

PRABAL TEST PAPER

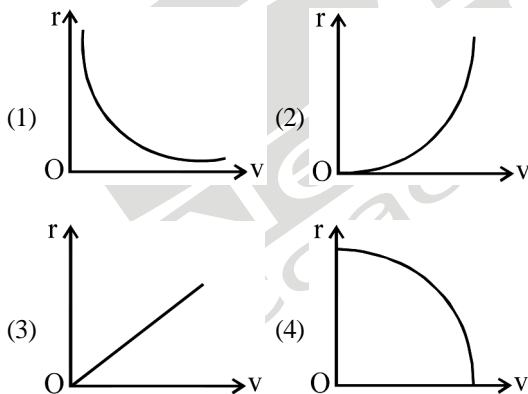
Time : 1 : 00 Hr.

Question : 50

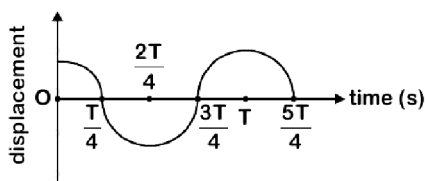
PHYSICS

01. A car is standing 400 m behind a bus, which is also at rest. The two start moving at the same instant but with different forward accelerations. The bus has acceleration 2 ms^{-2} and the car has acceleration 4 ms^{-2} . The car will catch up with the bus after time
- (1) 10 s
 - (2) 15 s
 - (3) 20 s
 - (4) none of these

02. A particle of mass m moves in a circular orbit under the central potential field, $U(r) = \frac{-C}{r}$, where C is a positive constant. The correct radius - velocity graph of the particle's motion is :



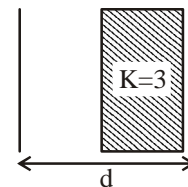
03. The displacement time graph of a particle executing S.H.M is given in figure (sketch is schematic and not to scale)



Which of the following statements is/are true for this motion?

- (A) The force is zero at $t = \frac{3T}{4}$
 - (B) The acceleration is maximum at $t = T$
 - (C) The speed is maximum at $t = \frac{T}{4}$
 - (D) The P.E. is equal to K.E. of the oscillation at $t = \frac{T}{2}$
- (1) (B), (C) and (D)
 - (2) (A) and (D)
 - (3) (A), (B) and (C)
 - (4) (A), (B) and (D)

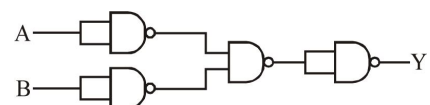
04. A parallel plate capacitor with plate area A and plate separation $d = 2 \text{ cm}$ has a capacitance of $4 \mu\text{F}$. The new capacitance of the system if half of the space between them is filled with a dielectric material of dielectric constant $K=3$ (as shown in figure) will be:



- (1) $2\mu\text{F}$
- (2) $32\mu\text{F}$
- (3) $6\mu\text{F}$
- (4) $8\mu\text{F}$

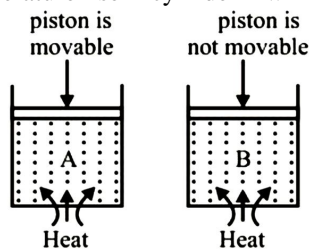
05. Assertion: The ferromagnetic substance do not obey Curie's law.
Reason: At Curie point a ferromagnetic substance start behaving as a paramagnetic substance.
- (1) If both Assertion and Reason are true and Reason is the correct explanation of Assertion
 - (2) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion
 - (3) If Assertion is true but Reason is false
 - (4) If Assertion and Reason both are false

06. The following logic gate is equivalent to :



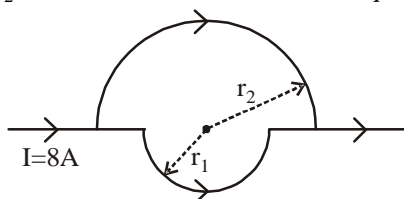
- (1) NOR Gate
- (2) OR Gate
- (3) AND Gate
- (4) NAND Gate

07. Two cylinders contain n moles each of an ideal diatomic gas. As shown in figure same amount of heat is given to the two cylinders. If temperature rise in cylinder B is T_0 then temperature rise in cylinder A will be



- (1) $\frac{7}{5}T_0$ (2) $2T_0$ (3) $\frac{3}{5}T_0$ (4) $\frac{5}{7}T_0$

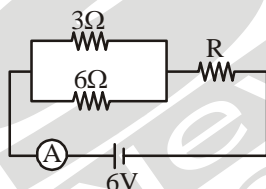
08. Consider the following current carrying structure. Find the magnetic field at the centre. Given that $r_1 = 2\pi$ m and $r_2 = 4\pi$ m. Assume current divides equally.



- (1) 10^{-8} T (2) 5×10^{-8} T
(3) 10^{-7} T (4) 4×10^{-7} T

09. The fundamental frequency of a closed organ pipe is equal to the first overtone frequency of an open organ pipe. If length of the open pipe is 60 cm, the length of the closed pipe will be
- (1) 60 cm (2) 45 cm (3) 30 cm (4) 15 cm

10. If the ammeter in given circuit reads 1 A, then resistance R is



- (1) 4 Ω (2) 2 Ω (3) 3 Ω (4) 1 Ω

CHEMISTRY

11. **Assertion** : T, P, V are called state variables or state function.

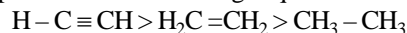
Reason : Their values depend on the state of the system and how it is reached.

- (1) Both Assertion and reason are true and Reason is the correct explanation of assertion
(2) Both Assertion and reason are true but Reason is not the correct explanation of assertion.
(3) Assertion is true but Reason is false.
(4) Both Assertion and Reason are false.

12. A process is always non spontaneous if
(1) $\Delta H > 0$ and $\Delta S < 0$ (2) $\Delta H > 0$ and $\Delta S > 0$
(3) $\Delta H < 0$ and $\Delta S > 0$ (4) $\Delta H < 0$ and $\Delta S < 0$

13. **Assertion**: Acidity of C-H bond lies in following sequence: $\text{HC} \equiv \text{CH} > \text{H}_2\text{C} = \text{CH}_2 > \text{CH}_3 - \text{CH}_3$

Reason: Percentage character of s' orbital in these compounds lie in following sequence:



- (1) If both Assertion and Reason are true and Reason is the correct explanation of Assertion
(2) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion
(3) If Assertion is true but Reason is false
(4) If Assertion and Reason both are false

14. Identify the correct order of boiling points of the following compounds:



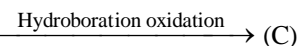
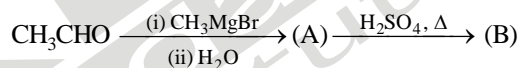
1 2



3

- (1) $1 > 2 > 3$ (2) $3 > 1 > 2$
(3) $1 < 3 < 2$ (4) $3 > 2 > 1$

15. Compounds A and C in the following reaction are:

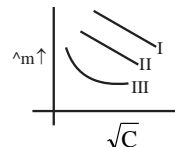


- (1) identical isomers
(2) positional isomers
(3) functional isomers
(4) optical isomers

16. According to molecular orbital theory, which of the following will not possible ion?

- (1) He_2^{2+} (2) He_2^+ (3) H_2^- (4) H_2^{2-}

17. A graph is plotted between molar conductivity of various electrolytes (NaCl, HCl & NH_4OH) and \sqrt{C} (Mol L^{-1}) correct match will be:



	I	II	III
(1)	NaCl	HCl	NH_4OH
(2)	HCl	NaCl	NH_4OH
(3)	NH_4OH	NaCl	HCl
(4)	NH_4OH	HCl	NaCl

18. Which of the following will not show geometrical isomerism?
- (1) $\begin{array}{c} \text{F} \\ | \\ \text{C} \\ | \\ \text{Cl} \end{array} = \begin{array}{c} \text{H} \\ | \\ \text{C} \\ | \\ \text{D} \end{array}$ (2) $\begin{array}{c} \text{F} \\ | \\ \text{C} \\ | \\ \text{Cl} \end{array} = \begin{array}{c} \text{F} \\ | \\ \text{C} \\ | \\ \text{Cl} \end{array}$
- (3) $\begin{array}{c} \text{H}_3\text{C} \\ | \\ \text{C} \\ | \\ \text{H}_5\text{C}_2 \end{array} = \begin{array}{c} \text{C}_2\text{H}_5 \\ | \\ \text{C} \\ | \\ \text{CH}_3 \end{array}$
- (4) $\begin{array}{c} \text{CH}_3 \\ | \\ \text{C} \\ | \\ \text{CH}_3 \end{array} = \begin{array}{c} \text{CH}_3 \\ | \\ \text{C} \\ | \\ \text{C}_2\text{H}_5 \end{array}$
19. Which of the following is a correct set?
- (1) H_2O sp³ angular
 (2) H_2O sp² linear
 (3) NH_4 dsp² square planar
 (4) CH_4 dsp² tetrahedral
20. Which of the following pairs has the same size?
- (1) Zn^{2+} , Hf^{4+} (2) Fe^{2+} , Ni^{2+}
 (3) Zr^{4+} , Ti^{4+} (4) Zr^{4+} , Hf^{4+}

BOTANY

21. **Assertion:** In a monohybrid cross F_1 generation indicates recessive characters.
Reason: Dominance occurs only in homozygous state.
 (1) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
 (2) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
 (3) If the assertion is true but the reason is false.
 (4) If both the assertion and reason are false.
22. Which is the true about the structure of Heterochromatin?
- (1) Loosely packed; Stain light
 (2) Loosely packed; Stain dark
 (3) Densely packed; Stain light
 (4) Densely packed; Stain dark
23. Number of genes found in chromosomes -1 and Y-chromosome are
- (1) 2986 and 213 respectively
 (2) 2968 and 231 respectively
 (3) 2968 and 321 respectively
 (4) 2986 and 123 respectively
24. Kranz anatomy related to-
- (1) Mesophyll chloroplast of C_4 -Plant
 (2) Bundle sheath chloroplast of C_4 -Plant
 (3) Mesophyll chloroplast of C_3 -plant
 (4) None
25. Spraying of GAs on juvenile conifers cause
- (1) Early flowering
 (2) Early senescence
 (3) Early seed production
 (4) All of these
26. Nuclear DNA exists as a complex of proteins called _____ that condenses into _____ during cellular division.
- (1) chromosomes, chromatin
 (2) chromatids, chromosomes
 (3) chromophores, chromatin
 (4) chromatin, chromosomes
27. Sacred groves are found in
- (i) Khasi and Jaintia Hills in Meghalaya
 (ii) Aravalli Hills of Rajasthan
 (iii) Western ghat regions of Karnataka and Maharashtra and Sarguja, Chanda and Bastar areas of Madhya Pradesh
 (iv) Indo-Burma region
- (1) (i) and (ii)
 (2) (i), (ii), and (iii)
 (3) (i) and (iii)
 (4) All of the above
28. Western Ghats have come under the category of Hotspot because of
- (1) High endemism (2) High elevation
 (3) Tropical climate (4) Evergreen forest
29. A diploid female plant and a tetraploid male plant are crossed. The ploidy of endosperm shall be
- (1) Tetraploid (2) Triploid
 (3) Diploid (4) Pentaploid
30. is not generally seen in biodiversity hotspots.
- (1) Endemism
 (2) Species richness
 (3) Loss of diversity
 (4) Lesser interspecific competition.
31. VNTRs vary in size of _____ to _____.
- (1) 0.1 to 20 bases
 (2) 0.1 to 20 kilobases
 (3) 0.1 to 20 hectobases
 (4) 0.1 to 20 decbases
32. What is true about Ribosomes?
- (1) The prokaryotic ribosomes are 80S, where "S" stands for sedimentation coefficient.
 (2) These are composed of ribonucleic acid and proteins.
 (3) These are found only in eukaryotic cells.
 (4) These are self-splicing introns of some RNAs.
33. A dicotyledonous plant bears flowers but never produces fruits and seeds. The most probable cause for the above statement is
- (1) Plant is dioecious and bears only pistillate flowers
 (2) Plant is dioecious and bears both pistillate and staminate flowers
 (3) Plant is monoecious
 (4) Plant is dioecious and bears only staminate flowers

34. Consider the following statements.
 (i) Secondary effluent in sewage treatment is transferred to anaerobic chamber for anoxic degradation.
 (ii) Trichoderma species are symbiotic fungi common in root ecosystems.
 (iii) Statins modified by genetic engineering are used as 'clot buster'.
 (iv) Cyclosporin A is used as an immunosuppressive agent in organ transplant patients.
 (v) Large holes in swiss cheese are due to large amount of CO₂ by *Propionibacterium sharmanii*.
 Select the correct option.
 (1) (ii), (iii) and (v) are correct
 (2) (i), (ii) and (iii) are incorrect
 (3) (i), (iii) (iv) and (v) are correct
 (4) (ii) and (iv) are incorrect
35. "The pyramid of energy is always upright" states that
 (1) The energy conversion efficiency of herbivores is better than carnivores
 (2) The energy conversion efficiency of carnivores is better than herbivores
 (3) Producers have the lowest energy conversion efficiency
 (4) Energy conversion efficiency is the same in all trophic levels

ZOOLOGY

36. Which of the following is false?
 (1) Fertilisation is external (in water) in frog.
 (2) In frog, development involves larval stage called tadpole.
 (3) Tadpole undergo metamorphosis to form the adult.
 (4) Development in frog is direct.
37. Which of the following is incorrect about birds?
 (1) Air sacs connected to lungs help in respiration.
 (2) Hind limbs possess scales and are modified for walking, swimming or claspings.
 (3) Separate sexes, internal fertilisation, oviparous and direct development.
 (4) Endoskeleton consists of feathers, scales, beak and claws.
38. Which of following statement is incorrect about Annelida?
 (1) They are triploblastic, metamerically segmented coelomate animals.
 (2) They possess both longitudinal and circular muscles which help in locomotion.
 (3) A closed circulatory system is present.
 (4) All are monoecious and reproduction is sexual.

39. Read the following statements and choose option which have correct ones only.
 A. The body of arthropods are generally consists of head, thorax and abdomen.
 B. In member of phylum Platyhelminthes, alimentary canal is complete with a well developed muscular pharynx.
 C. Body of molluscans is unsegmented with a distinct head, muscular foot and visceral hump.
 D. In Annelids, neural system is consists of paired ganglia connected by lateral nerves to a double solid dorsal nerve cord.
 (1) A, B & D (2) A, C, & D
 (3) A & C (4) A, B, C, D

40. Choose the correct option to fill up the gaps in the given table.

Blood group	Antigens on RBCs	Antibody in plasma	Donor groups
A	A	Anti-B	A, O
B	B	Anti-A	B, O
AB	AB	(b)	A, B, ABO
O	(a)	(c)	(d)

- (1) (a)–Nil; (b)–Nil; (c)–Nil; (d)–O
 (2) (a)–Nil; (b)–Nil; (c)–Anti-A, B; (d)–AB
 (3) (a)–Nil; (b)–Anti-A, B; (c)–Nil; (d)–O
 (4) (a)–Nil; (b)–Nil; (c)–Anti-A, Anti-B; (d)–O
41. Which of the following is false about hind brain?
 (1) Pons a part of it consists of fibre tracts that interconnect different region of brain.
 (2) Cerebellum part of it has very convoluted surface to accommodate many neurons.
 (3) Medulla of this part is connected to spiral cord.
 (4) Hind brain regulate excitement, pleasure, rage and fear.
42. Find the total number of hormones from the following which binds to intracellular receptors.
 Cortisol, Testosterone, T₃, Glucagon, Oxytocin, FSH, Progesterone, ICSH, Estrogen, GH
 (1) Four (2) Five (3) Six (4) Seven
43. Autoimmunity is caused due to the
 (a) ability of immune cells to discriminate between self-cells from non-self-cells.
 (b) inability of normal cells in damaging cell representing foreign antigens.
 (c) inability of immune cells in distinguishing self cells from non-self cells.
 (d) ability of immune cells to damage self-cells.
 (1) (c) and (d) are correct
 (2) (a), (b) and (c) are correct
 (3) All are correct
 (4) None is correct

44. In sickle cell anaemia, the sequence of amino acids from the first to the seventh position of the β -chain of haemoglobinS (Hb) is
 (1) His, Leu, Thr, Pro, Glu, Val, Val.
 (2) Val, His, Leu, Thr, Pro, Glu, Glu.
 (3) Thr, His, Pro, Val, Pro, Val, Glu.
 (4) Val, His, Leu, Thr, Pro, Val, Glu.
45. Assertion (A): Testis are the primary sex organs of female.
 Reason (R): Testis produce gametes and no hormones.
 (1) Both (A) and (R) are correct
 (2) Both (A) and (R) are incorrect
 (3) (A) is correct but (R) is not correct
 (4) (A) is not correct but (R) is correct
46. Identify the incorrect statements regarding surgical methods of contraception?
 I. Surgical procedure in male is called tubectomy and that in the female is called vasectomy.
 II. They block gamete transport and there by prevent conception.
 III. These techniques are highly effective and are reversible.
 IV. These methods are generally advised to couples as a terminal method to prevent any more pregnancy.
 (1) II and III (2) I and IV
 (3) I and III (4) III and IV
47. Assertion: Around 2000 varieties of rice are found in India.
 Reason: Basmati is distinct for its unique aroma and flavour.
 (1) Both A and R are true, but R is not the correct explanation of A.
 (2) A is true, but R is false.
 (3) A is false, but R is true.
 (4) Both A and R are true and R is the correct explanation of A.
48. The greatest evolutionary change enabling the land vertebrates to be completely free from the water habitat was the development of
 (1) four legs
 (2) four-chambered heart
 (3) lungs
 (4) shelled eggs and internal fertilisation
49. Malonate inhibiting succinate dehydrogenase, is an example of
 (1) allosteric inhibition
 (2) negative feedback
 (3) competitive inhibition
 (4) non-competitive inhibition
50. Read the following (a) to (d) statements and select the one option that contains both the correct statements.
 (a) Z line is present at the centre of the light band.
 (b) Thin filaments are firmly attached to the M line.
 (c) The central part of thick filaments, not overlapped by thin filaments is called Z band.
 (d) Light band contains only thin filaments.
 (1) (a) and (d) (2) (b) and (c)
 (3) (a) and (c) (4) (b) and (d)