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SKD New Standard Coaching Institute
39 YEARS OF TEACHING EXCELLENCE
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PRABAL TEST PAPER

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

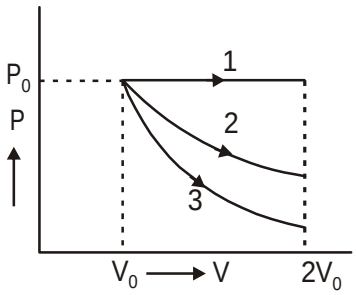
PHYSICS

01. The position of a particle as a function of time t, is given by $x(t) = t^3 - 6t^2 + 35t$. When the particle attains zero acceleration, then its velocity will be
(1) 17 (2) 26
(3) 23 (4) –1

02. A particle is projected with velocity 'v' and at the top most point has velocity $\sqrt{3}\frac{v}{2}$, then find the greatest height of particle.
(1) $\frac{v^2}{8g}$ (2) $\frac{v^2}{4g}$ (3) $\frac{v^2}{2g}$ (4) $\frac{v^2}{g}$

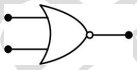
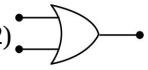
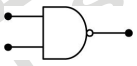
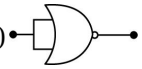
03. A ball is suspended by a thread from the ceiling of a tram car. The brakes are applied and the speed of the car changes uniformly from 45 Km h^{-1} to zero in 5 s. The angle by which the ball deviates from the vertical is ($g = 10\ ms^{-2}$)
(1) $\tan^{-1}\left(\frac{1}{2}\right)$ (2) $\tan^{-1}\left(\frac{1}{3}\right)$
(3) $\tan^{-1}\left(\frac{1}{4}\right)$ (4) none of these

04. A gas is expanded from volume V_0 to $2V_0$ under three different processes. In figure process 1 is an isobaric process, process 2 is isothermal and process 3 is adiabatic. Let ΔU_1, ΔU_2 and ΔU_3 be the change in internal energy of the gas in these three processes. Then

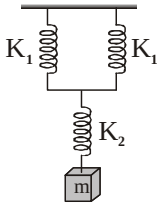


(1) $\Delta U_1 > \Delta U_2 > \Delta U_3$ (2) $\Delta U_1 < \Delta U_2 < \Delta U_3$
(3) $\Delta U_2 < \Delta U_1 < \Delta U_3$ (4) $\Delta U_2 < \Delta U_3 < \Delta U_1$

05. A Carnot's engine working between 300 K and 900 K has a work output of 1200 J per cycle. The amount of heat energy supplied to the engine from the source in each cycle is :
(1) 3200 J (2) 1800 J
(3) 1600 J (4) 2400 J

06. Which of the following gives a reversible operation?
(1)  (2) 
(3)  (4) 

07. What will be the force constant of the spring system shown in the figure ?



(1) $\frac{K_1}{2} + K_2$ (2) $\left[\frac{1}{2K_1} + \frac{1}{K_2}\right]^{-1}$
(3) $\frac{1}{2K_1} + \frac{1}{K_2}$ (4) $\left[\frac{2}{K_1} + \frac{1}{K_2}\right]^{-1}$

08. Two forces F_1 and F_2 are applied on two rods P and Q of same materials such that elongation in rods are same. If ratio of their radii is x : y and ratio of length is m : n, then ratio of $F_1 : F_2$ is
(1) $\left(\frac{y}{x}\right)^2 \cdot \frac{n}{m}$ (2) $\left(\frac{x}{y}\right)^2 \cdot \frac{n}{m}$

(3) $\left(\frac{x}{y}\right)^2 \cdot \frac{m}{n}$ (4) $\left(\frac{y}{x}\right)^2 \cdot \left(\frac{m}{n}\right)$

09. Two-point charge +Q and +q are separated by a certain distance.
If +Q < +q then in between the charges the electric field is zero at a point.
(1) Closer to +Q
(2) Closer to +q
(3) Exactly at the mid-point of line segment joining +Q and +q
(4) No where on the line segment joining +Q and +q

10. A charge $Q = 10^{-6}$ C is placed at origin. Find the potential difference between two points A and B whose position vectors are $(\sqrt{3}\hat{i} + \sqrt{3}\hat{j})$ m and $(\sqrt{6}\hat{j})$ m respectively.
(1) Zero (2) 1000 volts
(3) 2000 volts (4) 500 volts

CHEMISTRY

11. Number of degenerate orbitals present in second shell of hydrogen atom is
(1) 2 (2) 3 (3) 4 (4) 5

12. Consider the following E° values, $E^o_{Fe^{3+}/Fe^{2+}} = +0.77\,V$, $E^o_{Sn^{2+}|Sn} = -0.14\,V$ .The E°_{cell} for the reaction:
$Sn_{(s)} + 2Fe^{3+}_{(aq.)} \rightarrow 2Fe^{2+}_{(aq.)} + Sn^{2+}_{(aq.)}$ is
(1) 0.63 V (2) 1.40 V
(3) 0.91 V (4) 1.68 V

13. In the following reaction,
$C_6H_5NH_2 + CHCl_3 \xrightarrow{3KOH} A + 3B + 3C$
The product A is:
(1) phenyl isocyanide (2) phenyl cyanide
(3) ethylene chloride (4) chlorobenzene

14. The formation of cyanohydrin from a ketone is an example of:
(1) electrophilic addition
(2) nucleophilic addition
(3) nucleophilic substitution
(4) electrophilic substitution

15. Among the following compounds which can be dehydrated very easily?
(1) $CH_3CH_2CH_2CH_2CH_2OH$
(2) $CH_3CH_2CH_2\underset{\displaystyle OH}{\underset{|}{C}}HCH_3$
(3) $CH_3CH_2-\underset{\displaystyle CH_3}{\underset{|}{\overset{\displaystyle OH}{\overset{|}{C}}}}-CH_2CH_3$
(4) $CH_3CH_2\underset{\displaystyle CH_3}{\underset{|}{C}}HCH_2CH_2OH$

16. Chlorination of toluene in presence of light and heat followed by treatment with aqueous NaOH gives:
(1) o-cresol
(2) p-cresol
(3) 2 : 4 dihydroxytoluene
(4) benzylalcohol

17. $CH_3-CH_2-\underset{\displaystyle Cl}{\underset{|}{C}}H-CH_3$ obtained by chlorination of n-butane will be:
(1) meso form (2) racemic mixture
(3) d-form (4) *l*-form

18. If 20 mL of 0.1 M NaOH is added to 30 mL of 0.2 M CH_3COOH (pK_a=4.74), the pH of the resulting solution is
(1) 5.03 (2) 4.43
(3) 8.96 (4) 9.26

19. 0.004 M Na_2SO_4 is isotonic with 0.01 M glucose. Degree of dissociation of Na_2SO_4 is:
(1) 75% (2) 50%
(3) 25% (4) 85%

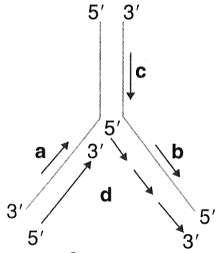
20. The compound which gives the most stable carbonium ion on dehydration is:
(1) $(CH_3)_2CH-CH_2OH$
(2) $CH_3CH_2CH_2CH_2OH$
(3) $CH_3-CH(OH)-CH_2CH_3$
(4) $(CH_3)_3C-OH$

BOTANY

21. In dihybrid cross, out of 16 plants obtained in F_2 generation, the number of genotypes will be
(1) 4 (2) 9
(3) 16 (4) 12

22. In Mendelian dihybrid cross, how many of progeny in F_2 generation possess genotype rryy?
(1) $\frac{1}{16}$ (2) $\frac{2}{16}$
(3) $\frac{3}{16}$ (4) $\frac{4}{16}$

23. What is indicated by 'C' in the figure?



(1) Continuous synthesis
(2) Newly synthesized discontinuous strands
(3) Template DNA
(4) Parental strand of DNA

24. Predominate method for control of gene expression in prokaryote is
(1) Transcriptional level
(2) Translational lavel
(3) Splicing lavel
(4) Translocation of m-RNA

25. Human Genome project was a X year long project starting from Y to Z.
(1) X = 13, Y = 1980, X = 1993
(2) X = 12, Y = 1990, Z = 2002
(3) X = 13, Y = 1990, Z = 2003
(4) X = 14, Y = 1990, Z = 2004

26. In pteridophytes and gymnosperms, which cells are present in the place of companion cell?
(1) Sclereids (2) Albuminous cells
(3) Idioblasts (4) None of these

27. Select the correct sequence of true and false statements from the following.
(1) Epidermis is usually single-layered.
(2) Epidermal cells are parenchymatous cells with abundant cytoplasm.
(3) Vessel members of xylem are interconnected through perforation in their common walls.
(4) Sclerenchyma provides mechanical support to organs.
(1) TTTT (2) TFFT (3) TFTT (4) FFTT

28. How much percentage of energy is released in fermentation?
(1) < 1% (2) < 7% (3) > 10% (4) > 20%

29. Exponential growth can be expressed as
(1) $W_1 = W_0e^{rt}$ (2) $W_0 = W_1e^{rt}$
(3) $W_1 = W_0e^{\Delta rt}$ (4) $L_o = L_t + rt$

30. An important criterion for modern day classification is
(1) Resemblances in morphology
(2) Anatomical and physiological traits
(3) Breeding habits
(4) Presence or absence of notochord

31. Which one of the following is a wrong matching of a microbe and its industrial product, while the remaining three are correct?
(1) Yeast - Statins
(2) Acetobacter aceti - Acetic acid
(3) Clostridium butylicum - Lactic acid
(4) Aspergillus niger - Citric acid

32. Seeds are regarded to be the product of sexual reproduction because they
(1) can be stored for a long period.
(2) give rise to new plants.
(3) are the result of fusion of male gamete with the female gamete.
(4) None of these

33. What is common between Chloroplasts, Chromoplasts and Leucoplasts?
(1) Presence of pigments
(2) Possession of thylakoids and grana
(3) Storage of starch, proteins and lipids
(4) Ability to multiply by a fission-like process

34. Match the following and choose the correct option.

	Column-I		Column-II
A.	Chromosomes are moved to spindle equator	I.	Pachytene
B.	Centromere splits and chromatids apart	II.	Zygotene
C.	Pairing between homologous chromosomes takes place	III.	Anaphase
D.	Crossing between homologous chromosomes	IV.	Metaphase

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

35. What is the function of the filiform apparatus present at the entrance of ovule?
(1) It helps in the entry of pollen tube into a synergid.
(2) It prevents entry of more than one pollen tube into the embryo sac.
(3) It brings about opening of the pollen tube.
(4) It guides pollen tube from a synergid to egg.

ZOOLOGY

36. External genitalia develops in the ..... of development
(1) 2nd month (2) 5th month
(3) 3rd month (4) 1st month

37. During which phase of the pregnancy MTP is safe?
(1) 1st trimester (2) 2nd trimester
(3) 3rd trimester (4) 4th trimester

38. Crystalline protein synthesised by Bacillus thuringiensis is activated by
(1) acidic conditions of bacterial food vacuole.
(2) alkaline pH of bacterial food vacuole.
(3) acidic pH in insect fore-gut.
(4) alkaline pH in insect mid-gut.

39. Match List-I with List-II.

	List-I		List-II
A.	Ichthyosaurus	I.	Caught in South Africa in 1938
B.	Coelacanth	II.	Fell of form coal deposits
C.	Giant pteridophytes	III.	Disappeared in cretaceous period
D.	Dinosaurs	IV.	Fish-like reptiles in 200 mya

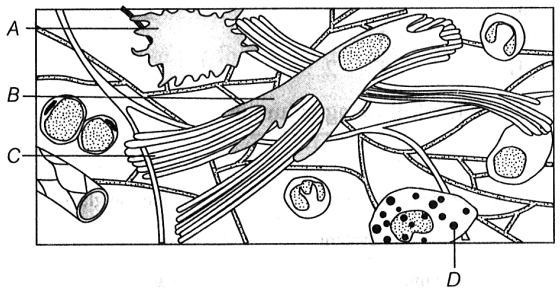
(1) A-III, B-II, C-I, D-IV (2) A-IV, B-I, C-II, D-III
(3) A-II, B-III, C-IV, D-I (4) A-III, B-IV, C-II, D-I

40. Which of the following can activate the chemosensitive area situated adjacent to the rhythm centre?
(1) High CO_2 concentration, less hydrogen ion concentration
(2) High CO_2 and high hydrogen concentration
(3) Less CO_2 and high H^+ ion concentration
(4) Less CO_2 and less H^+ ion concentration

41. Coccygeal bone is formed by the fusion of _____ bones in man.
(1) 3 vertebrae (2) 6 vertebrae
(3) 5 vertebrae (4) 4 vertebrae

42. Which one of the following statements is totally wrong about the occurrence of notochord, while the other three are correct?
(1) It is present in larval tail in ascidia
(2) It is replaced by a vertebral column in adult frog
(3) It is absent throughout life in humans from the very beginning
(4) It is present throughout life in Amphioxus

43. Given below is the diagrammatic sketch of a certain type of connective tissue. Identify the parts labelled A, B, C and D and select the right option about them.



	Part A	Part B	Part C	Part D
(1)	Macrophage	Fibroblast	Collagen fibres	Mast cell
(2)	Mast cell	Macrophage	Fibroblast	Collagen fibres
(3)	Macrophage	Collagen fibres	Fibroblast	Mast cell
(4)	Mast cell	Collagen fibres	Fibroblast	Macrophage

44. The inner parts of cerebral hemispheres and a group of associated deep structures like amygdala, hippocampus, etc., form a complex structure called
(1) arbor vitae
(2) limbic lobe/limbic system
(3) corpora quadrigemina
(4) reticular system

45. Choose the statements which correctly indicates the functioning of thyroid hormones.
I. Regulation of the basal metabolic rate.
II. Support the process of RBC formation.
III. Regulating the blood calcium levels.
IV. Maintenance of water and electrolyte balance.
The correct option is
(1) I, II and IV (2) I and II
(3) I, II, III and IV (4) III and IV

46. Which one of the following pairs of diseases are viral as well as transmitted by mosquitoes?
(1) Elephantiasis and dengue fever
(2) Malaria and yellow fever
(3) Ringworm and dengue fever
(4) Chikungunya and dengue fever

47. Consider the following statements.
I. Opioids are the drugs, which bind to opioid receptors in the central nervous system and gastrointestinal tract.
II. Heroin is a white, odourless, bitter, crystalline compound.
III. Heroin is commonly called smack.
Which of the statements given above are correct?
(1) I and II (2) I and III
(3) II and III (4) I, II and III

48. Choose the correct option for the chromosomal disorders
I. Colour blindness II. Down's syndrome
III. Phenylketouria IV. Turner's syndrome
V. Thalassaemia
(1) I, II and III (2) II, IV and Vcare
(3) III, IV and V (4) II and IV

49. Identify the incorrect statements.
I. Each kidney has a notch on its inner convex surface side called hilum through which ureter, blood vessels and nerves enter.
II. Around 99 per cent of the glomerular filtrate has to be reabsorbed by the renal tubules through the process called reabsorption.

III. The ascending limb of loop of Henle is permeable to water, but allows transport of electrolytes actively or passively.
IV. An increase in body fluid volume can switch on the osmoreceptors and promote the ADH release. (1) I, III and IV (2) I and III
(3) I and IV (4) I, II and IV

50. Consider the following four statements (I-IV) regarding kidney transplant and select the correct ones out of these.
I. Even if a kidney transplant is proper the recipient may need to take immunosuppressant for a long time.
II. The cell mediated immune response is responsible for the graft rejection.
III. The B-lymphocytes are responsible for rejection of the graft.
IV. The acceptance or rejection of a kidney transplant depends on specific interferons.
The two correct statement are
(1) II and III (2) III and IV
(3) I and III (4) I and II

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