Regn. No. 0920
SKD New Standard Coaching Institute
ESTD. 1985
37 YEARS OF TEACHING EXCELLENCE
Ist & IInd Floor, Skylark Building,
Near Leela Cinema, Newal Kishore Road,
Hazratganj, Lucknow. Call : 7080111582, 7080111595

SAMPLE PAPER - 43

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

PHYSICS

01. What is the angle between $(\vec{P}+\vec{Q})$ and $(\vec{P}\times\vec{Q})$?

(1) 0 (2) $\frac{\pi}{2}$ (3) $\frac{\pi}{4}$ (4) π

02. The angle between two vectors $-2\hat{i}+3\hat{j}+\hat{k}$ and $2\hat{i}+2\hat{j}-4\hat{k}$ is

(1) obtuse (2) right angle
(3) acute (4) can't say

03. A bomber moving horizontally with 500 m/s drops a bomb which strikes ground in 10 s. The angle of strike with horizontal is:

(1) $\sin^{-1}\frac{1}{5}$ (2) $\tan^{-1}1$

(3) $\tan^{-1}\frac{1}{5}$ (4) $\tan^{-1}5$

04. To the captain of a ship A travelling with velocity $\vec{v}_A=(3\hat{i}-4\hat{j})$ km/h, a second ship B appears to have a velocity $(5\hat{i}+12\hat{j})$ km/h. What is the true velocity of the ship B?

(1) $2\hat{i}+16\hat{j}$ km/h (2) $13\hat{i}+8\hat{j}$ km/h

(3) $-2\hat{i}-16\hat{j}$ km/h (4) $8(\hat{i}+\hat{j})$ km/h

05. An insect trapped in a circular groove of radius 12 cm moves along the groove steadily and completes 7 revolutions in 100 s. The linear speed of the insect is

(1) 4.3 cm s^{-1} (2) 5.3 cm s^{-1}
(3) 6.3 cm s^{-1} (4) 7.3 cm s^{-1}

06. Water in a bucket is whirled in a vertical circle with a string attached to it. The water does not fall down even when the bucket is inverted at the top of its path. We conclude that in this position

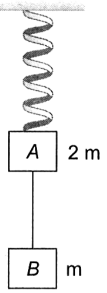
(1) $mg=\frac{mv^2}{r}$

(2) mg is greater than $\frac{mv^2}{r}$

(3) mg is not greater than $\frac{mv^2}{r}$

(4) none of these

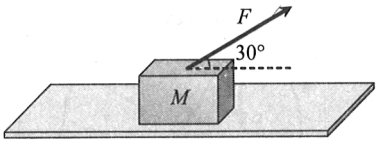
07. Two blocks A and B of masses 2 m and m, respectively are connected by a massless and inextensible string. The whole system is suspended by a massless spring as shown in the figure. The magnitudes of acceleration of A and B immediately after the string is cut, are respectively :



(1) g, $\frac{g}{2}$ (2) $\frac{g}{2}$, g

(3) g, g (4) $\frac{g}{2}$, $\frac{g}{2}$

08. A block of mass m = 5 kg is resting on a rough horizontal surface for which the coefficient of friction is 0.2. When a force F = 40 N is applied, the acceleration of the block will be ($g = 10\ m/s^2$)

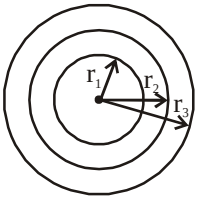


(1) 5.73 m/sec^2
(2) 8.0 m/sec^2
(3) 3.17 m/sec^2
(4) 10.0 m/sec^2

09. A given charge situated at a certain distance from a short electric dipole in the end on position experience a force F. If the distance of the charge is doubled, the force acting on the charge will be

(1) 2F (2) $\frac{F}{2}$ (3) $\frac{F}{4}$ (4) $\frac{F}{8}$

10. Figure shows three concentric metallic spherical shells. The outermost shell has charge q_2, the inner most shell has charge q_1 and the middle shell is uncharged. The charge appearing on the inner surface of outermost shell is



(1) $q_1 + q_2$ (2) $\frac{q_2}{2}$ (3) $-q_1$ (4) Zero

11. Two metallic spheres of radii 1 cm and 2 cm have been charged to 1.5×10^{-8} C and 0.3×10^{-7} respectively. When the two spheres are connected with a wire, charge will
(1) Flow from first sphere to second
(2) Flow from second sphere to first
(3) Not flow at all
(4) May flow in either direction depending upon length of connecting wire.

12. If I_1 is the moment of inertial of a thin rod about an axis perpendicular to its length and passing through its centre of mass, and I_2 is the moment of inertial (about central axis) of the ring formed by bending the rod, then the ratio of I_1 to I_2 is
(1) 1 : 1 (2) $\pi^2 : 3$ (3) $\pi : 4$ (4) 3 : 5

13. Two rings of same mass and radius R are placed with their planes perpendicular to each other and centres at a common point. The radius of gyration of the system about an axis passing through the centre and perpendicular to the plane of one ring is

(1) 2R (2) $\frac{R}{\sqrt{2}}$

(3) $\sqrt{\frac{3}{2}}R$ (4) $\frac{\sqrt{3}R}{2}$

14. A body weighs 1400 gram weight on the surface of earth. How much will it weigh on the surface of a planet whose mass is $\frac{2}{7}$ and radius is $\frac{1}{3}$ that of the earth ?

(1) 0.45 kg wt (2) 0.9 kg wt
(3) 1.8 kg wt (4) 3.6 kg wt

15. Two satellites of equal mass are revolving around earth in elliptical orbits of different semi-major axis. If their angular momenta about earth centre are in the ratio 3 : 4 then ratio of their areal velocities is

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

(3) $\frac{1}{3}$ (4) $\frac{4}{3}$

CHEMISTRY

16. On dissolving sugar in water at room temperature, solution feels cool to touch. In which of the following cases, dissolution of sugar will be most rapid ?
(1) Sugar crystals in cold water
(2) Sugar crystals in hot water
(3) Powdered sugar in cold water
(4) Powdered sugar in hot water

17. Two solutions of glucose have osmotic pressures 1.5 and 2.5 atm. 1 litre of first solution is mixed with 2 litre of second solution. The osmotic pressure of the resultant solution will be:
(1) 1.62 atm (2) 6.12 atm
(3) 1.26 atm (4) 2.16 atm

18. Which of the following behaves nearly as ideal solution ?
(1) Cyclohexane + cyclopentane
(2) Chloroform + acetone
(3) Ethanol + water
(4) Nitric acid + water

19. For the reaction, $N_2(g) + O_2(g) \rightleftharpoons 2NO(g)$, the value of K_c at 800 °C is 0.1. When the equilibrium concentrations of both the reactants is 0.5 mol, what is the value of K_p at the same temperature
(1) 0.5 (2) 0.1
(3) 0.01 (4) 0.025

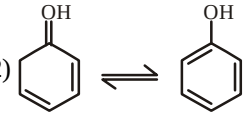
20. In the reaction $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$, the amounts of PCl_5, PCl_3 and Cl_2 are 2 moles each at equilibrium and the total pressure is 3 atmospheres. The equilibrium constant, K_p, is:
(1) 1 atm (2) 2 atm
(3) 3 atm (4) 1.5 atm

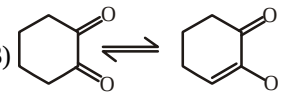
21. Which one among the following compounds will show tautomerism?
(1) 2, 2-dimethylpropanal
(2) 2,2-dimethyl-1-nitropropane
(3) Acetyl acetone
(4) Benzophenone

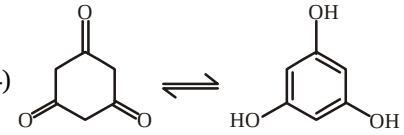
22. In which one of the following keto-enol systems, the keto form is more stable than the enol form?

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

$\Rightarrow CH_3-CH_2-\overset{\overset{O-H}{|}}{C}=CH_2$

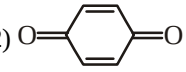
(2) 

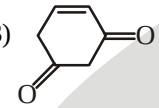
(3) 

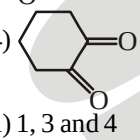
(4) 

23. Syn and anti nomenclature is used in:
(1) Structural isomerism
(2) Optical isomerism
(3) Geometrical isomerism
(4) Conformal isomerism

24. Tautomerism is exhibited by
(1) $C_6H_5-CH=CH-OH$

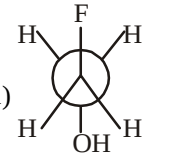
(2) 

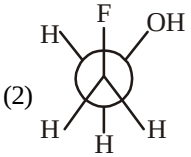
(3) 

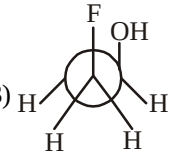
(4) 

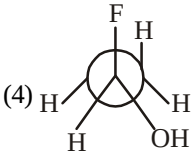
(1) 1, 3 and 4 (2) 2, 3 and 4
(3) All of these (4) None of these

25. The most stable Newmann conformation of 2–floro ethanol is

(1) 

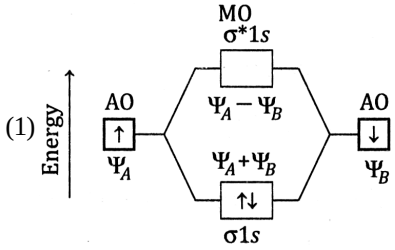
(2) 

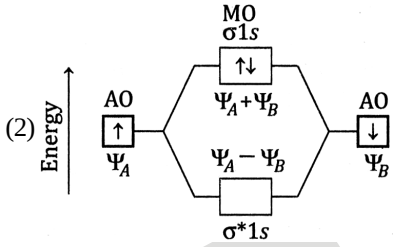
(3) 

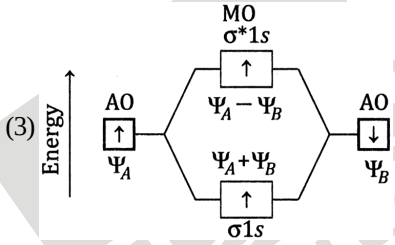
(4) 

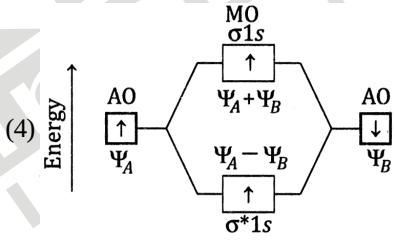
26. In which of the following molecules/ions, all the bonds are not equal?
(1) XeF_4 (2) BeF_4^{2-}
(3) PCl_5 (4) SiF_4

27. Which of the following shows the M.O. system of H_2 molecule?

(1) 

(2) 

(3) 

(4) 

28. The electronegativity difference between N and F is greater than that between N and H, yet the dipole moment of NH_3 (1.5 D) is larger than that of NF_3 (0.2D). This is because:
(1) in NH_3 as well as in NF_3 the atomic dipole and bond dipole are in opposite direction
(2) in NH_3 the atomic dipole and bond dipole are in opposite direction whereas in NF_3 these are in the same direction
(3) in NH_3 as well as in NF_3 the atomic dipole and bond dipole are in the same direction
(4) in NH_3 the atomic dipole and bond dipole are in the same direction whereas in NF_3 these are in opposite direction

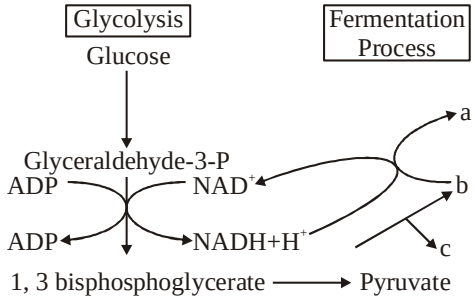
29. Planer structure among the following is
(1) B_2H_6 (2) $BeCl_2$ (solid)
(3) I_2Cl_6 (4) $(BeH_2)_n$

30. Which of the following represents the correct order of increasing first ionisation enthalpy for Ca, Ba, S, Se, Ar?
(1) Ca<S<Ba<Se<Ar (2) S<Se<Ca<Ba<Ar
(3) Ba<Ca<Se<S<Ar (4) Ca<Ba<S<Se<Ar

BOTANY

31. Cytochrome c is a small protein attached to the
(1) Outer surface of the inner membrane
(2) Inner surface of the outer membrane
(3) Inner surface of the inner membrane
(4) Outer surface of the outer membrane

32. Recognise the figure and find out the correct labelling.



(1) a-ethanol, b-CO_2, c-acetaldehyde
(2) a-CO_2, b-acetaldehyde, c-ethanol
(3) a-CO_2, b-ethanol, c-acetaldehyde
(4) a-ethanol,b-acetaldehyde, c-CO_2

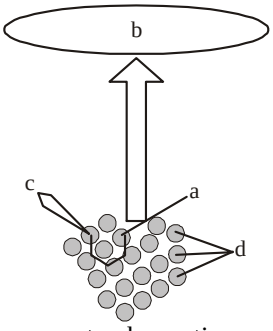
33. Complex IV refers to cytochrome c oxidase complex containing cytochromes
(1) b and c_1 and one copper center
(2) a and a_3 and four copper center
(3) c and c and three copper center
(4) a and a_3 and two copper center

34. Fill in the blanks:
1. ATP synthase consists of two major components, F_0 and F_1. The ....a.... headpiece is peripheral membrane protein complex and contains the site for synthesis of ATP from ADP and inorganic phosphate
2. ....b.... is an integral membrane protein complex that forms the channel through which proton crosses the membrane.
3. For each ATP produced, ...c... passes through ....b.... from the ...d... to the ....e.... down the electrochemical proton gradient.
(1) a-F_0, b-F_1, c-$3H^+$, d-matrix,c-inner membrane
(2) a-F_1, b-F_0, c-$2H^+$, d-intermembrane space, e-matrix
(3) a-F_0, b-F_1, c-$2H^+$, d-intermembrane space, e-matrix
(4) a-F_1, b-F_0, c-$2H^+$, d-matrix, e-intermembrane space

35. In aerobic respiration, one glucose produces
(1) 8 NADH + 2 $FADH_2$ + 2ATP
(2) 12 NADH + 2$FADH_2$ + 38 ATP
(3) 12 NADH + 30 ATP + H_2O
(4) 10 NADH + 2 $FADH_2$ + 2ATP + 2 GTP

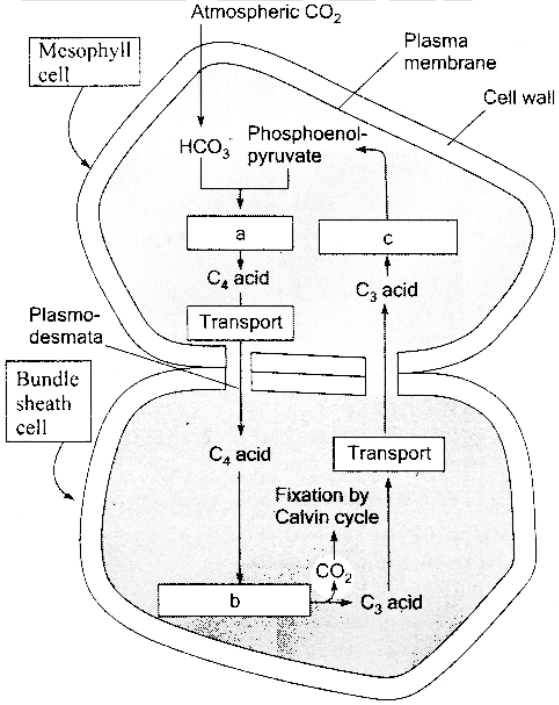
36. When malic acid is respiratory substrate, the amount of CO_2 released is
(1) More than O_2 consumed
(2) Less than O_2 released
(3) Equal to O_2 consumed
(4) CO_2 is not released

37. Recognise the figure and find out the correct matching.



(1) a-primary acceptor, b-reaction centre, c-pigment molecules, d-photon
(2) a-primary acceptor, b-reaction centre, d-pigment molecules, c -photon
(3) b-primary acceptor, a-reaction centre, d-pigment molecules, c-photon
(4) d-primary acceptor, a-reaction centre, b-pigment molecules, c-photon

38. Study the pathway given below:
In which of the following options correct words for all the three blanks a, b and c are indicated.



(1) a-Decarboxylation, b-Reduction, c-Regeneration
(2) a-Fixation, b-Transamination, c-Regeneration
(3) a-Fixation, b-Decarboxylation, c-Regeneration
(4) a-Carboxylation, b-Decarboxylation, c-Reduction

39. Royal botanic garden is situated in
(1) Kew (England) (2) Paris
(3) Washington (4) Howrah

40. Pleuro–pneumonia like organisms are grouped under
(1) prokaryotes (2) eukaryotes
(3) fungi (4) viruses

41. Paralytic shellfish poisoning (PSP) is caused to toxin saxitonin by
(1) Vorticella (2) Ephidicum
(3) Gonyaulax (4) Ceratium

42. Pencillium and yeast belong to class
(1) Ascomycetes (2) Phycomycetes
(3) Schizomycetes (4) Zygomycetes

43. Lichen is a symbiotic association of
(1) an alga and a fungus
(2) alga and bacteria
(3) fungus and bacteriophages
(4) bacteria and bryophyte

44. Which of the following character is similar in cyanobacteria and green plants?
(1) Nitrogen fixation (2) 80 S ribosome
(3) Chlorphyll 'a' (4) Nature of cell wall

45. How many of the following are not included in endomembrane system?
Endoplasmic reticulum, Golgi complex, Lysosome, Mitochondria, Chloroplast, Vacuoles, Peroxisomes
(1) 2 (2) 3 (3) 4 (4) 5

ZOOLOGY

46. Cushing's disease is caused by hyperactivity of
(1) GH (2) Thyroxine
(3) Insulin (4) Cortisol

47. Match the columns and find out the correct combination:

	Column–I		Column–II
A.	Hypothalamus	1.	Lactation after child birth
B.	Anterior pituitary	2.	Contraction of uterus
C.	Oxytocin	3.	FSH and LH
D.	Prolactin	4.	Growth releasing hormone

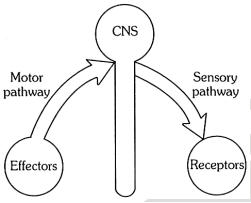
(1) A–2; B–4; C–3; D–1 (2) A–1; B–3; C–2; D–4
(3) A–4; B–3; C–2; D–1 (4) A–2; B–3; C–1; D–1

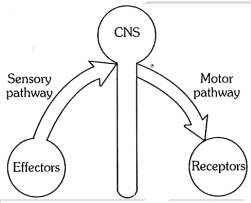
48. Read the following statements and choose how many statements are incorrect.
A. Testis performs dual functions as an endocrine gland and as secondary sex organ
B. Low pitch voice is induced by testosterone
C. When blood pressure decrease, ANF is secreted which causes dilation of blood vessels
D. Androgenic steroids play a role in growth of axial hair, pubic hair and facial hair during puberty
(1) One (2) Two
(3) Three (4) Four

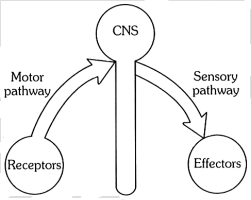
49. Which of the following do not play any role in calcium balance in the human body?
(1) Vitamin-D (2) Parathyroid hormone
(3) Thyrocalcitonin (4) Thymosin

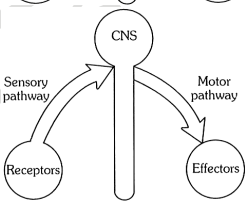
50. Which one of the following hormones is not involved in sugar metabolism?
(1) Aldosterone (2) Insulin
(3) Glucagon (4) Cortisol

51. Choose the correct diagram which represent the flow of information through the nervous system

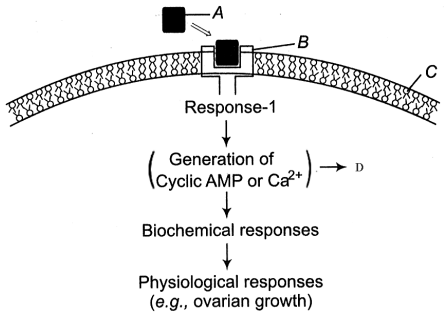
(1)


(2)


(3)


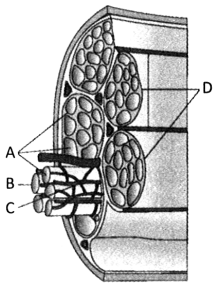
(4)


52. Identify A to D and choose the correct option.



(1) A–Hormone, B–Receptor, C–Cell membrane, D–Secondary messenger
(2) A–Hormone, B–Receptor, C–Cell membrane, D–Primary messenger
(3) A–Receptor, B–Hormone, C–Cell membrane, D–Primary messenger
(4) A–Receptor, B–Hormone, C–Cell membrane, D–Secondary messenger

53. Section of a skeletal muscle is shown in the diagram. Out of the following labellings (A–D), which indicates the anatomical unit of muscle?



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

54. In their middle portions, thick filaments are attached to ..... in a skeletal muscle
(1) Z-line (2) M-line (3) H-zone (4) Fascia

55. Chondroitin salts are found in:
(1) Bones (2) Cartilages
(3) Ligaments (4) Tendons

56. Identify an autoimmune disorder:
(1) Myasthenia gravis
(2) Tetany
(3) Gout
(4) Arthritis

57. Total number of cervical vertebra in human is ....., out of which the second .....is
(1) 7, Atlas (2) 7, Axis
(3) 12, Atlas (4) 12, Axis

58. Which of the following is a flat bone on the ventral midline of thorax?
(1) Sternum (2) Ribs
(3) Thoracic vertebra (4) Atlas

59. Match the columns:

	Column A		Column B
A.	Thigh bone	1.	Flat bone in ventral midline of thorax
B.	Humerus	2.	Acetabulum
C.	Sternum	3.	Acromian process
D.	Scapula	4.	Glenoid cavity

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

60. Each pelvic girdle is made up of two .....A..... bones. Each .....A..... bone is formed by the fusion of three bones–Ilium, ...B..... and .....C..... . .....C..... part of both .....A..... bones fuse anteriorly at .....D....., made up of .....E..... cartilage.
Select the correct option:
(1) B-Pubis, D-Pubic symphysis
(2) A-Coxal, E-Elastic
(3) A-Coxal, B-Ischium, E-Fibrous
(4) C-Pubis, E-Elastic