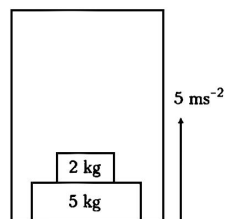


## PHYSICS

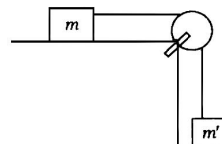
01. In the SI system, the unit of temperature is  
(a) degree centigrade (b) kelvin  
(c) degree celsius (d) degree Fahrenheit
02. If error in measuring diameter of a circle is 4% the error in measuring radius of the circle would be  
(a) 2% (b) 8%  
(c) 4% (d) 1%
03. The work done by a force  $F = (\hat{i} + 2\hat{j} + 3\hat{k})$  N, to displace a body from position A to position B is [The position vector of A is  $r_1 = (\hat{i} + 3\hat{j} + \hat{k})$  m and the position vector of B is  $r_2 = (2\hat{i} + 2\hat{j} + 3\hat{k})$  m]  
(a) 5 J (b) 3 J  
(c) 2 J (d) 10 J
04. Three balls of same masses are projected with equal speeds at angle  $15^\circ$ ,  $45^\circ$ ,  $75^\circ$ , and their ranges are respectively  $R_1$ ,  $R_2$  and  $R_3$ , then  
(a)  $R_1 > R_2 > R_3$  (b)  $R_1 < R_2 < R_3$   
(c)  $R_1 = R_2 = R_3$  (d)  $R_1 = R_3 < R_2$
05. A boy throws a ball with a velocity  $u$  at an angle  $\theta$  with the horizontal. At the same instant he starts running with uniform velocity to catch the ball before it hits the ground. To achieve this he should run with a velocity of  
(a)  $u \cos \theta$  (b)  $u \sin \theta$   
(c)  $u \tan \theta$  (d)  $u \sec \theta$
06. Two equal forces are acting at a point with an angle of  $60^\circ$  between them. If the resultant force is equal to  $40\sqrt{3}$  N, the magnitude of each force is  
(a) 40 N (b) 20 N  
(c) 80 N (d) 30 N

07. Find the force exerted by 5kg block on floor of lift, as shown in figure. (Take,  $g = 10 \text{ ms}^{-2}$ )



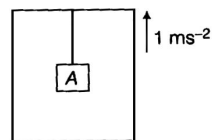
- (a) 100 N (b) 115 N  
(c) 105 N (d) 135 N

08. In the figure given below masses  $m$  and  $m'$  are tied with a thread passing over a pulley,  $m$  is on a frictionless horizontal surface. If acceleration due to gravity is  $g$ , the acceleration of  $m'$  in this arrangement will be



- (a)  $g$  (b)  $\frac{m'g}{(m+m')}$   
(c)  $\frac{mg}{m'}$  (d)  $\frac{mg}{(m-m')}$

09. If the elevator in the shown figure is moving upwards with constant acceleration  $1 \text{ ms}^{-2}$ , the tension in the string connected to block A of mass 6 kg would be (take,  $g = 10 \text{ ms}^{-2}$ )

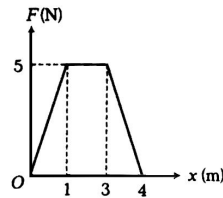


- (a) 60 N (b) 66 N  
(c) 54 N (d) 42 N

**ROUGH WORK**

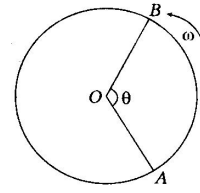
10. A man pushes against a wall but fails to move it. He does  
 (a) negative work  
 (b) positive but not maximum work  
 (c) maximum positive work  
 (d) no work at all

11. The force  $F$  acting on a particle is moving in a straight line as shown in figure. What is the work done by the force on the particle in the 4 m of the trajectory?

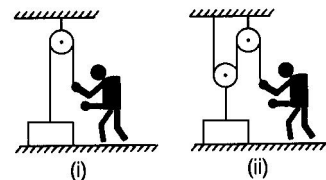


- (a) 5 J (b) 10 J  
 (c) 15 J (d) 2.5 J
12. Two bodies of masses  $m_1$  and  $m_2$  have same momentum. The ratio of their KE is  
 (a)  $\sqrt{\frac{m_2}{m_1}}$  (b)  $\sqrt{\frac{m_1}{m_2}}$  (c)  $\frac{m_1}{m_2}$  (d)  $\frac{m_2}{m_1}$
13. A particle moving along a circular path due to a centripetal force having constant magnitude is an example of motion with  
 (a) constant speed and velocity  
 (b) variable speed and variable velocity  
 (c) variable speed and constant velocity  
 (d) constant speed and variable velocity
14. A disc of mass 2 kg and radius 0.2 m is rotating with angular velocity  $30 \text{ rad s}^{-1}$ . What is angular velocity, if a mass of 0.25 kg is put on periphery of the disc?  
 (a)  $24 \text{ rad s}^{-1}$  (b)  $36 \text{ rad s}^{-1}$   
 (c)  $15 \text{ rad s}^{-1}$  (d)  $26 \text{ rad s}^{-1}$
15. A stone of mass 2 kg is projected upwards with KE of 98 J. The height at which the KE of the body becomes half its original value, is given by (take,  $g = 9.8 \text{ ms}^{-2}$ )  
 (a) 5 m (b) 2.5 m  
 (c) 1.5 m (d) 0.5 m

16. A circular disc of radius  $R$  is rotating about its axis  $O$  with a uniform angular velocity  $\omega \text{ rad s}^{-1}$  as shown in the figure. The magnitude of the relative velocity of point  $A$  relative to point  $B$  on the disc is



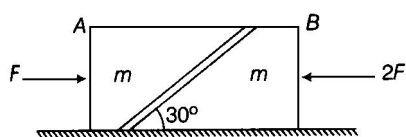
- (a) zero (b)  $R\omega \sin\left(\frac{\theta}{2}\right)$   
 (c)  $2R\omega \sin\left(\frac{\theta}{2}\right)$  (d)  $\sqrt{3} R\omega \sin\left(\frac{\theta}{2}\right)$
17. If the earth suddenly shrinks (without changing mass) to half of its present radius, then acceleration due to gravity will be  
 (a)  $g/2$  (b)  $4g$   
 (c)  $g/4$  (d)  $2g$
18. A force of  $2\hat{i} + 3\hat{j} + 4\hat{k}$  N acts on a body for 4 seconds, produces a displacement of  $(3\hat{i} + 4\hat{j} + 5\hat{k})$  m. The power used is  
 (a) 9.5 W (b) 7.5 W  
 (c) 6.5 W (d) 4.5 W
19. In the figure shown, a person wants to raise a block lying on the ground to a height  $h$ . In both the cases if time required is the same, then in which case he has to exert more force. Assume pulleys and strings are light



- (a) (i)  
 (b) (ii)  
 (c) same in both  
 (d) Cannot be determined

**ROUGH WORK**

20. Two blocks A and B each of mass  $m$  are placed on a smooth horizontal surface. Two horizontal forces  $F$  and  $2F$  are applied on the blocks A and B respectively as shown in figure. The block A does not slide on block B.



Then the normal reaction acting between the two blocks is

- (a)  $F$  (b)  $\frac{F}{2}$  (c)  $\frac{F}{\sqrt{3}}$  (d)  $3F$

## CHEMISTRY

21. Which one of the following species has plane triangular shape?  
 (a)  $N_3$  (b)  $NO_3^-$  (c)  $NO_2^-$  (d)  $CO_2$
22. The pair of species with the same bond order is  
 (a)  $O_2^{2-}$ ,  $B_2$  (b)  $O_2^+$ ,  $NO^+$   
 (c)  $NO$ ,  $CO$  (d)  $N_2$ ,  $O_2$
23. Which of the two ions from the list given below, have the geometry that is explained by the same hybridisation of orbitals,  
 $NO_2^-, NO_3^-, NH_2^-, NH_4^+, SCN^-$  ?  
 (a)  $NH_4^+$  and  $NO_3^-$  (b)  $SCN^-$  and  $NH_2^-$   
 (c)  $NO_2^-$  and  $NH_2^-$  (d)  $NO_2^-$  and  $NO_3^-$
24. Which of the following has the minimum bond length?  
 (a)  $O_2^-$  (b)  $O_2^{2-}$  (c)  $O_2$  (d)  $O_2^+$
25. In which of the following pairs of molecules/ions, the central atoms have  $sp^2$  hybridisation?  
 (a)  $NO_2^-$  and  $NH_3$  (b)  $BF_3$  and  $NO_2^-$   
 (c)  $NH_2^-$  and  $H_2O$  (d)  $BF_3$  and  $NH_2^-$

26. The correct order of increasing bond angles in the following species is

- (a)  $NO_2^+ < NO_2 < NO_2^-$  (b)  $NO_2^- < NO_2^+ < NO_2$   
 (c)  $CH_4 < NH_3 < H_2O$  (d)  $NO_2^- < NO_2 < NO_2^+$

27. Equal moles of hydrogen and oxygen gases are placed in container with a pin-hole through which both can escape. What fraction of the oxygen escapes in the time required for one-half of the hydrogen to escape?

- (a)  $1/4$  (b)  $3/8$   
 (c)  $1/2$  (d)  $1/8$

28. If a gas expands at constant temperature, it indicates that

- (a) kinetic energy of molecules decreases  
 (b) pressure of the gas increases  
 (c) kinetic energy of molecules remains the same  
 (d) number of the molecules of gas increases

29. Which one of the following statements is wrong for gases?

- (a) Gases do not have a definite shape and volume  
 (b) Volume of the gas is equal to volume of container confining the gas  
 (c) Confined gas exerts uniform pressure on the walls of its container in all directions  
 (d) Mass of gas cannot be determined by weighing a container in which it is enclosed

30. 600 cc of a gas at a pressure of 750 mm is compressed to 500 cc. Taking the temperature to remain constant, the increase in pressure is

- (a) 150 mm (b) 250 mm  
 (c) 350 mm (d) 450 mm

31. Which of the following is not a 'S' block element

- (a) Cs (b) Rb  
 (c) Cu (d) He

32. Ionic mobility of which of the following alkali metal ions is lowest when aqueous solution of their salts are put under an electric field?

- (a) Na (b) K  
 (c) Rb (d) Li

## ROUGH WORK

33. On heating which of the following releases CO<sub>2</sub> most easily?  
 (a) K<sub>2</sub>CO<sub>3</sub> (b) Na<sub>2</sub>CO<sub>3</sub>  
 (c) MgCO<sub>3</sub> (d) CaCO<sub>3</sub>
34. Which one of the following atoms will have the smallest size?  
 (a) Mg (b) Na  
 (c) Be (d) Li
35. In which of the following the hydration energy is higher than the lattice energy?  
 (a) BaSO<sub>4</sub> (b) MgSO<sub>4</sub>  
 (c) RaSO<sub>4</sub> (d) SrSO<sub>4</sub>
36. All the following substances react with water. The pair that gives the same gaseous product is  
 (a) K and CO<sub>2</sub> (b) Na and Na<sub>2</sub>O<sub>2</sub>  
 (c) Ca and CaH<sub>2</sub> (d) Ba and BaO<sub>2</sub>
37. Which of the following is used for balancing a chemical equation of a reaction in acidic medium?  
 (a) H<sup>+</sup> (b) H<sup>-</sup>  
 (c) OH<sup>-</sup> (d) O<sup>2-</sup>
38. What are the oxidation numbers of three Br atoms  $\overset{\text{I}}{\text{Br}} - \overset{\text{II}}{\text{Br}} - \overset{\text{III}}{\text{Br}}$  in Br<sub>3</sub>O<sub>8</sub>?  
 (a) + $\frac{16}{3}$  each one  
 (b) -1 outer and zero the central  
 (c) +6 outer and -4 the central  
 (d) +6 outer and +4 the central
39. Sum of O.N of all atoms in a compound is always taken as :  
 (a) zero (b) +1  
 (c) -1 (d) none of these
40. O.N. of oxygen, in general, in most compounds is taken as :  
 (a) -1 (b) - $\frac{1}{2}$   
 (c) -2 (d) +2
41. Lining layer of fallopian tubes, bronchi and bronchioles consists of  
 (a) Transitional epithelium  
 (b) Ciliated epithelium  
 (c) Sensory epithelium  
 (d) Squamous epithelium
42. Mineral found in red pigment of vertebrate blood is  
 (a) Magnesium (b) Iron  
 (c) Calcium (d) Copper
43. Goblet cells of intestinal epithelium are examples of  
 (a) Unicellular glands  
 (b) Compound epithelium  
 (c) Striated epithelium  
 (d) None of these
44. An epithelial tissue which has thin flat cells, arranged edge to edge so as to appear like closely packed tiles, is found to be present at  
 (a) Outer surface of ovary  
 (b) Inner lining of fallopian tube  
 (c) Inner lining of stomach  
 (d) Inner lining of cheeks.
45. Triploblastic organ system grade body, coelomate and unsegmented animals are seen in-  
 (a) Echinodermata  
 (b) Ctenophora  
 (c) Arthropoda  
 (d) Porifera
46. Compound tissue is defined as  
 (a) Different types of cells performing one function  
 (b) Different types of cells which are different in structure and function  
 (c) Similar cells at different regions performing many functions  
 (d) Similar types of cells held together by connective tissue.
47. Rudimentary cephalization, protonephridia etc. characterize some members of phylum belongs to  
 (a) Arthropoda (b) Cnidaria  
 (c) Platyhelminthes (d) Mollusca

**ROUGH WORK**

48. Trochophore larvae are characteristic of  
 (a) Arthropoda (b) Cnidaria  
 (c) Platyhelminthes (d) Annelida
49. Tapeworms are classified in phylum  
 (a) Porifera (b) Cnidaria  
 (c) Platyhelminthes (d) Ctenophora
50. A fluid-filled cavity that develops completely within mesodermal tissue is a characteristic of  
 (a) Coelomate (b) Acoelomate  
 (c) Pseudocoelomate (d) All of the above

51. The structure present in cyanobacteria (BGA) helping in  $N_2$  fixation is  
 (a) HaplospERM (b) Holostrum  
 (c) Holotrema (d) Heterocyst

52. Match column I with column II and choose the right option.

Column-I	Column-II
A. Rhizopus	1. Ascomycetes
B. Penicillium	2. Basidiomycetes
C. Ustilago	3. Deuteromycetes
D. Alternaria	4. Phycomycetes
(a) A-4, B-3, C-1, D-2	(b) A-2, B-3, C-4, D-1
(c) A-4, B-1, C-2, D-3	(d) A-3, B-4, C-2, D-1

53. Pteridophytes differ from bryophytes and thallophytes in having  
 (a) Vascular tissues (b) Motile antherozoids  
 (c) Archegonia generations  
 (d) Alternation

54. Match the following and choose the correct combination.

Column-I	Column-II
A. Red algae	1. Marchantia
B. Liver wort	2. Acetabularia
C. Walking fern	3. Polysiphonia
D. Green algae	4. Adiantum
(a) A-1, B-2, C-4, D-3	(b) A-2, B-4, C-3, D-1
(c) A-2, B-3, C-1, D-4	(d) A-3, B-1, C-4, D-2

55. Match the following column

Column-I	Column-II
A. Haplontic life cycle	1. Bryophyte & Pteridophyte
B. Diplontic life cycle	2. Gymnosperm & Angiosperm
C. Haplo-diplontic life cycle	3. Volvox, Spirogyra, & Chlamydomonas
(a) A-3, B-1, C-2	(b) A-1, B-2, C-3
(c) A-2, B-3, C-1	(d) A-3, B-2, C-1

56. Match the following column

Column-I	Column-II
A. Lysosomes	1. Protein synthesis
B. Ribosomes	2. Hydrolytic Activity
C. SER	3. Steroid Synthesis
D. Centriole	4. Formation of Spindle
(a) A-2, B-1, C-3, D-4	(b) A-1, B-3, C-4, D-2
(c) A-1, B-4, C-3, D-2	(d) A-4, B-3, C-1, D-2

57. Age of a tree can be estimated by

- (a) Number of annual rings  
 (b) Diameter of its heartwood  
 (c) Its height and girth  
 (d) Biomass

58. Keel is the characteristic feature of flower of

- (a) Aloe (b) Tomato  
 (c) Tulip (d) Indigofera

59. Suicidal bag of plant cell is

- (a) Peroxisome (b) Lysosome  
 (c) ER (d) Nucleus

60. In cell cycle, different phases are in the following sequence

- (a)  $S - G_1 - G_2 - M$  (b)  $G_1 - S - G_2 - M$   
 (c)  $S - G_2 - G_1 - M$  (d)  $M - S - G_1 - G_2$

**ROUGH WORK**

61. World Health day is observed on?  
 (a) 3rd April (b) 4th April  
 (c) 5th April (d) 7th April
62. Which among the following bodies estimates the national income of India?  
 (a) Office of the Economic Advisor  
 (b) Ministry of Statistics  
 (c) Central Statistical Office  
 (d) Ministry of Finance
63. The right to constitutional remedies allows Indian citizens to stand up for their rights against anybody even the government of India. Which article says this?  
 (a) Article 31 (b) Article 32  
 (c) Article 33 (d) Article 34
64. What was the original name of Mirabehn, an associate and disciple of Mahatma Gandhi?  
 (a) Oliver Schriener (b) Millie Graham Pollock  
 (c) Madeline Slade (d) Margarate Cousins
65. For his major role in the development of computer chip 'Pentium', which Indian IT expert is called the 'Father of Pentium'?  
 (a) Ajay Bhatt (b) AnandChandrasekher  
 (c) VinodDham (d) Biswamohan Pani
66. GolGhar, a beehive shaped structure built in 1786 to store grains for the British Army, is located in which city?  
 (a) Bhopal (b) Patna  
 (c) Varnas (d) Lucknow
67. What is the name of India's first nuclear reactor?  
 (a) Cirius (b) Apsara  
 (c) Dhruva (d) Kamini

68. Mahatama Gandhi had launched his first Satyagraha in India from which among the following places?  
 (a) Kheda (b) Bardoli  
 (c) Champaran (d) Sabarmati
69. Which among the following Indian classical dance form was developed by Siddhendra Yogi from Bhamakalapam dance drama ?  
 (a) Kuchipudi (b) Odissi  
 (c) Yakshagana (d) Kathkali
70. Which of the following European countries is known as the 'Land of a thousand lakes'?  
 (a) Norway (b) Sweden  
 (c) Finland (d) Estonia
71. Stilwell Road" connects India with which among the following neighbors?  
 (a) China (b) Bhutan  
 (c) Bangladesh (d) Pakistan
72. Major Dhyanchand's birthday is celebrated as National Sports Day in India, on which among the following dates?  
 (a) July 29th (b) August 29th  
 (c) March 29th (d) April 29th
73. The Commonwealth Games started from which among the following countries?  
 (a) England (b) Australia  
 (c) Canada (d) India
74. Who among the following had written Bangladesh's national anthem "Amar Sonar Bangla"?  
 (a) Nazrul Islam (b) Rabindranath Tagore  
 (c) AnisurRahman (d) SantidevGhosh
75. Which among the following types of glasses contains Cerium and other rare earths and has a high absorption of ultraviolet rays?  
 (a) Crookes Glass (b) Pyrex Glass  
 (c) Flint Glass (d) Crown Glass

**ROUGH WORK**

76. Where are the headquarters of NATO?  
 (a) New York (b) Brussels  
 (c) Paris (d) Vienna
77. National Housing Bank is the wholly subsidiary of RBI. In which year, NHB was established?  
 (a) 1985 (b) 1986  
 (c) 1987 (d) 1988
78. The Mandal Commission was constituted during the tenure of which among the following prime ministers?  
 (a) Indira Gandhi (b) Morarji Desai  
 (c) Rajiv Gandhi (d) V P Singh
79. "The Analects" is a sacred text of which philosopher?  
 (a) Confucius (b) Hippocrates  
 (c) Socrates (d) Herodotus
80. Maximum number of animals species belong to which among the following groups?  
 (a) Mammalia (b) Ayes  
 (c) Pisces (d) Arthropoda

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**ROUGH WORK**