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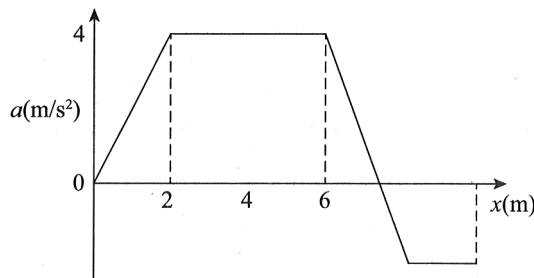
PRABAL TEST PAPER

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

PHYSICS

01. The graph shows the acceleration of a 3 kg particle as an applied force moves it from rest along x-axis. The total work done by the force on the particle by the time the particle reaches x = 6 m is equal to

(1) 20 J   (2) 30 J   (3) 40 J   (4) 60 J

02. Statement-I : Beam of electron contains wave nature.
Statement-II : The above fact is discovered by davission-Germar.
(1) S-I is false, S-II is true
(2) S-I is true, S-II is false
(3) S-I is true, S-II is true
(4) S-I is false, S-II is false

03. A ring of mass M and radius R lies in x-y plane with its centre at origin as shown. The mass distribution of ring is non uniform such that, at any point P on the ring, the mass per unit length is given by $\lambda = \lambda_0 \cos^2\theta$ (where λ_0 is a positive constant). Then the moment of inertia of the ring about z-axis is:
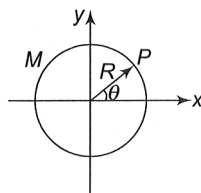

(1) MR^2 (2) $\dfrac{1}{2}MR^2$ (3) $\dfrac{1}{2}\dfrac{M}{\lambda_0}R$ (4) $\dfrac{1}{\pi}\dfrac{M}{\lambda_0}R$

04. 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
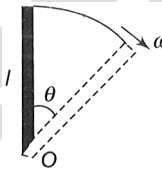
(1) $\sqrt{\dfrac{3g}{l}}\ \sin(\theta/2)$ (2) $\sqrt{\dfrac{6g}{l}}\ \sin(\theta/2)$

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

05. For the series LCR circuit shown in the figure, what is the resonance frequency and the amplitude of the current at the resonating frequency
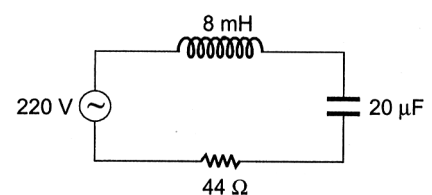
(1) 2500 rad-s^{-1} and $5\sqrt{2}$ A

(2) 2500 rad-s^{-1} and 5A

(3) 2500 rad-s^{-1} and $\dfrac{5}{\sqrt{2}}$ A

(4) 25 rad-s^{-1} and $5\sqrt{2}$ A

06. Electric charge is uniformly distributed along a along straight wire of radius 1 mm. The charge per centimetre length of the wire is Q coulomb. Another cylindrical surface of radius 50 cm and length 1 m symmetrically encloses the wire as shown in Fig. The total electric flux

passing through the cylindrical surface is
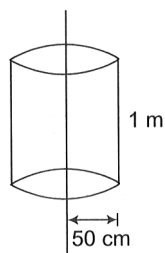
(1) $\dfrac{Q}{\varepsilon_0}$ (2) $\dfrac{100Q}{\varepsilon_0}$ (3) $\dfrac{10Q}{\pi\varepsilon_0}$ (4) $\dfrac{100Q}{\pi\varepsilon_0}$

07. Electric potential at any point is $V = -5x + 3y + \sqrt{15}z$, then the magnitude of the electric field is

(1) $3\sqrt{2}$ (2) $4\sqrt{2}$ (3) $5\sqrt{2}$ (4) 7

08. A battery consists of a variable number n of identical cells having internal resistance connected in parallel. The terminals of the battery are short circuited and the current I measured. Which one of the graph below shows the correct relationship between I and n?
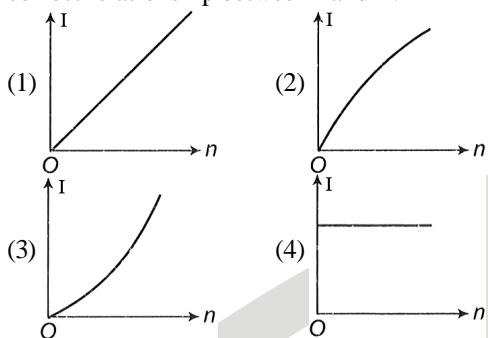
09. A student plotted the following four graphs representing the variation of velocity of sound in a gas with the pressure p at constant temperature. Which one is correct?
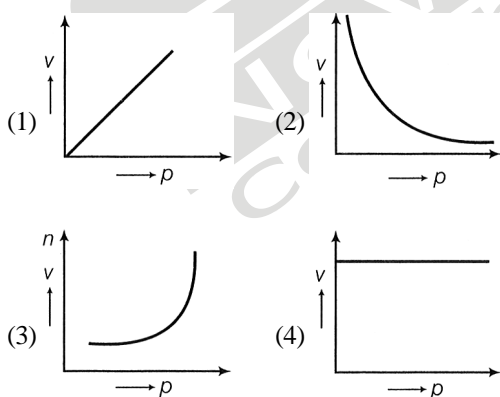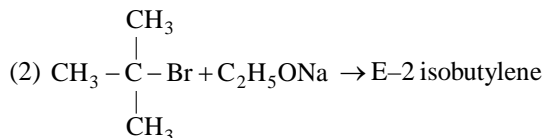

10. A myopic adult has a far point at 0.1 m. His power of accomodation is 4 diopters. Find power of lenses are required to see distant objects

(1) 50 D (2) 20 D
(3) -10 D (4) None of these

CHEMISTRY

11. Incorrect match is:
(1) $CH_3 - Cl + C_2H_5ONa \rightarrow$ Williamson's synthesis of ether

(2) $CH_3 - \overset{\overset{\displaystyle CH_3}{|}}{\underset{\underset{\displaystyle CH_3}{|}}{C}} - Br + C_2H_5ONa \rightarrow$ E–2 isobutylene

(3) $2CH_3 - Br \xrightarrow{2Na/Dry\ ether}$ Wurtz reaction $CH_3 - CH_3$

(4) $CH_3 - CH_2 - Cl + NaI \xrightarrow{Dry\ Acetone} CH_3{-}CH_2{-}I$ Swartz reaction

12. Correct match is
(1) $C_6H_5COCl \xrightarrow{H_2/Pd/BaSO_4}$ Rosenmund reaction
(2) $CH_3 - C \equiv C - CH_3 \xrightarrow{H_2/Pd/C}$ Trans But–2–ene

(3) $\xrightarrow{Cu/HCl}$ Sand meyer reaction

(4) $CH_3 - CH_2 - Cl + C_2H_5ONa \longrightarrow$ Cannizaro reaction

13. How many types of aldol condensation products will be obtained when

 $C - CH_2 - CH_3$ and $CH_3 - CH_2 - CH = O$ reacts

with NaOH and Heat.
(1) 6 (2) 4 (3) 5 (4) 3

14. Which one is not aromatic?
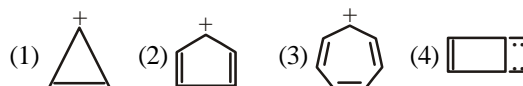
15. $C_2H_5OH \xrightarrow{P.C.C.} A \xrightarrow[Zn+H_2O]{CH_3MgBr} B \xrightarrow{K_2Cr_2O_7/H^+} C$, C is?

(1) $CH_3 - \underset{\underset{\displaystyle CH_3}{|}}{CH} - OH$ (2) CH_3OH

(3) $CH_3 - CH = O$ (4) $CH_3 - \overset{\overset{\displaystyle }{\|}}{\underset{\underset{\displaystyle O}{}}{C}} - CH_3$

16. Henry's law constants of He, N_2 and O_2 gases respectively are 144.97, 76.48 and 34.86 kbar then correct order of solubility of gases under identical condition is
(1) $He > N_2 > O_2$ (2) $He > O_2 > N_2$
(3) $O_2 > N_2 > He$ (4) $O_2 > He > N_2$

17. Which one of the following condition will favour maximum formation of the product in the reaction at equilibrium
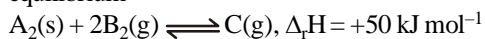
$A_2(s) + 2B_2(g) \rightleftharpoons C(g)$, $\Delta_r H = +50 \text{ kJ mol}^{-1}$
(1) High temperature
(2) Low pressure
(3) Adding more A_2
(4) Adding more C

18. Which of the following acid is strongest?
(1) HA($pK_a = 3.7$)   (2) HB ($pK_a = 4.1$)
(3) HC ($pK_a = 2.7$)   (4) HD ($pK_a = 4.7$)

19. In a first order reaction $A \longrightarrow B$, if k is rate constant and initial concentration of the reactant A is 0.5M, then the half-life is :
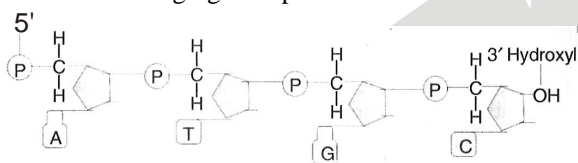
(1) $\dfrac{0.693}{k}$ (2) $\dfrac{0.693}{0.5k}$ (3) $\dfrac{\log 2}{k}$ (4) $\dfrac{\log 2}{k\sqrt{0.5}}$

20. On electrolysis of NaCl(aq) using Pt electrodes product obtained at cathode will be
(1) $Cl_2(g)$ (2) $Na(s)$
(3) $H_2(g)$ (4) $O_2(g)$

BOTANY

21. The following figure represents

(1) A polypeptide chain
(2) A polysaccharide chain
(3) A polynucleotide chain
(4) A polynucleoside chain

22. Escherichia coli with completely radioactive DNA was allowed to replicate in non-radioactive medium for two generations. Percentage of bacteria with radioactive DNA is
(1) 100%   (2) 50%   (3) 25%   (4) 12.5%

23. Genotype of F_1 individuals can be tested by
(1) Backcross with homozygous recessive parent
(2) Reciprocal crossing
(3) Backcrossing with heterozygous parent
(4) Backcrossing with homozygous dominant parent

24. Given below are some statements.
I. RuBisCO binds better with CO_2 when $CO_2 : O_2$ is nearly equal.
II. Carboxylation of RuBP results in 3 molecules of 3-carbon compound phosphoglycerate.
III. In photorespiration, one less PGA is produced in C_3 plants.

IV. Plastoquinone and plastocyanin are important pigments present in bacterial cells.
V. Chemiosmosis required a membrane, a proton pump, a proton gradient and ATP synthase.
Choose the most appropriate answer showing the correct statements from the options given below.
(1) I, II, IV and V   (2) II, III and V
(3) I, III and V   (4) I, II and IV

25. Match List-I with List-II.

	List-l		List-II
A.	Charles Darwin	i.	Oat seedlings
B.	E. Kurosawa	ii.	Crystallised Kinetin
C.	Miller et al.	iii.	Gibberellins
D.	F.W. Went	iv.	Phototropism

Choose the correct answer from the options given below.
(1) A–I, B–II, C–IV, D–III
(2) A–IV, B–III, C–II, D–I
(3) A–IV, B–II, C–III, D–I
(4) A–III, B–IV, C–II, D–I

26. Which of the following statements regarding the estimates of number of species found on earth is not correct?
(1) Total number of species present on earth are considered to be about 7 million as estimated by Robert May.
(2) Plants constitute more than 70% of all the species recorded, whereas animals constitute less than 22% of the total number of species.
(3) Insects constitute more than 70% of all the animal species.
(4) None of these

27. Percentage of photosynthetically active radiation (PAR) available to plants in the total incident solar radiation is
(1) 1 – 5%   (2) 2 – 10%
(3) less than 50%   (4) approx. 100%

28. Study the age pyramids given below and select the correct statements regarding these.
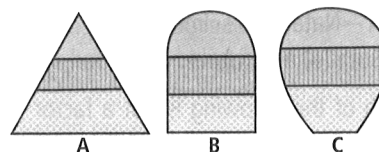
(1) A is a triangular age pyramid, where pre-reproductive stage is very large as compared to the reproductive and small than post-reproductive stages of the population. This type of age structure indicates that the population would increase rapidly.
(2) B is an inverted bell shaped age pyramid, where number of pre-reproductive and reproductive individuals is not equal. This type of age structure indicates that the population is stable.
(3) C is an urn shaped age pyramid, where more number of reproductive individuals are present. This type of age structure indicates that the population is declining.
(4) All of these

29. Select the mismatched pair.
(1) W.M. Stanley - Viruses could be crystallised
(2) D.J. Ivanowsky - Coined term virus
(3) M.W. Beijerinck - Extract of the infected plants of tobacco cause infection in healthy plants
(4) None of these

30. The stage of mitosis by which condensation of chromosomes is completed, also shows all the following features, except
(1) Chromosomes can be observed clearly under the microscope
(2) Spindle fibres attach to kinetochores of chromosomes
(3) Nucleolus, Golgi complex and ER reform
(4) Chromosomes come to lie at the equator

31. Select the correct statement
(a) RNA polymerase I transcribes rRNAs
(b) RNA polymerase II transcribes snRNA
(c) RNA polymerase III transcribes hnRNA
(d) RNA polymerase II transcribes hnRNA
(1) (a) and (d) are correct
(2) (b) and (c) are correct
(3) (a) and (b) are correct
(4) (a) and (c) are correct

32. Assume that genes a and b are linked and show 40% recombination. If $++/++$ individual is crossed with ab/ab, then types and proportions of gametes in F_1 will be
(1) $++$ 20% : ab 20% : + b 20% : a + 40%
(2) $++$ 50% : ab 50%
(3) $++$ 25% : ab 25% : + b 25% : a + 25%
(4) $++$ 30% : ab 30% : + b 20% : a + 20%

33. Match Column I with Column II and select the correct option from the given codes.

	Column I		Column II
A.	Gross primary productivity	(i)	Self-sustainable ecosystem
B.	Net primary productivity	(ii)	Terrestrial ecosystem
C.	Pond	(iii)	O_2 requiring process
D.	Crop field	(iv)	Photosynthetic production
E.	Decomposition	(v)	Available to secondary consumers

(1) A–(iv), B–(ii), C–(i), D–(iii), E–(v)
(2) A–(iv), B–(v), C–(i), D–(ii), E–(iii)
(3) A–(i), B–(iii), C–(ii), D–(iv), E–(v)
(4) A–(ii), B–(i), C–(iii), D–(v), E–(iv)

34. Match the following Column-I with Column-II and choose the correct option.

	Column-I		Column-II
A.	Compositae	(i)	Br or Ebr $\oplus \female$ Epi$_{5-7}$ K$_{(5)}$ C$_5$ A$_{(\infty)}$ $\underline{G}_{(5)}$
B.	Gramineae	(ii)	$\oplus \female$ K$_{2+2}$ C$_4$ A$_{2+4}$ $\underline{G}_{(2)}$
C.	Malvaceae	(iii)	% $\female$ P$_{2-3 \text{ (lodicule)}}$ A$_3$ $\underline{G}_1$
D.	Cruciferae	(iv)	Br $\oplus \female$ K$_{\text{absent/Pappus}}$ C$_{(5)}$ A$_5$ $\overline{G}_{(2)}$

	A	B	C	D
(1)	(II)	(I)	(IV)	(III)
(2)	(IV)	(III)	(I)	(II)
(3)	(III)	(I)	(II)	(IV)
(4)	(IV)	(III)	(II)	(I)

35. Consider the two statements:
Statement I: Besides flagella, Pili and Fimbriae are also surface structures of the bacteria but do not play a role in motility.
Statement II: Pili and fimbriae help attach the bacteria to rocks in streams and also to the host tissues.
(1) Statement I is correct; Statement II is correct
(2) Statement I is correct; Statement II is incorrect
(3) Statement I is incorrect; Statement II is correct
(4) Statement I is incorrect; Statement II is incorrect

ZOOLOGY

36. Which of the following are amphibians?
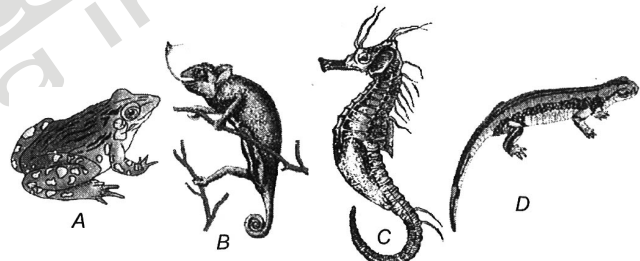
(1) A and C
(2) B and D
(3) C and D
(4) A and D

37. Which of the following statements are true
I. Mollusca possess cellular level of organisation.
II. Arthropoda are true coelomates.
III. Platyhelminths are pseudocoelomates.
IV. Ctenophora have bilateral symmetry.
Choose the correct option.
(1) I and II are True
(2) Only II is True
(3) I and IV are True
(4) II, III and IV are True

38. Select the correct statements with reference to chordates.
A. Presence of mid-dorsal, solid and double nerve cord.
B. Presence of closed circulatory system
C. Presence of paired pharyngeal gillslits
D. Presence of dorsal heart
E. Triploblastic pseudocoelomate animals

Choose the correct answer from the options given below
(1) B and C only (2) B, D and E only
(3) C, D and E only (4) A, C and D only

39. Statocysts are the
(1) Lateral locomotory appendages in annelids
(2) Suckers present in parasitic platyhelminthes
(3) Balancing organs in arthropods
(4) Stinging capsules in cnidarians

40. Read the following statements carefully and select the correct option.
I. The medulla is connected to the spinal cord.
II. Medulla contains controlling centres for respiration, cardiovascular reflexes and gastric secretion.
III. Cerebellum has very convoluted surface in order to provide the additional space for more neurons.
(1) Only I (2) I and III
(3) Only III (4) I, II and III

41. Frog has
(1) 4 digit in forelimb and 5 digit in hind limb
(2) 5 digit in forelimb and 5 digit in hind limb
(3) 5 digit in forelimb and 4 digit in hind limb
(4) 6 digit in forelimb and 5 digit in hind limb

42. Fill in the blanks.
I. An antiviral protein called .... is released by .... infected cells.
II. .... immunity is also known as inborn immunity.
III. .... in the stomach prevent microbial growth.
Choose the correct option.

	I	II	III
(1)	interferon; virus	passive	acid
(2)	interferon; virus	innate	acid
(3)	antibody; bacteria	active	acid
(4)	antibody; virus	acquired	hormone

43. Which match(es) is/are incorrect?
(a) Spermatogonium 46 chromosomes
(b) Spermatid 46 chromosomes
(c) Sperm 23 chromosomes
(d) Secondary spermatocyte 23 chromosomes
(1) Only (b) (2) (a), (b) and (c)
(3) (c) and (d) (4) (a), (b), (c) and (d)

44. Full form of RCH is
(1) reproduction and contraception hazard.
(2) reproductive and child health care.
(3) research and care development.
(4) reproductive community health centre.

45. Select the incorrect statement with respect to Green Revolution.
(1) Succeeded in quadrupling the food supply
(2) Increase was insufficient to feed the growing human population
(3) Increased yields could be attributed to improved crop varieties
(4) Use of agrochemicals contributed to enhanced yields

46. Which one of the following statement is incorrect?
(1) Primary metabolites have indefinable functions.
(2) Some secondary metabolites have ecological importance.
(3) Secondary metabolites like rubber, drugs, spices and pigments are useful for human welfare.
(4) Secondary metabolites are not found in fungi, microbes and plants.

47. Match the following columns.

Column I		Column II	
A.	Ancylostoma	1.	Hookworm
B.	Wuchereria	2.	Filaria worm
C.	Ascaris	3.	Roundworm
D.	Fasciola	4.	Liver fluke
		5.	Flatworms

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

48. Which one of the following diseases is caused due to helminth infection?
(1) Ascariasis (2) Wuchereriasis
(3) Both (1) and (2) (4) None of these

49. Which of the following statements about enzymes are true?
(a) Enzymes are proteins whose three-dimensional shape is key to their functions.
(b) Enzymes speed up reactions by lowering activation energy.
(c) Enzymes are not specific for reactions.
(d) Enzyme activity can be affected by change in temperature and pH.
(1) All except (b) (2) All except (a)
(3) All except (c) (4) All of these

50. During inspiration, the volume of thoracic cavity increases because of
(1) contraction of diaphragm and external intercostal muscles.
(2) relaxation of diaphragm and external intercostal muscles.
(3) contraction of diaphragm and relaxation of external intercostal muscles.
(4) relaxation of diaphragm and contraction of external intercostal muscles.