Regn. No. 0920
SKD New Standard Coaching Institute
ESTD. 1985
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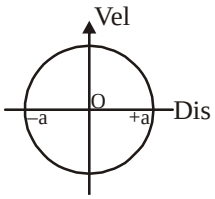
SAMPLE PAPER - 50

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

PHYSICS

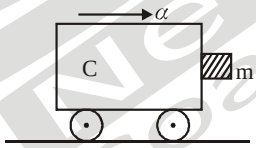
01. Two oscillators are started simulataneously in same phase. After 50 oscillations of one, they get out of phase by π that is half oscillation, the percentage difference of frequencies of the two oscillations is nearst to.
(1) 2% (2) 1% (3) 0.5% (4) 0.25%

02. The graphs represents



(1) S.H.M. (2) Circular motion
(3) Rectilinear motion
(4) Uniform circular motion

03. A block of mass m is in contact with the cart C as shown in the figure. The coefficient of static friction between the block and the cart is μ. The acceleration α of the cart that will prevent the block from falling satisfies :



(1) $\alpha < \frac{g}{\mu}$ (2) $\alpha > \frac{mg}{\mu}$

(3) $\alpha > \frac{g}{\mu m}$ (4) $\alpha \geq \frac{g}{\mu}$.

04. A man is standing at a platform of spring Balance. Reading of spring balance is 60 kg wt. if man jumps outside platform. Then reading of spring balance-
(1) first increases then decreases to zero
(2) decrease
(3) increase
(4) remains same

05. A solid sphere of mass M, radius R and having moment of inertial about an axis passing through the centre of mass as I, is recast into a disc of thickness t, whose moment of inertial about an axis passing through its edge and perpendicular to its plane remains I. Then, radius of the disc will be :-

(1) $\frac{2R}{\sqrt{15}}$ (2) $R\sqrt{\frac{2}{15}}$ (3) $\frac{4R}{\sqrt{15}}$ (4) $\frac{R}{4}$

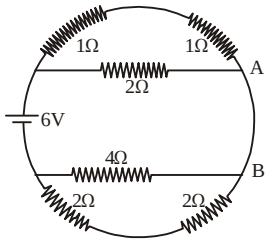
06. The mass and the diameter of a planet are twice that of earth. The seconds pendulum on earth will have its period on this planet equal to
(1) 2 sec (2) $2\sqrt{2}$ sec
(3) 1 sec (4) $4\sqrt{2}$ sec

07. The position of a particle at time is given by the relation $\vec{r} = (t^3\hat{i} - t^2\hat{j} + 2t\hat{k})$. The magnitude of acceleration of the particle after 4 sec is
(1) $\sqrt{180}$ (2) $\sqrt{380}$
(3) $\sqrt{580}$ (4) $\sqrt{480}$

08. The acceleration of a body due to the attraction of the earth (radius R) at a distance 2R from the surface of the earth is (g = acceleration due to gravity at the surface of the earth):-

(1) $\frac{g}{9}$ (2) $\frac{g}{3}$ (3) $\frac{g}{4}$ (4) g

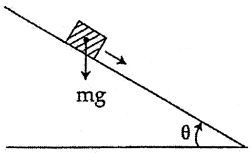
09. The current in the branch AB is



(1) 1 A (2) 2 A (3) 1.5 A (4) 3 A

10. Conversion of an ammeter into a voltmeter requires
(1) a low resistance in series
(2) a high resistance in series
(3) a high resistance in series and removal of shunt
(4) low resistance in parallal and removal of series resistance.

11. A plank with a box on it at one end is gradually raised about the other end. As the angle of inclination with the horizontal reaches 30°, the box starts to slip and slides 4.0 m down the plank in 4.0 s. The coefficients of static and kinetic friction between the box and the plank will be, respectively :



(1) 0.4 and 0.3 (2) 0.6 and 0.6
(3) 0.6 and 0.5 (4) 0.5 and 0.6

12. Consider electrons and protons accelerated in a vacuum tube across the same potential difference. Which of the following is true ?
(1) Protons have smaller momentum
(2) electrons have smaller velocity
(3) Protons have larger kinetic energy
(4) protons & electrons have same kinetic energy

13. A chain of mass M and length l is placed on a table with one sixth of it hanging freely from the table edge. The amount of work done to pull the chain on the table is :

(1) $\frac{Mgl}{36}$ (2) $\frac{Mgl}{72}$ (3) $\frac{Mgl}{4}$ (4) $\frac{Mgl}{12}$

14. The electric potential in a certain region of space is given by $V = -8x + 4$, where V is in volt and x is in metre. In this region, the equipotential surfaces are:-
(1) Planes parallel to yz plane
(2) planes parallel to x-axis
(3) concentric circles centred at the origin
(4) coaxial cylinders with axes parallel to y-axis.

15. In the HCl molecule., the separation between the nuclei of the two atoms is about 1.27 Å($1Å=10^{-10}m$) The approximate location of the centre of mass of the molecule, assuming the chlorine atom to be about 35.5 times massive as hydrogen is :
(1) 1Å (2) 2.5Å (3) 1.24Å (4) 1.5Å

CHEMISTRY

16. From the following half-cell reactions and their potentials, what is the smallest possible standard e.m.f. for spontaneous reactions?
$PO_4^{3-}(aq)+2H_2O(l)+2e^- \rightarrow HPO_3^{2-}+3OH^-(aq)$; $E°=-1.05\,V$
$PbO_2(s)+H_2O(l)+2e^- \rightarrow PbO(s)+2OH^-(aq)$; $E°=+0.28\,V$
$IO_3^-(aq)+2H_2O(l)+4e^- \rightarrow IO^-(aq)+4OH^-(aq)$; $E°=+0.56\,V$
(1) +0.00 (2) +0.74
(3) +0.56 (4) +0.28

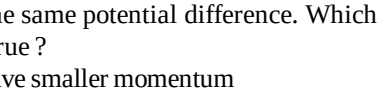
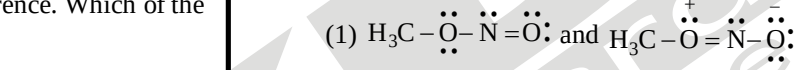
17. What will be the emf for the given cell?
$Pt \mid H_2\,(g, P_1) \mid H^+\,(aq) \parallel H_2(g, P_2) \mid Pt$

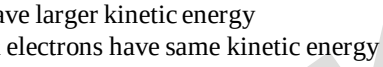
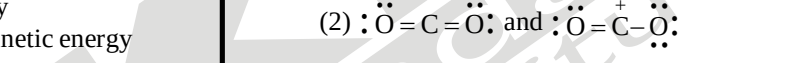
(1) $\frac{RT}{F}\ln\frac{P_1}{P_2}$ (2) $\frac{RT}{2F}\ln\frac{P_1}{P_2}$

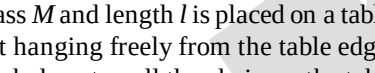
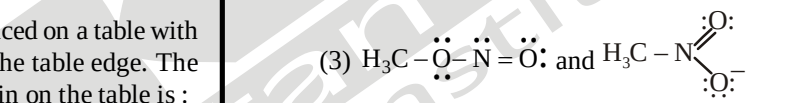
(3) $\frac{RT}{F}\ln\frac{P_2}{P_1}$ (4) None of these

18. Which cycloalkane has the greatest ring strain?
(1) Cyclopropane (2) Cyclobutane
(3) Cyclopentane (4) Cyclohexane

19. Which of the following pairs are NOT resonance structure?

(1)  and 

(2)  and 

(3)  and 

(4) Each of these pairs represents resonance structure

20. Which of the following will have the maximum dipole moment?
(1) CH_3F (2) CH_3Cl
(3) CH_3Br (4) CH_3I

21. Which of the following is true about any (R)–enantiomer?
(1) It is dextrorotatory
(2) It is levorotatory
(3) It is an equal mixture of (+) and (–)
(4) It is the mirror image of the (S)–enatiomer

22. How many secondary hydrogens are there in the following alkane?

(1) 1 (2) 2 (3) 4 (4) 9

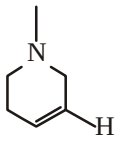
23. The reactivity of hydrogen atom in an alkane toward substitution by bromine atgom is
(1) 1°H > 2°H > 3°H
(2) 3°H > 2°H > 1°H
(3) 2°H > 1°H > 3°H
(4) None

24. What is the index of hydrogen deficiency (or degree of unsaturation) of benzene (C_6H_6)?
(1) 2 (2) 4 (3) 3 (4) 5

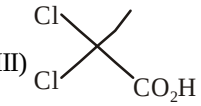
25. Which one of the following has the strong O–O bond?
(1) O_2^+ (2) O_2 (3) O_2^- (4) O_2^{2-}

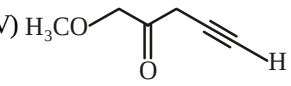
26. Considering the elements B, Al, Mg and K, the correct order of their metallic character is
(1) B > Al > Mg > K (2) Al > Mg > B > K
(3) Mg > Al > K > B (4) K > Mg > Al > B

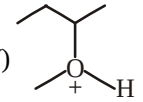
27. Rank the bold–faced hydrogens for the following compounds from most acidic to least acidic.

(I) 

(II) CF_3OH

(III) 

(IV) 

(V) 

(1) V > III > II > IV > I (2) II > V > III > I > IV
(3) II > III > V > IV > I (4) III > I > V > II > IV

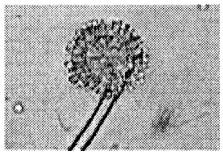
28. Photoelectric effect is maximum in
(1) Cs (2) Na (3) K (4) Li

29. The empirical formula of a non-electrolyte is CH_2O. A solution containing 3 g L^{-1} of the compound exerts the same osmotic pressure as that of 0.05 M glucose solution. The molecular formula of the compound is:
(1) CH_2O (2) $C_2H_4O_2$ (3) $C_4H_8O_4$ (4) $C_3H_6O_3$

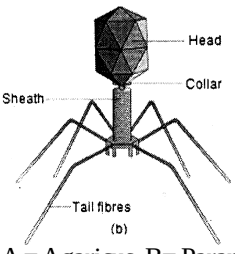
30. Magnesium burn in air to give
(1) MgO (2) Mg_3N_2
(3) $MgCO_3$ (4) Both MgO and Mg_3N_2

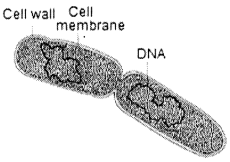
BOTANY

31. Identify figures A, B, C and D :

(A) 

(B) 

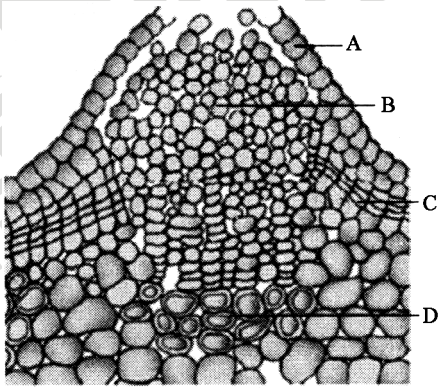
(C) 

(D) 

(1) A = Agaricus, B= Paramoecium, C=Bacteriophage,D = Anabaena
(2) A = Aspergillus, B = Euglena, C = TMV, D= Dividing bacteria
(3) A = Aspergillus, B = Paramoecium, C = Bacteriophage, D = Dividing bacteria
(4) A = Aspergillus, B = Paramoecium, C = Bacteriophage, D =Euglena

32. After parturition, which natural contraception may can be utilized ?
(1) Lactational menorrhea
(2) Lactational amenorrhea
(3) Lactational deficiency
(4) Lactational prevention

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



(1) A-phellem, B-lenticel, C-phellogen, D-phelloderm
(2) A-epidermis, B-complimentary cells, C-cork cambium, D-secondary cortex
(3) A-epidermis, B-complimentary cells, C-phellogen, D-phelloderm
(4) Both (2) and (3) are Correct

34. Emergency contraceptive should be used within ..... hours of unprotected intercourse.
(1) 48 (2) 72
(3) 36 (4) 86

35. Which of the following is not a product of light reaction of photosynthesis ?
(1) ATP
(2) NADH
(3) NADPH
(4) Oxygen

36. The difference between primary and secondary spermatocyte lies in ..... .
(1) Presence/absence of a tail
(2) Number of chromosomes
(3) Being hormone producing/non-hormone producing
(4) Primary gamete/secondary gamete in males

37. Study the following table carefully and selct the correct option for 1, 2, 3 and 4.

Characters	Monera	Protista	Fungi	Plantae	Animalia
Cell type	1	Eukary-otic	Eukay-otic	Eukary-otic	Eukary-otic
Cell wall	2	Present in some	Present	Present	Present
Nuclear membrane	Absent	Present	Present	Present	3
Body organisation	Cellular	Cellular	4	Tissue/ organ	Tissue/ organ/ Organ system

	1	2	3	4
(1)	Prokaryotic	Absent	Absent	Unicellular
(2)	Prokaryotic	Present	Present	Multicellular
(3)	Eukaryotic	Present	Present	Multicellular
(4)	Eukaryotic	Absent	Absent	Unicellular

38. Under ZIFT procedure, zygote or embryos, with up to 8 blastomeres can be transferred into the
(1) Uterus (2) Placenta
(3) Fallopian tube (4) Cervix

39. Inner most anterior petals in papilionaceous type corolla is called :-
(1) Vexillum (2) Keel
(3) Wings (4) Alae

40. Which method is suitable for transferring an alien DNA into a plant cell ?
(1) $CaCl_2$ (2) Biolistics or gene gun
(3) Micro-infection (4) Heat shock

41. The ovulation phase is followed by ..... phase.
(1) Gestation (2) Luteal
(3) Menstrual (4) Oogenesis

42. Match column I with column II, and choose the correct combination from the options given below.

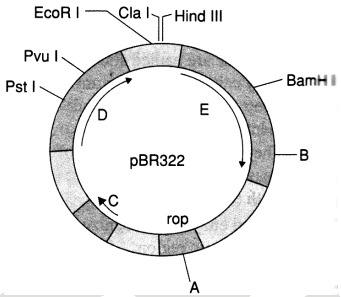
Column I		Column II	
A.	Complex I	1.	Cytochrome bc1 complex
B.	Complex II	2.	NADH dehydrogenase
C.	Complex III	3.	Cytochrome c oxidase
D.	Complex IV	4.	ATP synthase
E.	Complex V	5.	$FADH_2$

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

43. Oncogenic character is seen in
(1) E. coli (2) pBR322
(3) T_i plasmids (4) R_i plasmids

44. Calvin cycle takes place in
(1) Only C_3 plant
(2) Only C_4 plant
(3) Both C_3 and C_4 plant
(4) Neither C_3 and C_4 plant

45. 'E' is



(1) Amp^R gene (2) tet^R gene
(3) $Chlor^R$ gene (4) Eco^R gene

ZOOLOGY

46. Protective components of food are
(1) Minerals, vitamins and water
(2) Minerals, carbohydrate and proteins
(3) Minerals, carbohydrate and fats
(4) Vitamins, water and carbohydrate

47. Which of the following is not an adaptation for cross pollination ?
(1) Self-sterility (2) Heterostyly
(3) Dichogamy (4) Cleistogamy

48. Birth canal is formed by
(1) Cervical canal + Uterus
(2) Cervical canal + Vagina
(3) Cervical canal + Isthmus
(4) Cervical canal + Fallopian tube

49. A moderately active person requires energy per day
(1) 2000 kcal (2) 1000 kcal
(3) 750 kcal (4) 2500 kcal

50. Which of the following statement is not true about blood pressure?
(1) Blood pressure is measured with an instrument called sphygmomanometer
(2) If the blood pressure of an individual is 140/90 mm Hg or higher, it shows hypertension
(3) The normal systolic pressure is 120 mm Hg and diastolic pressure is 80 mm Hg.
(4) Hypertension is caused by vasodilation which results in increased resistance to blood flow

51. The part of human brain located between thalamus/ hypothalamus and pons is
(1) Forebrain (2) Midbrain
(3) Hindbrain (4) Vestibular apparatus

52. Match Column-I with Column-II and select the correct option from the codes given below.

Column-I	**Column-II**
A. Plant virus	(i) Kuru disease
B. Animal Virus	(ii) Potato Spindle Tuber
C. Viroids	(iii) Polio
D. Prions	(iv) Tobacco mosaic virus

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

53. The lower membrane of the scala vestibuli is the
(1) Tympanic membrane (2) Reissner's membrane
(3) Basilar's membrane (4) Tectorial membrane

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

55. Arrange the following in the order of increasing volume.
1. Tidal volume
2. Residual volume
3. Expiratory reserve volume
4. Inspiratory reserve volume
(1) 1 < 2 < 3 < 4 (2) 1 < 4 < 3 < 2
(3) 1 < 3 < 2 < 4 (4) 1 < 4 < 2 < 3

56. Which of the following is an incorrect statement about filtration ?
(1) Selective process
(2) Non-selective process
(3) Performed by glomerulus
(4) It occurs through the usage of capillary (glomerulus) blood pressure.

57. Our lung removes how much CO_2 per minute from the body?
(1) 10 ml (2) 200 ml
(3) 400 ml (4) 2000 ml

58. Tetany is due to
(1) Low Ca^{2+} in body fluid
(2) High Ca^{2+} in body fluid
(3) High concentration of uric acid in body fluid
(4) All of these

59. Articulation of the atlas with the axis is an example of
(1) Hinge joint (2) Ball and socket joint
(3) Gliding joint (4) Pivot joint

60. The functional unit of the contractile system in the striped muscle is
(1) Z-band (2) A-band
(3) Myofibril (4) Sarcomere