A
C. RNAI	3. Cry protein
D. Lepidopterans	4. Gene silencing

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

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

41. Saltation stands for

(1) single step large mutation

(2) single step small mutation

(3) double step small mutation

(4) double step large mutation

42. Dorsal part of frog is and ventral part is

(1) olivegreen; uniformly pale yellow

(2) olivegreen; uniformly dark yellow

(3) olivegreen; nonuniformly pale yellow

(4) olivegreen; nonuniformly dark yellow

43. (1) Marine with streamlined body

(2) Cartilaginous endoskeleton

(3) Mouth ventral

(4) In male copulatory organ are clasper

(5) Body is coverd by placoid scale.

Above characters belong to how many of the following organisms?

Dogfish, Sawfish, Flying fish, Fighting fish, Angle fish, Jellyfish, Starfish, Trygon, Torpedo, Rohu, Catla, Magur

(1) Three   (2) Four   (3) Six   (4) Seven

44. **Assertion (A):** The SAN is called the pacemaker of the heart.

Reason (R): The SAN can generate the maximum number of action potentials, i.e., 70-75 min[1] and is responsible for initiating and maintaining the rhythmic contractile activity of the heart.

(1) Both Assertion (A) and Reason (R) are true, and Reason (R) is a correct explanation of Assertion (A).

(2) Both Assertion (A) and Reason (R) are true, but Reason (R) is not a correct explanation of Assertion (A).

(3) Assertion(A) is true, and Reason (R) is false.

(4) Assertion (A) is false, and Reason (R) is true.

45. In humans, epithelium that plays limited role in absorption, diffusion and secretion is likely to be found in

(1) Small intestine   (2) Trachea

(3) Fallopian tube   (4) Buccal cavity

46. Which of the following statements are correct for the enzyme taq polymeras

I. Taq polymerase is thermally unstable.

II. It requires primers for carrying out the process of polymerisation.

III. Taq polymerase is isolated from thermophilic bacterium, Thermus aquaticus.

Choose the correct option.

(1) I and II   (2) I and III

(3) II and III   (4) I, II and III

47. 'XX' lived 100000-40000 years ago, in Europe, Asia and Africa. 'XX' was short stature, hairy eyebrows, sctreating forehead and large jaws. Identify 'XX'
(1) Neanderthal man   (2) Homo habilis
(3) Cro-magnon man   (4) Dryopithecus

48. Match the following columns.

Column I	Column II
A. Sternum	1. Synovial fluid
B. Glenoid cavity	2. Vertebrae
C. Freely movable joint	3. Pectoral girdle
D. Cartilagenous joint	4. Flat bones

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

49. Choose the correct statement
(1) The antibodies produced in the allergy reaction is IgE type
(2) Allergy is due to the release of chemicals like histamine and serotonin from the mast cells
(3) Modern day lifestyle has resulted in lowering the immunity and more sensitivity to allergens
(4) All of these

50. A hormone which regulates the growth of mammary glands and milk production in them, is released by
(1) Pars distalis   (2) Pars intermedia
(3) Hypothalamus   (4) Pars nervosa