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SAKSHAM TEST PAPER

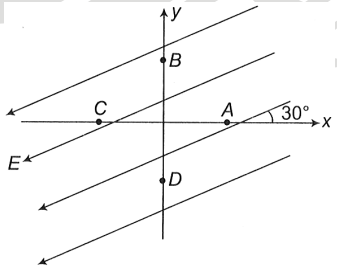
Time : 1 : 00 Hr. **Question : 50**

PHYSICS

01. A ball of mass m is moving normally towards a wall of mass M(>> m) with a velocity 4 m/s. The wall is also moving. After striking elastically with the wall, velocity of ball becomes 8 m/s. Find the speed of the wall:
(1) 4 m/s (2) 2 m/s
(3) $2\sqrt{2}$ m/s (4) $4\sqrt{2}$ m/s

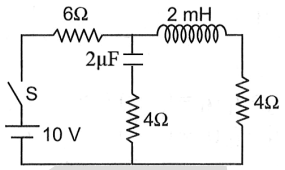
02. In order to shift a body of mass m from a circular orbit of radius 3R to a higher orbit of radius 5R around the Earth, the work done is
(1) $\frac{3GMm}{5R}$ (2) $\frac{GMm}{2R}$
(3) $\frac{2}{15}\frac{GMm}{R}$ (4) $\frac{GMm}{5R}$

03. There exists a uniform electric field in the space as shown. Four points A, B, C and D are marked which are equidistant from the origin. If V_A, V_B, V_C and V_D are their potentials respectively, then



(1) $V_B > V_A > V_C > V_D$
(2) $V_A > V_B > V_D > V_C$
(3) $V_A = V_A > V_C = V_D$
(4) $V_B > V_C > V_A > V_D$

04. In the given circuit, let i_1 be the current drawn from battery at time t = 0 and i_2 be steady current at t = ∞ then the ratio $\frac{i_1}{i_2}$ is



(1) 1.0 (2) 0.8
(3) 1.2 (4) 1.5

05. A and B are two samples of silicon. A is doped with phosphorus and B is doped with bismuth, then
(1) Both A and B are p-type crystals
(2) A is p-type and B is n-type crystal
(3) A is n-type and B is p-type crystal
(4) Both A and B are n-type crystal

06. Two polaroids are facing parallel to each other and θ is angle between their axes. When unpolarised beam of intensity I_0 is incident on one of them perpendicular to the plane the intensity of beam emergent from the other is found to be $3I_0/8$;
then θ =
(1) 30° (2) 45°
(3) 60° (4) none of these

07. A man can row a boat with 4 km/hr in still water. He is crossing a river where the speed of current is 2 km/hr. If width of river is 4 km, how long will the man take to cross the river to reach directly opposite of starting point
(1) $\frac{1}{2}$ hr (2) 2 hr
(3) $\frac{2}{\sqrt{3}}$ hr (4) $\frac{\sqrt{3}}{2}$ hr

08. The coefficient of volume expansion for an ideal gas at constant pressure is
(1) $\frac{1}{T}$ (2) $\frac{1}{T^2}$
(3) T (4) T^2

09. Velocity of sound in open-ended tube is 330 ms^{-1}, the frequency of tuning fork is 1.1 kHz and the length of tube = 30 cm. In which harmonic will it oscillate?
(1) 2nd (2) 3rd (3) 4th (4) 5th

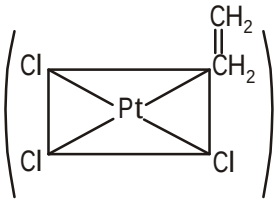
10. In the equation $\left(\frac{1}{p\beta}\right) = \frac{y}{k_B T}$, where p is the pressure, y is the distance, k_B is Boltzmann constant and T is the temperature. Dimensions of β are

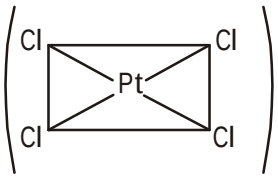
(1) $[M^{-1}L^1T^2]$ (2) $[M^0L^2T^0]$

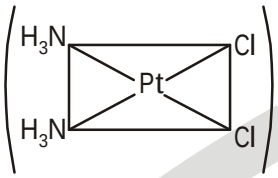
(3) $[M^1L^{-1}T^{-2}]$ (4) $[M^0L^0T^0]$

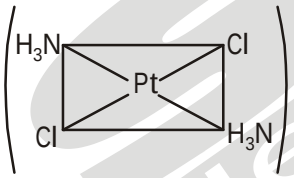
CHEMISTRY

11. Which of the following is considered to be an anticancer species?

(1) 

(2) 

(3) 

(4) 

12. In $Fe(CO)_5$ bond possesses

(1) π–character only

(2) Ionic character

(3) σ–character only

(4) Both σ and π characters

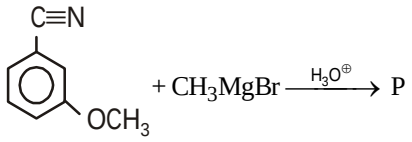
13. Correct increasing order for the wavelengths of absorption in the visible region for the complexes of Co^{3+} is:

(1) $[Co(NH_3)_6]^{3+}$, $[Co(en)_3]^{3+}$, $[Co(H_2O)_6]^{3+}$

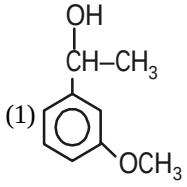
(2) $[Co(en)_3]^{3+}$, $[Co(NH_3)_6]^{3+}$, $[Co(H_2O)_6]^{3+}$

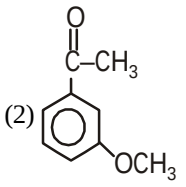
(3) $[Co(H_2O)_6]^{3+}$, $[Co(en)_3]^{3+}$ $[Co(NH_3)_6]^{3+}$

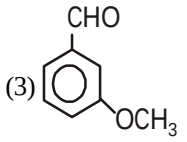
(4) $[Co(H_2O)_6]^{3+}$, $[Co(NH_3)_6]^{3+}$, $[Co(en)_3]^{3+}$

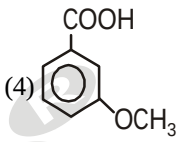
14. 

Product 'P' in the above reaction is

(1) 

(2) 

(3) 

(4) 

15. The correct order of boiling points of the following isomeric amines is

$C_4H_9NH_2$, $(C_2H_5)_2NH$, $C_2H_5N(CH_3)_2$

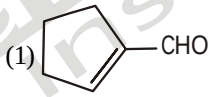
(1) $C_2H_5N(CH_3)_2 > (C_2H_5)_2NH > C_4H_9NH_2$

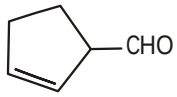
(2) $(C_2H_5)_2NH > C_2H_5N(CH_3)_2 > C_4H_9NH_2$

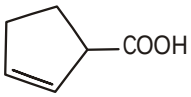
(3) $(C_4H_9)NH_2 > (C_2H_5)_2NH > C_2H_5N(CH_3)_2$

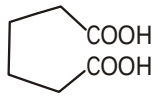
(4) $(C_2H_5)_2NH > C_4H_9NH_2 > C_2H_5N(CH_3)_2$

16. Cyclohexene on ozonolysis followed by reaction with zinc dust and water gives compound E and compound E on further treatment with aqueous KOH yields compound F. Then compound F is

(1) 

(2) 

(3) 

(4) 

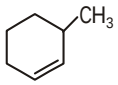
17. The ease of hydrolysis in the compounds

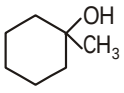
(I) CH_3COCl (II) $CH_3CO—O—COCH_3$

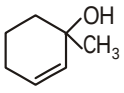
(III) $CH_3COOC_2H_5$ (IV) CH_3CONH_2 is of order

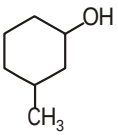
(1) I > II > III > IV (2) IV > III > II > I

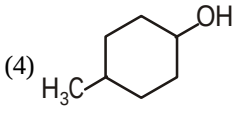
(3) I > II > IV > III (4) II > I > IV > III

18. The major product formed by the acid catalyzed hydration of  is

(1) 

(2) 

(3) 

(4) 

19. Match the species in Column I with the type of hybrid orbitals in Column II and choose the correct option from the codes given below.

	Column-I (Molecule type)		Column-II (Shape)
A.	SF_4	1.	sp^3d^2
B.	IF_5	2.	sp
C.	NO_2^+	3.	sp^3d
D.	NH_4^+	4.	sp^3

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

20. **Assertion:** NO is an acidic oxide while CrO_3 is a basic oxide.
Reason: Oxides of metals are generally basic and oxides of non-metals are generally acidic.
(1) If both assertion and reason are true and the reason is the correct explanation of the assertion.
(2) If both assertion and reason are true but reason is not the correct explanation of the assertion.
(3) If assertion is true but reason is false.
(4) If assertion is false but reason is true.

BOTANY

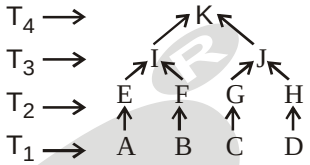
21. A unicellular eukaryotic cell wall containing microbe was collected by a student from rain water. His teacher grouped the organism in ..... kingdom according to Linnaeus system and in ..... kingdom according to Whittaker's system.
(1) Animalia, monera (2) Monera, plantae
(3) Plantae, protista (4) Protista, protista

22. **Assertion :** Careful analysis of records shows that extinctions across taxa are not random
Reason : Amphibians appear to be more vulnerable to extinction.
(1) Both Assertion & Reason are True & the Reason is a correct explanation of the Assertion.
(2) Both Assertion & Reason are True but Reason is not a correct explanation of the Assertion.
(3) Assertion is True but the Reason is False.
(4) Both Assertion & Reason are False.

23. Which one is correct about bivalent ?
(i) Bivalent are tetrads.
(ii) A bivalent means 4 chromatids and 2 centromere.
(iii) One bivalent consists of 2 homologous chromosomes each and sister chromatids.
(iv) Bivalents formation occurs in zygotene.
(1) All of these (2) Only (iii)
(3) (iii) and (iv) (4) Only (iv)

24. Which of the following statements are correct ?
(i) In prokaryotic cells, a special membranous structure formed by the extension of the plasma membrane into the cell is known as polysome.
(ii) The smooth endoplasmic reticulum is the major site for synthesis of glycoproteins.
(iii) RuBisCO is the most abundant protein in the whole biosphere.
(iv) Mitochondria, chloroplasts and peroxisomes are not considered as part of endomembrane system.
Of the above statements
(1) (iii) and (iv) (2) (i) and (ii)
(3) (ii) and (iii) (4) (i) and (iv)

25. What is true for following food web?



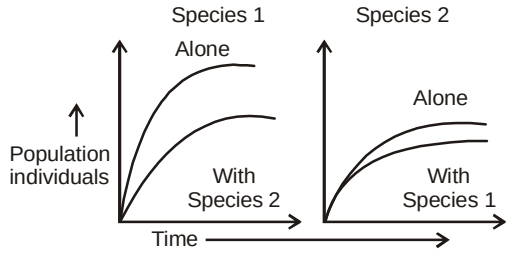
(1) B, C, D, E are primary producers
(2) E, F, G, H are carnivores
(3) K is herbivores
(4) I and J may be predator/ secondary consumer

26. Select the correct statements (i-v) regarding taxonomic categories.
(i) Each step or rank in hierarchy is called taxonomic category.
(ii) Species is a group of individual organisms with fundamental similarities capable of breeding among themselves.
(iii) Taxonomic studies of all unknown organisms have led to the development of common categories like kingdom, phylum or division, class, order, family, genus and species.
(iv) Lower the category, greater is the difficulty of determining the relationship to other taxa at the same level.
(1) (i) & (ii) only (2) (ii) & (iv) only
(3) (c) (i), (ii) & (iii) only (4) All of the above

27. Select the correct statements from the following
(a) Inferior ovary in found in Compositae family
(b) Superior ovary is found in Malvaceae family
(c) Inferior ovary is found in Cucurbitaceae family
(d) Superior ovary is found in Asteraceae family
(1) a and b only (2) a and d only
(3) a, b and c (4) a, c and d

28. The population growth is generally described by dN the following equation : $\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$
What does 'r' represent in the given equation?
(1) Population density at time 't'
(2) Intrinsic rate of natural increase
(3) Carrying capacity
(4) The base of natural logarithm

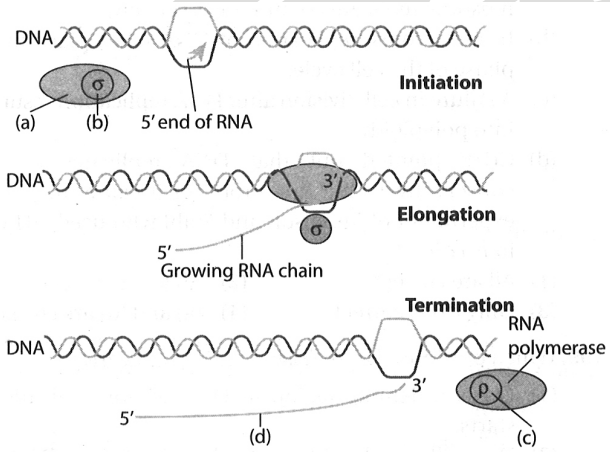
29. In laboratory experiments, two species of the protist Paramecium were grown alone and in the presence of the other species. The following graphs show growth of species 1 (left) and species 2 (right), both along and when in mixed culture.



Interpretation of these graphs shows that
(1) competitive exclusion occurred in these experiments.
(2) both species are affected by interspecific competition but species 1 is less affected.
(3) both species are affected by interspecific competition but species 2 is less affected.
(4) both species are affected equally by interspecific competition.

30. Consider the following statements about organic farming.
(i) It utilizes genetically modified crops like Bt cotton.
(ii) It uses only naturally produced inputs like compost.
(iii) It does not use pesticides and urea.
(iv) It produces vegetables rich in vitamins and minerals.
Which of the above statements are correct?
(1) (ii), (iii) and (iv) (2) (iii) and (iv) only
(3) (ii) and (iii) only (4) (i) and (ii) only

31. The given diagram refers to transcription in prokaryotes. (a), (b), (c) and (d) respectively denotes



(1) DNA polymerase, Sigma factor, Rho factor and RNA
(2) RNA polymerase, Rho factor, Sigma factor and RNA
(3) DNA polymerase, Initiation factor, Rho factor and RNA
(4) RNA polymerase, Sigma factor, Rho factor and RNA

32. If E. coli containing ^{15}N bases was allowed to grow for 60 minutes in a medium ^{14}N containing nitrogenous bases, then what would be the proportions of light and hybrid densities DNA molecule?
(1) 2 light: 6 hybrid (2) 2 light: 2 hybrid
(3) 6 light: 2 hybrid (4) All light: No hybrid

33. In 1953, James Watson and F. Crick proposed double helix model of DNA and got Nobel Prize. Their model of DNA was based on
(a) X-ray diffraction of DNA produced by M. Wilkins and R. Franklin.
(b) Griffith's experiment.
(c) Hershey and Chase experiment.
(d) Chargaff's rule of base equivalence, (A+G)/(T+ C) = 1.
(1) (a) and (d) (2) (a), (b), (c) and (d)
(3) (b), (c) and (d) (4) (a), (b) and (c)

34. True breeding tall and dwarf plants were crossed and total 1000 seeds were obtained in F_2 generation.
Find out the number of seeds which genotypically resemble with F_1 parent.
(1) 250 (2) 500 (3) 750 (4) 900

35. All are true about glycolysis, except
(1) oxygen independent pathway.
(2) it produces one pyruvic acid molecule from each glucose.
(3) it occurs in the cytoplasm of cell.
(4) it can operate by using both glucose and fructose.

ZOOLOGY

36. Temporarily stopage of menstruation is due to:
(1) Fall in level of progesterone
(2) Increase in level of progesterone
(3) Increase in level of FSH
(4) Fall in level of estrogen

37. What is the method of create awareness among the people about reproduction-related aspects?
(1) With the help of audio-visual and the print media
(2) With the help of parents, other close relatives, teachers and friends
(3) Introduction of sex education in schools
(4) All are correct

38. A contraceptive pill prevents ovulation by:
(1) Blocking fallopian tube
(2) Inhibiting release of FSH and LH
(3) Stimulating release of FSH and LH
(4) Causing immediate degeneration of released ovum

39. Restriction endonucleases:
(1) Are synthesized by bacteria as part of their defense mechanism
(2) Are present in mammalian cells for degradation of DNA when the cell dies
(3) Are used in genetic engineering for ligating two DNA molecules
(4) Are used for in vitro DNA synthesis

40. **Statement I:** Restriction endonucleases recognise specific sequence to cut DNA known as palindromic nucleotide sequence.
Statement II: Restriction endonucleases cut the DNA strand a little away from the centre of the palindromic site.
In the light of the above statements, choose the most appropriate answer from the options given below:
(1) Statement I is correct but Statement II is incorrect.
(2) Statement I is incorrect but Statement II is correct.
(3) Both Statement I and Statement II are correct.
(4) Both Statement I and Statement II are incorrect.

41. Cry protein is obtained from:
(1) Bacillus thuringiensis
(2) Bacillus subtilis
(3) Clostridium welchi (4) E.coli

42. Which of the following is not a characteristics of lipids?
(1) It forms by esterification of glycerol and fatty acid.
(2) They can be monoglycerides, diglycerides and triglycerides.
(3) Lecithin is a conjugate lipid which found in cell membrane.
(4) Phospholipids have phosphorus and a phosphorylated inorganic compound.

43. Which is odd:
(1) Chitin – Carbohydrates
(2) Pectin – Protein
(3) Steroid – Lipid
(4) Wax – Lipid

44. How many statement are correct from given statement?
(i) The hindlimbs of birds have generally scales.
(ii) Skin of bird is dry without glands except the oil gland at the base of the tail.
(iii) Long bones of mammals are hollow with air cavities.
(iv) Reptiles, Aves and Mammals are homoiothermous animals.
(v) Ornithorhynchus, Macropus and Pteropus are viviparous mammals.
(1) One (2) Two (3) Four (4) Five

45. Given below are two statements:
Statement I: Tendons are dense irregular tissue.
Statement II: Bones is dense regular tissue.
In the light of the above statements, choose the correct answer from the options given below:
(1) Both Statement I and Statement II are true
(2) Both Statement I and Statement II are false
(3) Statement I is true but Statement II is false
(4) Statement I is false but Statement II is true

46. Hepatic portal system carries :
(1) Deoxygenated blood from stomach to liver
(2) Deoxygenated blood from liver to intestine
(3) Oxygenated blood from intestine to liver
(4) Deoxygenated blood from intestine to liver

47. Match the pairs of the human being listed under Column I with the functions given under Column II; choose the choice which gives the correct combination of the alphabets of the two columns:

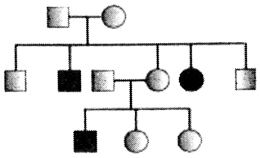
	Column-I		Column-II
(A)	Cerebral hemisphere	(p)	Relaying impulses
(B)	Thalamus	(q)	Posture and balance
(C)	Cerebellum	(r)	Control of heart, stomach, lungs, etc.
(D)	Medulla oblongata	(s)	Reflex actions
		(t)	Voluntary control, intelligence, hearing, speech, etc.

(1) (A)–(t), (B)–(q), (C)–(p), (D)–(r)
(2) (A)–(t), (B)–(p), (C)–(q), (D)–(r)
(3) (A)–(r), (B)–(s), (C)–(q), (D)–(t)
(4) (A)–(r), (B)–(q), (C)–(p), (D)–(s)

48. Select incorrect statements about pineal gland:
(i) It is located on the dorsal side of hindbrain.
(ii) It secretes a hormone called melatonin.
(iii) Melatonin regulates 24 hours rhythm of our body.
(iv) Melatonin maintaining the normal rhythms of sleep-wake cycle, body temperature.
(v) Melatonin also influences metabolism, menstrual cycle as well as our defence capability.
(vi) Melatonin responsible for dark pigmentation of body.
(1) (v) and (vi) (2) (i) and (v)
(3) (i) and (vi) (4) None of these

49. Haemophilic female marries normal male, the theoretical ratio of their offsprings regarding haemophilia will be :
(1) All offsprings are haemophilic
(2) All girls are haemophilic
(3) All sons are haemophilic
(4) Half daughters and half sons are haemophilic

50. The given pedigree chart shows the inheritance of which of the following mendelian disorder?



(1) Sex linked dominant trait
(2) Autosomal dominant trait
(3) Sex linked recessive trait
(4) Autosomal recessive trait