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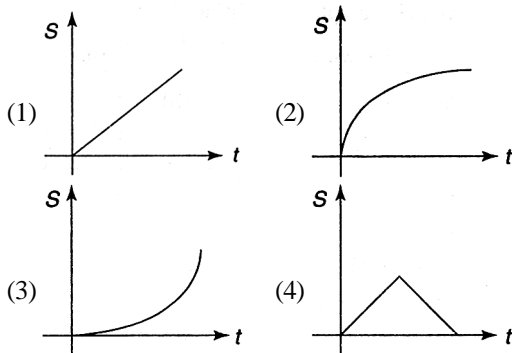
# PRACTICE SHEET - 1

## PHYSICS

**01.** One stone is dropped from the top a tower from rest and simultaneously another stone is projected vertically upwards from the same point with some initial velocity. The graph of the distance (s) between the two stones varies with time (t) as (before either stone hits the ground)

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

**02.** The potential energy of a system is represented in the first figure. The force acting on the system will be represented by



(1) 
(2) 
(3) 
(4) 
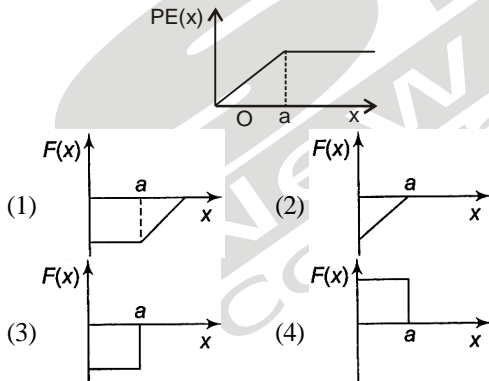
**03.** Unpolarised light falls on two polarizing sheets placed one on top of the other. What must be the angle between the characteristic directions of the sheets if the intensity of the final transmitted light is one-third the maximum intensity of the first transmitted beam ?

(1) $\cos^{-1}\left(\dfrac{1}{4}\right)$
(2) $\cos^{-1}\left(\dfrac{1}{\sqrt{3}}\right)$
(3) $\cos^{-1}\left(\dfrac{1}{\sqrt{2}}\right)$
(4) $\cos^{-1}\left(\dfrac{1}{3}\right)$

**04.** A Carnot engine whose low temperature reservoir is at 7°C has an efficiency of 50%. It is desired to increase the efficiency to 70%. By how many degrees should the temperature of the high temperature reservoir be increased

(1) 840 K     (2) 280 K     (3) 560 K     (4) 380 K

**05.** Work done on electron moving in a solenoid along its axis is equal to



(1) zero                (2) evB
(3) ilB                 (4) None of these

**06.** A cone lies in a uniform electric field E as shown in figure. The electric flux entering the cone is
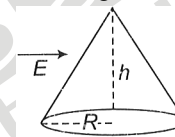


(1) $E\pi R^2$     (2) $ERh$     (3) $\dfrac{EhR}{2}$     (4) $Eh^2$

**07.** A thin rectangular magnet suspended freely has a period of oscillation equal to T. Now, it is broken into two equal halves (each having half of the original length) and one piece is made to oscillate freely in the same field. If its period of oscillation is T′. The ratio of T′/T is
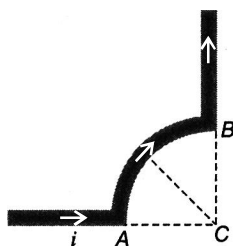
(1) $\dfrac{1}{2\sqrt{2}}$

(2) 1/2

(3) 2

(4) 1/4

**08.** An optical fibre consists of core of $\mu_1$ surrounded by a cladding of $\mu_2 < \mu_1$. A beam of light enters from air at an angle $\alpha$ with axis of fibre. The highest $\alpha$ for which ray can be travelled through fibre is
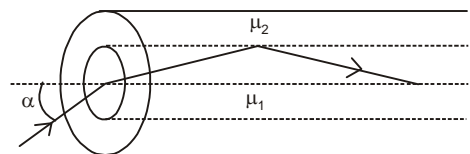


(1) $\cos^{-1}\sqrt{\mu_2^2 - \mu_1^2}$
(2) $\sin^{-1}\sqrt{\mu_1^2 - \mu_2^2}$
(3) $\tan^{-1}\sqrt{\mu_1^2 - \mu_2^2}$
(4) $\sec^{-1}\sqrt{\mu_1^2 - \mu_2^2}$

09. A wire carrying current i is shaped as shown. Section AB is a quarter circle of radius r. The magnetic field at C is directed



(1) At an angle $\pi/4$ to the plane of the paper

(2) Perpendicular to the plane of the paper and directed in to the paper

(3) Along the bisector of the angle ACB towards AB

(4) Along the bisector of the angle ACB away from AB

10. A cube of side 2 m is placed in front of a concave mirror of focal length 1 m with its face A at a distance of 3 m and face B at a distance of 5m from the mirror. The distance between the images of face A and B and height of images of A and B are respectively.
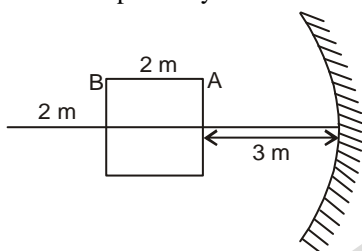


(1) 1 m, 0.5m, 0.25 m

(2) 0.5 m, 1m, 0.25 m

(3) 0.5 m, 0.25m, 1 m

(4) 0.25 m, 1m, 0.5 m

## CHEMISTRY

11. The incorrect matching among following

(1) 50 ppm - uper limit of pH in drinking water

(2) 500 ppm - lower limit of sulphate in drinking water

(3) excess $NO_3^-$ - in drinking water causes blue baby syndrom

(4) 1 ppm - Fluoride ion suitable in drinking water

12. A black coloured compound 'A' fused with an alkali metal hydroxide and an oxidising agent like $KNO_3$ it produce dark green coloured compound 'B' which give purple coloured compound 'C' in acidic medium.

The compound 'C' is

(1) $MnO_2$  (2) $MnSO_4$  (3) $KMnO_4$  (4) $K_2MnO_4$

13. Match the correct atomic radius with the element.

|  | Elements |  | Atomic radius (pm) |
|---|---|---|---|
| (i) | Be | (A) | 74 |
| (ii) | C | (B) | 88 |
| (iii) | O | (C) | 111 |
| (iv) | B | (D) | 77 |
| (v) | N | (E) | 66 |

(1) (i)–C; (ii)–D; (iii)–E; (iv)–B; (v)–A

(2) (i)–A; (ii)–B; (iii)–C; (iv)–D; (v)–E

(3) (i)–B; (ii)–C; (iii)–D; (iv)–A; (v)–E

(4) (i)–C; (ii)–E; (iii)–D; (iv)–B; (v)–A

14. Following graph shows variation of ionisation energy (IE) with atomic number in second period (Li–Ne). Value of ionisation energy (IE) of Na (11) will be
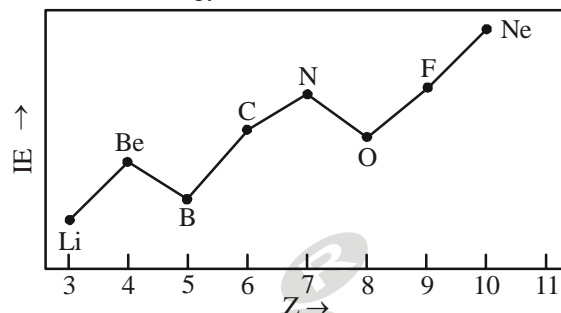


(1) above Ne

(2) below Ne but above O

(3) below Li

(4) between N and O

15. Which functional group is not present in the following molecule?
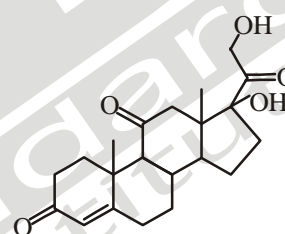


(1) 1° alcohol

(2) Ketone

(3) 3° alcohol

(4) Carboxylic acid

16. O-xylene on ozonolysis will give:

(1) $HOC-CHO$ and $CH_3-\overset{\overset{O}{\|}}{C}-CHO$

(2) $CH_3-\overset{\overset{O}{\|}}{C}-\overset{\overset{O}{\|}}{C}-CH_3$ and $CH_3-\overset{\overset{O}{\|}}{C}-CHO$

(3) $CH_3-\overset{\overset{O}{\|}}{C}-\overset{\overset{O}{\|}}{C}-CH_3$ and $CHO-CHO$

(4) $CH_3-\overset{\overset{O}{\|}}{C}-\overset{\overset{O}{\|}}{C}-CH_3$ , $CH_3-\overset{\overset{O}{\|}}{C}-CHO$ and $HOC-CHO$

17. Correct matching between I, II, III

|  | I (Compound) | II (Preparation) | III (Property) |
|---|---|---|---|
| (1) | Pure $N_2$ | $Ba(N_3)_2$ | highly poisonous |
| (2) | Ammonia | $NH_4Cl+Ca(OH)_2$ | Brown ppt with $FeCl_3$ |
| (3) | $CO_2$ | by strong heating of $CaCO_3$ | Reducing agent |
| (4) | $NO_2$ | by heating $Pb(NO_3)_2$ | Colourless gas |

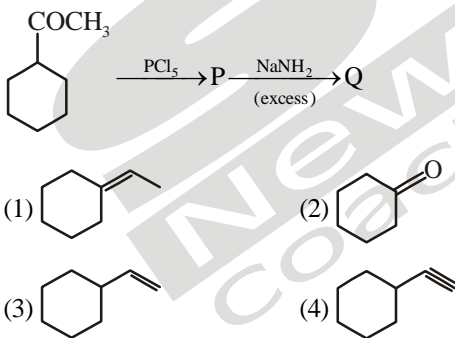18. What is the correct order regarding the acidity of the following ?
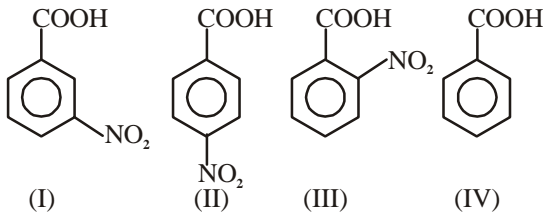


(I)  (II)  (III)  (IV)

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

19.



$$\text{cyclopentyl-CH}_2\text{OH} \xrightarrow[]{\text{PCC}} A$$
$$\xrightarrow[]{CrO_3/H_2SO_4} B$$
$$\xrightarrow[]{Na_2Cr_2O_7/H_2SO_4} C$$
$$\xrightarrow[]{CrO_3/\text{Pyridine}} D$$

Identify A, B, C and D

(1) A = D = [cyclopentyl-CHO] ; B = C = [cyclopentyl-COOH]

(2) A = D = [cyclopentyl-COOH] ; B = C = [cyclopentyl-CHO]

(3) A = B = [cyclopentyl-COOH] ; C = D = [cyclopentyl-CHO]
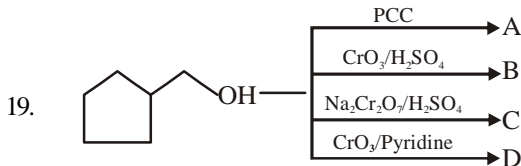
(4) A = [CHO...CHO], B = [CHO...CHO], C = [CHO...CHO], D = $CO_2$

20. Identify 'Q' in the following sequence of reaction:



$$\xrightarrow[]{PCl_5} P \xrightarrow[(\text{excess})]{NaNH_2} Q$$

(1) [cyclohexane with =CH]
(2) [cyclohexanone C=O]
(3) [cyclohexane-CH=CH]
(4) [cyclohexane-C≡CH]

## BOTANY

21. Match the columns I and II, and choose the correct combination from the options given.

| | Column I (Class) | | Column II (Stored food material) |
|---|---|---|---|
| a. | Chlorophyceae | i. | Floridean starch |
| b. | Phaeophyceae | ii. | Starch |
| c. | Rhodophyceae | iii. | Laminarin and mannitol |

(1) a-i, b-ii, c-iii
(2) a-ii, b-iii, c-i
(3) a-i, b-iii, c-ii
(4) a-ii, b-i, c-iii
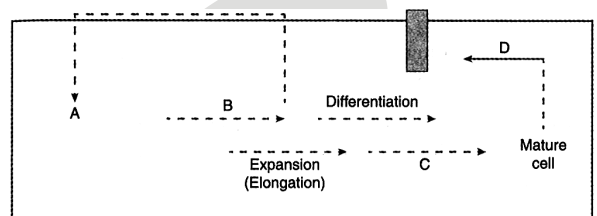
22. Select the correct match.

| | Column-I | | Column-II |
|---|---|---|---|
| A. | $Mg^{2+}$ | 1. | Chlorphyll |
| B. | P | 2. | ATP |
| C. | $Zn^{2+}$ | 3. | Alcohol dehydrogenase |
| D. | Mo | 4. | Nitrogenase |

(1) A : 2, B : 1, C : 3, D : 4
(2) A : 1, B : 2, C : 3, D : 4
(3) A : 4, B : 1, C : 2, D : 3
(4) A : 4, B : 3, C : 2, D : 1

23. How many turns of Calvin cycle yield one molecule of glucose ?
(1) Eight
(2) Two
(3) Six
(4) Four

24. Identify A, B, C and D in the given figure.



Sequences of developmental processes in a plant cell

(1) A: Cell division, B: Senescence, C: Plasmatic growth, D: Mature cell.
(2) A: Meristematic cell, B: Plasmatic growth, C: Maturation, D: Senescence.
(3) A: Mature cell, B: Maturation, C: Senescence, D: meristematic cell
(4) A: Maturation, B: Cell division, C: Meristematic cell, D : Differentiation.

25. The backbone of DNA double helix consists of:
(1) Sugar–Base
(2) Sugar–Phosphate
(3) Sugar–Hydroxyl group
(4) Sugar–Methyl group

26. Male gametes in angiosperms are formed by the division of
(1) generative cell
(2) vegetative cell
(3) microspore mother cell
(4) microspore

27. Vegetative reproduction of Agave occurs through
(1) Rhizome
(2) Bulb
(3) Bulbils
(4) Sucker

28. Select the total number of diseases from the following which can be caused by virus in plant or animals.
Mumps, Small pox, Rust, Smut, Herpes, Influenza, Potato Spindle tuber, Red rot of sugar cane, Turnip mosaic, Blank rot crucifier
(1) 4
(2) 5
(3) 7
(4) 8

29. Which is the correct formula of the graph shown below? Given:
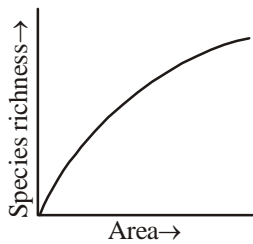


S-species richness    A-Area    C-Y-intercept
Z-Slope of line (regression coefficient)
(1) $S = CA^Z$    (2) $S = CZ^A$
(3) $S = ZC^A$    (4) $Z = SC^A$

30. Homeostasis is
(1) Tendency of biological system to change with change in environment
(2) Tendency of biological systems to resist change
(3) Disturbance of self-regulatory system and natural controls
(4) Biotic material used in homeopathic medicines

## ZOOLOGY

31. Birth canal is formed by
(i) Uterus         (ii) Cervix
(iii) Vagina
(1) i and ii       (2) i and iii
(3) ii and iii     (4) iii only

32. A natural method of contraception, periodic abstinence is
(1) Abstaining from coitus from day 1 to 5 of the menstrual cycle
(2) Abstaining from coitus from day 17 to 22 of the menstrual cycle
(3) Abstaining from coitus from day 10 to 17 of the menstrual cycle
(4) Abstaining from coitus from day 5 to 10 of the menstrual cycle

33. If yellow body, white eyed drosophila is crossed with wild brown body red eyes drosophila. Then what would be the frequency of recombinants in $F_1$ generation?
(1) 100%           (2) 1.3%
(3) 98.7%          (4) 0%

34. The fitness referred to in Darwin's theory is
(1) Physical fitness    (2) Mental fitness
(3) Reproductive fitness  (4) All of these

35. When readymade antibodies are given to protect the body against foreign agents, it is called .......immunity
(1) Passive        (2) Active
(3) Innate         (4) Humoral

36. 30 cycle of PCR amplified DNA approximately is how many times
(1) 1 billion times  (2) 1 million times
(3) 100 times      (4) 1000 times

37. RNAi stands for
(1) RNA infection  (2) RNA induction
(3) RNA interference  (4) RNA inhibition

38. A muscular sphincter that regulates the opening of stomach into duodenum is
(1) Pyloric sphincter
(2) Gastroesophageal sphincter
(3) Sphincter of Oddi
(4) Cervical sphincter

39. Glottis is an opening in the floor of
(1) Mouth          (2) Trachea
(3) Pharynx        (4) Diaphragm

40. Following are the points of mechanism of JGA, arrange them accordingly
(A) Activation of JG cells
(B) Activated JG cells release renin
(C) Fall in GFR
(D) Increase of glomerular blood flow
(E) GFR back to normal
(1) E, A, D, C, B  (2) C, A, B, D, E
(3) A, B, C, D, E  (4) C, A, D, B, E