



**QUESTION BOOKLET – 2016**  
**Subjects : Paper I : Physics & Chemistry**

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| Question Booklet Version                    |
| <b>11</b>                                   |
| (Write this number on<br>your Answer Sheet) |

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| Roll No.         |  |  |  |  |  |  |
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| Answer Sheet No. |  |  |  |  |  |  |
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| Question Booklet Sr. No.                    |
| (Write this number on<br>your Answer Sheet) |

Duration: 1 Hour 30 Minutes

Total Marks : 100

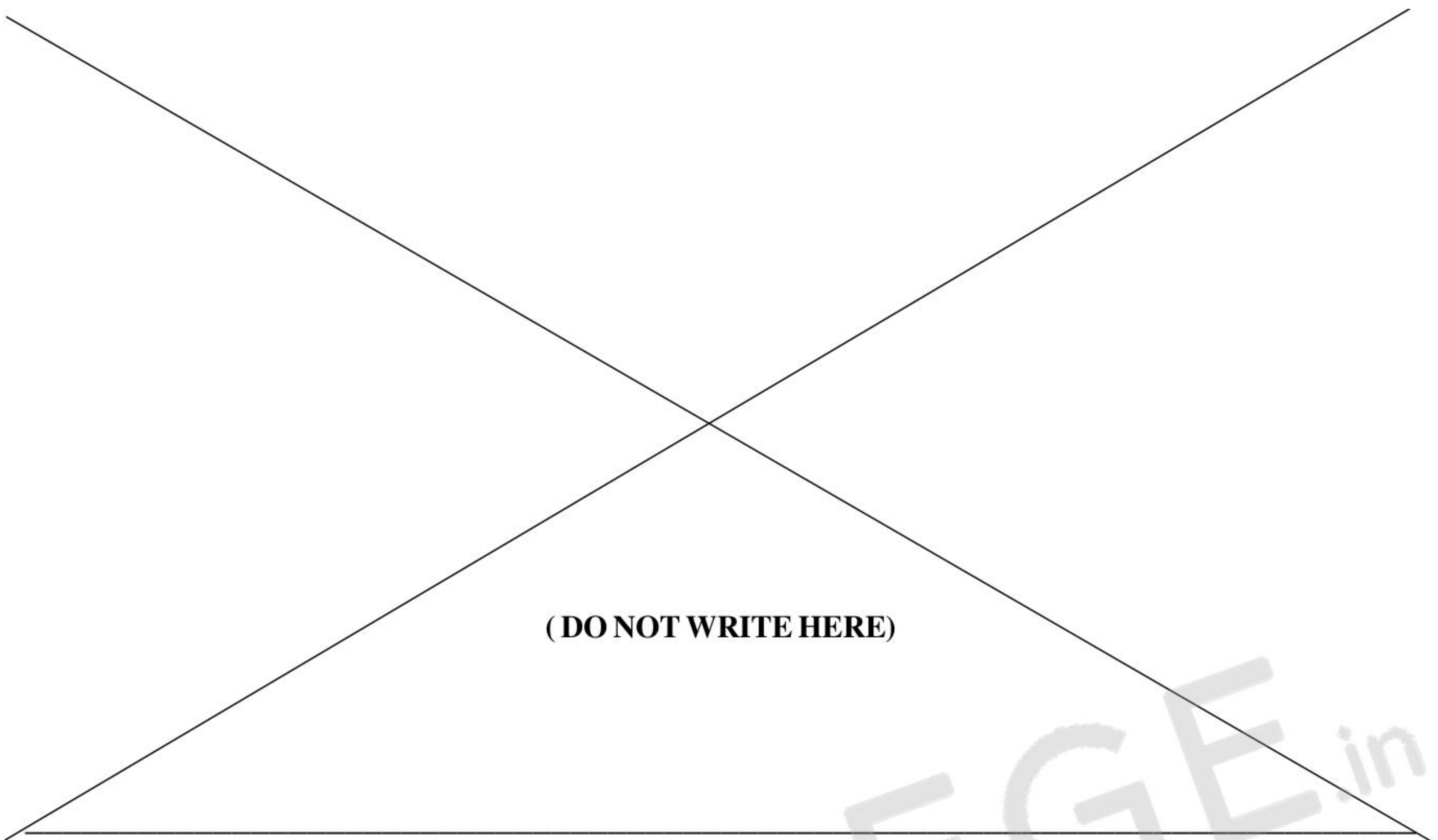
This is to certify that, the entries of Roll Number and Answer Sheet Number have been correctly written and verified.

*Candidate's Signature*

*Invigilator's Signature*

**Instructions to Candidates**

1. This question booklet contains 100 Objective Type Questions (Single Best Response Type) in the subjects of Physics (50) and Chemistry (50).
2. The question paper and OMR (Optical Mark Reader) Answer Sheets are issued to examinees separately at the beginning of the examination session.
3. Choice and sequence for attempting questions will be as per the convenience of the candidate.
4. Candidate should carefully read the instructions printed on the Question Booklet and Answer Sheet and make the correct entries on the Answer Sheet. As Answer Sheets are designed to suit the OPTICAL MARK READER (OMR) SYSTEM, special care should be taken to mark appropriate entries/answers correctly. Special care should be taken to fill QUESTION BOOKLET VERSION, SERIAL No. and Roll No. accurately. The correctness of entries has to be cross-checked by the invigilators. **The candidate must sign on the Answer Sheet and Question Booklet.**
5. Read each question carefully.
6. Determine the correct answer from out of the four available options given for each question.
7. Fill the appropriate circle completely like this ●, for answering the particular question, with Black ink ball point pen only, in the OMR Answer Sheet.
8. Each answer with correct response shall be awarded **one (1) mark**. There is **no Negative Marking**. If the examinee has marked two or more answers or has done scratching and overwriting in the Answer Sheet in response to any question, or has marked the circles inappropriately e.g. half circle, dot, tick mark, cross etc, mark/s shall NOT be awarded for such answer/s, as these may not be read by the scanner. Answer sheet of each candidate will be evaluated by computerized scanning method only (Optical Mark Reader) and there will not be any manual checking during evaluation or verification.
9. Use of whitener or any other material to erase/hide the circle once filled is not permitted. Avoid overwriting and/or striking of answers once marked.
10. Rough work should be done only on the blank space provided in the Question Booklet. **Rough work should not be done on the Answer Sheet.**
11. The required mathematical tables (Log etc.) are provided within the Question Booklet.
12. Immediately after the prescribed examination time is over, the Question Booklet and Answer sheet are to be returned to the Invigilator. Confirm that both the Candidate and Invigilator have signed on question booklet and answer sheet.
13. No candidate is allowed to leave the examination hall till the examination session is over.



(DO NOT WRITE HERE)

SPACE FOR ROUGH WORK

**PHYSICS**

1. For a gas  $\frac{R}{C_v} = 0.4$ , where 'R' is the universal gas constant and ' $C_v$ ' is molar specific heat at constant volume. The gas is made up of molecules which are
  - A) rigid diatomic
  - B) monoatomic
  - C) non-rigid diatomic
  - D) polyatomic
2. In vertical circular motion, the ratio of kinetic energy of a particle at highest point to that at lowest point is
  - A) 5
  - B) 2
  - C) 0.5
  - D) 0.2
3. Two wires having same length and material are stretched by same force. Their diameters are in the ratio 1 : 3. The ratio of strain energy per unit volume for these two wires (smaller to larger diameter) when stretched is
  - A) 3 : 1
  - B) 9 : 1
  - C) 27 : 1
  - D) 81 : 1
4. A ring and a disc roll on the horizontal surface without slipping with same linear velocity. If both have same mass and total kinetic energy of the ring is 4 J then total kinetic energy of the disc is
  - A) 3 J
  - B) 4 J
  - C) 5 J
  - D) 6 J
5. When the observer moves towards the stationary source with velocity, ' $V_1$ ', the apparent frequency of emitted note is ' $F_1$ '. When the observer moves away from the source with velocity ' $V_1$ ', the apparent frequency is ' $F_2$ '. If ' $V$ ' is the velocity of sound in air and  $\frac{F_1}{F_2} = 2$  then  $\frac{V}{V_1} = ?$ 
  - A) 2
  - B) 3
  - C) 4
  - D) 5
6. Wire having tension 225 N produces six beats per second when it is tuned with a fork. When tension changes to 256 N, it is tuned with the same fork, the number of beats remain unchanged. The frequency of the fork will be
  - A) 186 Hz
  - B) 225 Hz
  - C) 256 Hz
  - D) 280 Hz
7. Assuming the expression for the pressure exerted by the gas on the walls of the container, it can be shown that pressure is
  - A)  $\left[\frac{1}{3}\right]^{\text{rd}}$  kinetic energy per unit volume of a gas
  - B)  $\left[\frac{2}{3}\right]^{\text{rd}}$  kinetic energy per unit volume of a gas
  - C)  $\left[\frac{3}{4}\right]^{\text{th}}$  kinetic energy per unit volume of a gas
  - D)  $\frac{3}{2} \times$  kinetic energy per unit volume of a gas

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SPACE FOR ROUGH WORK



8. A mass ' $m_1$ ' connected to a horizontal spring performs S.H.M. with amplitude ' $A$ '. While mass ' $m_1$ ' is passing through mean position another mass ' $m_2$ ' is placed on it so that both the masses move together with amplitude ' $A_1$ '. The ratio of  $\frac{A_1}{A}$  is ( $m_2 < m_1$ )
- A)  $\left[ \frac{m_1}{m_1 + m_2} \right]^{\frac{1}{2}}$     B)  $\left[ \frac{m_1 + m_2}{m_1} \right]^{\frac{1}{2}}$     C)  $\left[ \frac{m_2}{m_1 + m_2} \right]^{\frac{1}{2}}$     D)  $\left[ \frac{m_1 + m_2}{m_2} \right]^{\frac{1}{2}}$
9. A particle moves along a circle of radius ' $r$ ' with constant tangential acceleration. If the velocity of the particle is ' $v$ ' at the end of second revolution, after the revolution has started then the tangential acceleration is
- A)  $\frac{v^2}{8\pi r}$     B)  $\frac{v^2}{6\pi r}$     C)  $\frac{v^2}{4\pi r}$     D)  $\frac{v^2}{2\pi r}$
10. Two strings A and B of same material are stretched by same tension. The radius of the string A is double the radius of string B. Transverse wave travels on string A with speed ' $V_A$ ' and on string B with speed ' $V_B$ '. The ratio  $\frac{V_A}{V_B}$  is
- A)  $\frac{1}{4}$     B)  $\frac{1}{2}$     C) 2    D) 4
11. The bob of a simple pendulum performs S.H.M. with period ' $T$ ' in air and with period ' $T_1$ ' in water. Relation between ' $T$ ' and ' $T_1$ ' is (neglect friction due to water, density of the material of the bob is  $= \frac{9}{8} \times 10^3 \text{ kg/m}^3$ , density of water  $= 1 \text{ g/cc}$ )
- A)  $T_1 = 3T$     B)  $T_1 = 2T$     C)  $T_1 = T$     D)  $T_1 = \frac{T}{2}$
12. In a capillary tube of radius ' $R$ ', a straight thin metal wire of radius ' $r$ ' ( $R > r$ ) is inserted symmetrically and one end of the combination is dipped vertically in water such that the lower end of the combination is at same level. The rise of water in the capillary tube is [ $T$  = surface tension of water,  $\rho$  = density of water,  $g$  = gravitational acceleration]
- A)  $\frac{T}{(R+r)\rho g}$     B)  $\frac{R\rho g}{2T}$     C)  $\frac{2T}{(R-r)\rho g}$     D)  $\frac{(R-r)\rho g}{T}$
13. When open pipe is closed from one end then third overtone of closed pipe is higher in frequency by 150 Hz than second overtone of open pipe. The fundamental frequency of open end pipe will be
- A) 75 Hz    B) 150 Hz    C) 225 Hz    D) 300 Hz
14. A disc of radius ' $R$ ' and thickness  $\frac{R}{6}$  has moment of inertia ' $I$ ' about an axis passing through its centre and perpendicular to its plane. Disc is melted and recast into a solid sphere. The moment of inertia of a sphere about its diameter is
- A)  $\frac{I}{5}$     B)  $\frac{I}{6}$     C)  $\frac{I}{32}$     D)  $\frac{I}{64}$

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SPACE FOR ROUGH WORK



15. Let a steel bar of length ' $l$ ', breadth ' $b$ ' and depth ' $d$ ' be loaded at the centre by a load ' $W$ '. Then the sag of bending of beam is ( $Y$  = Young's modulus of material of steel)
- A)  $\frac{Wl^3}{2bd^3Y}$       B)  $\frac{Wl^3}{4bd^3Y}$       C)  $\frac{Wl^2}{2bd^3Y}$       D)  $\frac{Wl^3}{4bd^2Y}$
16. Which of the following quantity does **NOT** change due to damping of oscillations ?
- A) Angular frequency      B) Time period  
C) Initial phase      D) Amplitude
17. If the end correction of an open pipe is 0.8 cm then the inner radius of that pipe will be
- A)  $\frac{1}{3}$  cm      B)  $\frac{2}{3}$  cm      C)  $\frac{3}{2}$  cm      D) 0.2 cm
18. A progressive wave is represented by  $y = 12 \sin(5t - 4x)$  cm. On this wave, how far away are the two points having phase difference of  $90^\circ$  ?
- A)  $\frac{\pi}{2}$  cm      B)  $\frac{\pi}{4}$  cm      C)  $\frac{\pi}{8}$  cm      D)  $\frac{\pi}{16}$  cm
19. Two particles of masses ' $m$ ' and ' $9m$ ' are separated by a distance ' $r$ '. At a point on the line joining them the gravitational field is zero. The gravitational potential at that point is ( $G$  = Universal constant of gravitation)
- A)  $-\frac{4Gm}{r}$       B)  $-\frac{8Gm}{r}$       C)  $-\frac{16Gm}{r}$       D)  $-\frac{32Gm}{r}$
20. A black rectangular surface of area ' $A$ ' emits energy ' $E$ ' per second at  $27^\circ\text{C}$ . If length and breadth are reduced to  $\frac{1}{3}$ <sup>rd</sup> of initial value and temperature is raised to  $327^\circ\text{C}$  then energy emitted per second becomes
- A)  $\frac{4E}{9}$       B)  $\frac{7E}{9}$       C)  $\frac{10E}{9}$       D)  $\frac{16E}{9}$
21. A liquid drop having surface energy ' $E$ ' is spread into 512 droplets of same size. The final surface energy of the droplets is
- A)  $2E$       B)  $4E$       C)  $8E$       D)  $12E$
22. Let ' $M$ ' be the mass and ' $L$ ' be the length of a thin uniform rod. In first case, axis of rotation is passing through centre and perpendicular to the length of the rod. In second case axis of rotation is passing through one end and perpendicular to the length of the rod. The ratio of radius of gyration in first case to second case is
- A) 1      B)  $\frac{1}{2}$       C)  $\frac{1}{4}$       D)  $\frac{1}{8}$
23. A simple pendulum of length ' $l$ ' has maximum angular displacement ' $\theta$ '. The maximum kinetic energy of the bob of mass ' $m$ ' is ( $g$  = acceleration due to gravity)
- A)  $mg l (1 + \cos \theta)$       B)  $mg l (1 + \cos^2 \theta)$   
C)  $mg l (1 - \cos \theta)$       D)  $mg l (\cos \theta - 1)$

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SPACE FOR ROUGH WORK



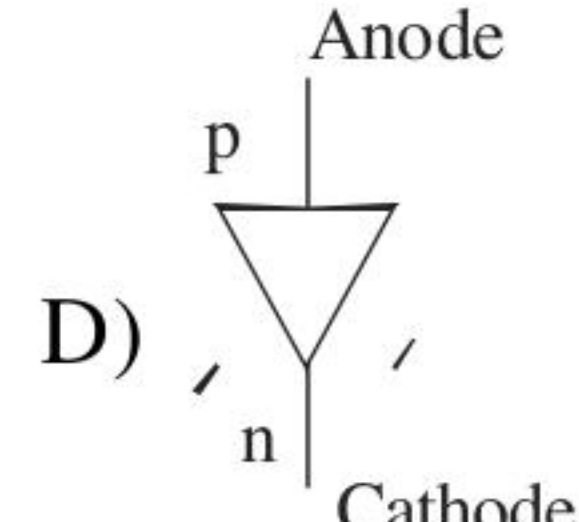
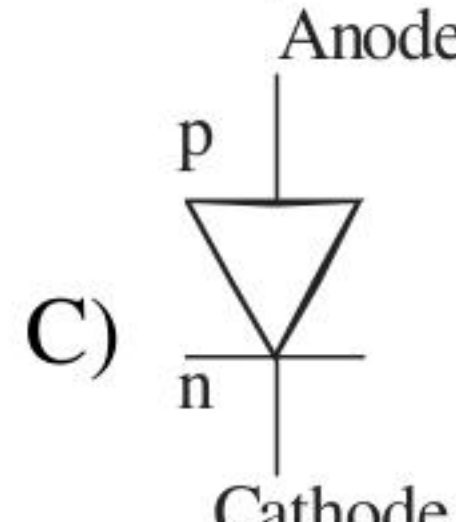
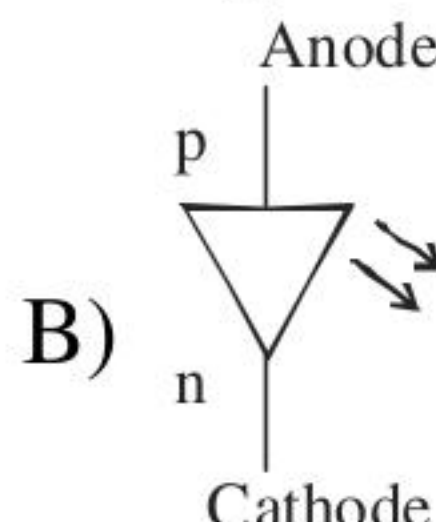
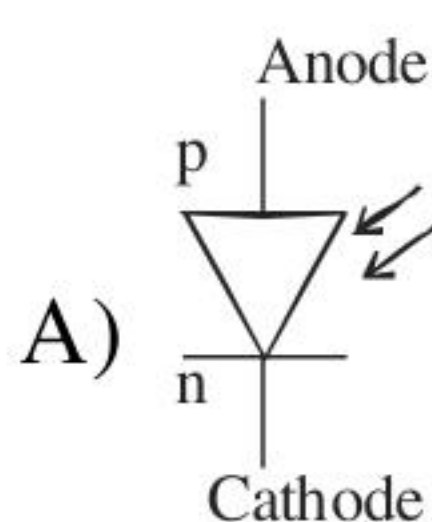
24. Angular speed of hour hand of a clock in degree per second is  
 A)  $\frac{1}{30}$                       B)  $\frac{1}{60}$                       C)  $\frac{1}{120}$                       D)  $\frac{1}{720}$
25. The value of gravitational acceleration 'g' at a height 'h' above the earth's surface is  $\frac{g}{4}$  then (R = radius of earth)  
 A)  $h = R$                       B)  $h = \frac{R}{2}$                       C)  $h = \frac{R}{3}$                       D)  $h = \frac{R}{4}$
26. In potentiometer experiment, null point is obtained at a particular point for a cell on potentiometer wire x cm long. If the length of the potentiometer wire is increased without changing the cell, the balancing length will (Driving source is not changed)  
 A) increase                      B) decrease                      C) not change                      D) becomes zero
27. An iron rod is placed parallel to magnetic field of intensity 2000 A/m. The magnetic flux through the rod is  $6 \times 10^{-4}$  Wb and its cross-sectional area is 3 cm<sup>2</sup>. The magnetic permeability of the rod in  $\frac{\text{Wb}}{\text{A-m}}$  is  
 A)  $10^{-1}$                       B)  $10^{-2}$                       C)  $10^{-3}$                       D)  $10^{-4}$
28. Alternating current of peak value  $\left(\frac{2}{\pi}\right)$  ampere flows through the primary coil of the transformer. The coefficient of mutual inductance between primary and secondary coil is 1 henry. The peak e.m.f. induced in secondary coil is (Frequency of a.c. = 50 Hz)  
 A) 100 V                      B) 200 V                      C) 300 V                      D) 400 V
29. An electron of mass 'm' has de-Broglie wavelength ' $\lambda$ ' when accelerated through potential difference 'V'. When proton of mass 'M', is accelerated through potential difference '9V', the de-Broglie wavelength associated with it will be (Assume that wavelength is determined at low voltage)  
 A)  $\frac{\lambda}{3} \sqrt{\frac{M}{m}}$                       B)  $\frac{\lambda}{3} \cdot \frac{M}{m}$                       C)  $\frac{\lambda}{3} \sqrt{\frac{m}{M}}$                       D)  $\frac{\lambda}{3} \cdot \frac{m}{M}$
30. Interference fringes are produced on a screen by using two light sources of intensities 'I' and '9I'. The phase difference between the beams is  $\frac{\pi}{2}$  at point P and  $\pi$  at point Q on the screen. The difference between the resultant intensities at point P and Q is  
 A) 2 I                      B) 4 I                      C) 6 I                      D) 8 I
31. Three parallel plate air capacitors are connected in parallel. Each capacitor has plate area ' $\frac{A}{3}$ ' and the separation between the plates is 'd', '2d' and '3d' respectively. The equivalent capacity of combination is ( $\epsilon_0$  = absolute permittivity of free space)  
 A)  $\frac{7\epsilon_0 A}{18d}$                       B)  $\frac{11\epsilon_0 A}{18d}$                       C)  $\frac{13\epsilon_0 A}{18d}$                       D)  $\frac{17\epsilon_0 A}{18d}$

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SPACE FOR ROUGH WORK



32. In an oscillator, for sustained oscillations, Barkhausen criterion is  $A\beta$  equal to ( $A$  = voltage gain without feedback,  $\beta$  = feedback factor)
- A) zero                      B)  $\frac{1}{2}$                       C) 1                      D) 2
33. Light of wavelength ' $\lambda$ ' which is less than threshold wavelength is incident on a photosensitive material. If incident wavelength is decreased so that emitted photoelectrons are moving with same velocity then stopping potential will
- A) increase                      B) decrease                      C) be zero                      D) become exactly half
34. A ray of light travelling through rarer medium is incident at very small angle ' $i$ ' on a glass slab and after refraction its velocity is reduced by 20%. The angle of deviation is
- A)  $\frac{i}{8}$                       B)  $\frac{i}{5}$                       C)  $\frac{i}{2}$                       D)  $\frac{4i}{5}$
35. The maximum frequency of transmitted radio waves above which the radio waves are no longer reflected back by ionosphere is \_\_\_\_\_ ( $N$  = maximum electron density of ionosphere,  $g$  = acceleration due to gravity)
- A)  $gN$                       B)  $gN^2$                       C)  $g\sqrt{N}$                       D)  $g^2N^2$
36. In Bohr's theory of Hydrogen atom, the electron jumps from higher orbit ' $n$ ' to lower orbit ' $p$ '. The wavelength will be minimum for the transition
- A)  $n = 5$  to  $p = 4$     B)  $n = 4$  to  $p = 3$     C)  $n = 3$  to  $p = 2$     D)  $n = 2$  to  $p = 1$
37. Two identical parallel plate air capacitors are connected in series to a battery of e.m.f. ' $V$ '. If one of the capacitor is completely filled with dielectric material of constant ' $K$ ', then potential difference of the other capacitor will become
- A)  $\frac{K}{V(K+1)}$     B)  $\frac{KV}{K+1}$     C)  $\frac{K-1}{KV}$     D)  $\frac{V}{K(K+1)}$
38. The LC parallel resonant circuit
- A) has a very high impedance                      B) has a very high current  
C) acts as resistance of very low value    D) has zero impedance
39. A galvanometer of resistance  $30\Omega$  is connected to a battery of emf 2V with  $1970\Omega$  resistance in series. A full scale deflection of 20 divisions is obtained in the galvanometer. To reduce the deflection to 10 divisions, the resistance in series required is
- A)  $4030\Omega$                       B)  $4000\Omega$                       C)  $3970\Omega$                       D)  $2000\Omega$
40. Two coherent sources ' $P$ ' and ' $Q$ ' produce interference at point ' $A$ ' on the screen where there is a dark band which is formed between 4<sup>th</sup> bright band and 5<sup>th</sup> bright band. Wavelength of light used is  $6000\text{\AA}$ . The path difference between PA and QA is
- A)  $1.4 \times 10^{-4}\text{ cm}$     B)  $2.7 \times 10^{-4}\text{ cm}$     C)  $4.5 \times 10^{-4}\text{ cm}$     D)  $6.2 \times 10^{-4}\text{ cm}$
41. The schematic symbol of light emitting diode is (LED)



SPACE FOR ROUGH WORK



42. The amount of work done in increasing the voltage across the plates of capacitor from 5V to 10V is 'W'. The work done in increasing it from 10V to 15V will be  
A) W                      B) 0.6 W                      C) 1.25 W                      D) 1.67 W
43. Magnetic flux passing through a coil is initially  $4 \times 10^{-4}$  Wb. It reduces to 10% of its original value in 't' second. If the e.m.f. induced is 0.72 mV then 't' in second is  
A) 0.3                      B) 0.4                      C) 0.5                      D) 0.6
44. Resolving power of telescope increases when  
A) wavelength of light decreases                      B) wavelength of light increases  
C) focal length of eye-piece increases                      D) focal length of eye-piece decreases
45. When light of wavelength ' $\lambda$ ' is incident on photosensitive surface, the stopping potential is 'V'. When light of wavelength ' $3\lambda$ ' is incident on same surface, the stopping potential is ' $\frac{V}{6}$ '. Threshold wavelength for the surface is  
A)  $2\lambda$                       B)  $3\lambda$                       C)  $4\lambda$                       D)  $5\lambda$
46. From Brewster's law, except for polished metallic surfaces, the polarising angle  
A) depends on wavelength and is different for different colours  
B) independent of wavelength and is different for different colours  
C) independent of wavelength and is same for different colours  
D) depends on wavelength and is same for different colours
47. Two particles X and Y having equal charges after being accelerated through same potential difference enter a region of uniform magnetic field and describe a circular paths of radii ' $r_1$ ' and ' $r_2$ ' respectively. The ratio of the mass of X to that of Y is  
A)  $\frac{r_1}{r_2}$                       B)  $\sqrt{\frac{r_1}{r_2}}$                       C)  $\left[\frac{r_2}{r_1}\right]^2$                       D)  $\left[\frac{r_1}{r_2}\right]^2$
48. When an electron in Hydrogen atom revolves in stationary orbit, it  
A) does not radiate light though its velocity changes  
B) does not radiate light and velocity remains unchanged  
C) radiates light but its velocity is unchanged  
D) radiates light with the change of energy
49. The magnetic field (B) inside a long solenoid having 'n', turns per unit length and carrying current 'I' when iron core is kept in it is ( $\mu_0$  = permeability of vacuum,  $\chi$  = magnetic susceptibility)  
A)  $\mu_0 nI (1 - \chi)$                       B)  $\mu_0 nI \chi$                       C)  $\mu_0 nI^2 (1 + \chi)$                       D)  $\mu_0 nI (1 + \chi)$
50. In balanced metre bridge, the resistance of bridge wire is  $0.1 \Omega / \text{cm}$ . Unknown resistance 'X' is connected in left gap and  $6 \Omega$  in right gap, null point divides the wire in the ratio 2 : 3. Find the current drawn from the battery of 5 V having negligible resistance.  
A) 1 A                      B) 1.5 A                      C) 2 A                      D) 5 A

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SPACE FOR ROUGH WORK

**CHEMISTRY**

51. If 'n' represents total number of asymmetric carbon atoms in a compound, the possible number of optical isomers of the compound is  
A)  $2n$                       B)  $n^2$                       C)  $2^n$                       D)  $2n + 2$
52. The equation that represents van't Hoff general solution equation is  
A)  $\pi = \frac{n}{V} RT$               B)  $\pi = nRT$               C)  $\pi = \frac{V}{n} RT$               D)  $\pi = nVRT$
53. Which is the most stable allotrope of sulphur ?  
A) Octahedral sulphur                      B) Monoclinic sulphur  
C) Plastic sulphur                      D) Colloidal sulphur
54. Correct statement for thermoplastic polymer is  
A) It does not become soft on heating under pressure  
B) It can not be remoulded  
C) It is either linear or branched chain polymer  
D) It is cross-linked polymer
55. How many Faradays of electricity are required to deposit 10 g of calcium from molten calcium chloride using inert electrodes ? (molar mass of calcium =  $40 \text{ g mol}^{-1}$ )  
A) 0.5 F                      B) 1 F                      C) 0.25 F                      D) 2 F
56. Name the reagent that is used in leaching of gold  
A) Carbon                      B) Sodium cyanide  
C) Carbon monoxide                      D) Iodine
57. Which of the following is an analgesic ?  
A) Ofloxacin                      B) Penicillin  
C) Aminoglycosides                      D) Paracetamol
58. The compound which is **NOT** formed when a mixture of n-butyl bromide and ethyl bromide treated with sodium metal in presence of dry ether is  
A) Butane                      B) Octane                      C) Hexane                      D) Ethane
59. What is the general molecular formula of the products obtained on heating lanthanoids (Ln) with sulphur ?  
A)  $\text{LnS}$                       B)  $\text{LnS}_3$                       C)  $\text{Ln}_3\text{S}_2$                       D)  $\text{Ln}_2\text{S}_3$
60. Butylated hydroxy anisole is  
A) an anti oxidant                      B) cleansing agent  
C) disinfectant                      D) an antihistamine
61. In the cell represented by  $\text{Pb}_{(s)} | \text{Pb}^{2+}_{(1M)} || \text{Ag}^{+}_{(1M)} | \text{Ag}_{(s)}$ , the reducing agent is  
A) Pb                      B)  $\text{Pb}^{2+}$                       C) Ag                      D)  $\text{Ag}^{+}$
62. Which metal crystallises in a simple cubic structure ?  
A) Polonium                      B) Copper                      C) Nickel                      D) Iron

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SPACE FOR ROUGH WORK



63. The amine 'A' when treated with nitrous acid gives yellow oily substance. The amine A is  
A) triethylamine B) trimethylamine  
C) aniline D) methylphenylamine
64. The element that does **NOT** form acidic oxide is  
A) Carbon B) Phosphorus C) Chlorine D) Barium
65. While assigning R, S configuration the correct order of priority of groups attached to chiral carbon atom is  
A)  $\text{CONH}_2 > \text{COCH}_3 > \text{CH}_2\text{OH} > \text{CHO}$   
B)  $\text{CONH}_2 > \text{COCH}_3 > \text{CHO} > \text{CH}_2\text{OH}$   
C)  $\text{COCH}_3 > \text{CONH}_2 > \text{CHO} > \text{CH}_2\text{OH}$   
D)  $\text{CHO} > \text{CH}_2\text{OH} > \text{COCH}_3 > \text{CONH}_2$
66. Bulletproof helmets are made from  
A) Lexan B) Saran C) Glyptal D) Thiokol
67. Which metal is refined by Mond Process ?  
A) Titanium B) Copper C) Nickel D) Zinc
68. Isopropyl methyl ether when treated with cold hydrogen iodide gives  
A) isopropyl iodide and methyl iodide B) isopropyl alcohol and methyl iodide  
C) isopropyl alcohol and methyl alcohol D) isopropyl iodide and methyl alcohol
69. In face centred cubic unit cell, what is the volume occupied ?  
A)  $\frac{4}{3}\pi r^3$  B)  $\frac{8}{3}\pi r^3$  C)  $\frac{16}{3}\pi r^3$  D)  $\frac{64r^3}{3\sqrt{3}}$
70. Glucose on oxidation with bromine water yields gluconic acid. This reaction confirms presence of  
A) six carbon atoms linked in straight chain  
B) secondary alcoholic group in glucose  
C) aldehyde group in glucose  
D) primary alcoholic group in glucose
71. How is sodium chromate converted into sodium dichromate in the manufacture of potassium dichromate from chromite ore ?  
A) By the action of concentrated sulphuric acid  
B) By roasting with soda ash  
C) By the action of sodium hydroxide  
D) By the action of lime stone
72. In dry cell, what acts as negative electrode ?  
A) Zinc B) Graphite  
C) Ammonium chloride D) Manganese dioxide
73. Select the compound which on treatment with nitrous acid liberates nitrogen.  
A) Nitroethane B) Triethylamine  
C) Diethylamine D) Ethylamine

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SPACE FOR ROUGH WORK



74. 5.0 g of sodium hydroxide (molar mass  $40 \text{ g mol}^{-1}$ ) is dissolved in little quantity of water and the solution is diluted up to 100 ml. What is the molarity of the resulting solution ?  
A)  $0.1 \text{ mol dm}^{-3}$  B)  $1.0 \text{ mol dm}^{-3}$  C)  $0.125 \text{ mol dm}^{-3}$  D)  $1.25 \text{ mol dm}^{-3}$
75. Which of the following compounds when treated with dibenzyl cadmium yields benzyl methyl ketone ?  
A) Acetone B) Acetaldehyde C) Acetic acid D) Acetyl chloride
76. Which halide of magnesium has highest ionic character ?  
A) Chloride B) Bromide C) Iodide D) Fluoride
77. The reaction takes place in two steps as  
i)  $\text{NO}_2\text{Cl}_{(g)} \xrightarrow{K_1} \text{NO}_2_{(g)} + \text{Cl}_{(g)}$   
ii)  $\text{NO}_2\text{Cl}_{(g)} + \text{Cl}_{(g)} \xrightarrow{K_2} \text{NO}_2_{(g)} + \text{Cl}_2_{(g)}$   
Identify the reaction intermediate  
A)  $\text{NO}_2\text{Cl}_{(g)}$  B)  $\text{NO}_2_{(g)}$  C)  $\text{Cl}_2_{(g)}$  D)  $\text{Cl}_{(g)}$
78. Which of the following aminoacids is basic in nature ?  
A) Valine B) Tyrosine C) Arginine D) Leucine
79. The relation between solubility of a gas in liquid at constant temperature and external pressure is stated by which law ?  
A) Raoult's law B) van't Hoff Boyle's law  
C) van't Hoff Charles' law D) Henry's law
80. Which among the following phenolic compounds is most acidic in nature ?  
A) p-aminophenol B) phenol  
C) m-nitrophenol D) p-nitrophenol
81. Which among the following solids is a nonpolar solid ?  
A) Hydrogen chloride B) Sulphur dioxide  
C) Water D) Carbon dioxide
82. Identify the metal that forms colourless compounds.  
A) Iron ( $Z = 26$ ) B) Chromium ( $Z = 24$ )  
C) Vanadium ( $Z = 23$ ) D) Scandium ( $Z = 21$ )
83. What is the highest oxidation state exhibited by group 17 elements ?  
A) + 1 B) + 3 C) + 5 D) + 7
84. Mathematical equation of first law of thermodynamics for isochoric process is  
A)  $\Delta U = q_v$  B)  $-\Delta U = q_v$  C)  $q = -W$  D)  $\Delta U = W$
85. Name the catalyst used in commercial method of preparation of phenol.  
A) Silica B) Calcium phosphate  
C) Anhydrous aluminium chloride D) Cobalt naphthenate
86. The rate constant and half life of a first order reaction are related to each other as  
A)  $t_{1/2} = \frac{0.693}{K}$  B)  $t_{1/2} = 0.693 K$  C)  $K = 0.693 t_{1/2}$  D)  $K t_{1/2} = \frac{1}{0.693}$

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SPACE FOR ROUGH WORK



87. What is the combining ratio of glycerol and fatty acids when they combine to form triglyceride ?  
A) 3 : 4                      B) 3 : 2                      C) 1 : 3                      D) 1 : 2
88. The molecular formula of Wilkinson catalyst, used in hydrogenation of alkenes is  
A)  $\text{Co}(\text{CO})_8$                       B)  $(\text{Ph}_3\text{P})_3\text{RhCl}$   
C)  $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$                       D)  $\text{K}[\text{Ag}(\text{CN})_2]$
89. The criterion for a spontaneous process is  
A)  $\Delta G > 0$                       B)  $\Delta G < 0$                       C)  $\Delta G = 0$                       D)  $\Delta S_{\text{total}} < 0$
90. Brown ring test is used for detection of which radical ?  
A) Ferrous                      B) Nitrite                      C) Nitrate                      D) Ferric
91. The reagent used in Wolff-Kishner reduction is  
A)  $\text{NH}_2 - \text{NH}_2$  and KOH in ethylene glycol  
B)  $\text{Zn} - \text{Hg}/\text{conc. HCl}$   
C)  $\text{NaBH}_4$   
D)  $\text{Na} - \text{Hg}/\text{H}_2\text{O}$
92. Which of the following is a neutral complex ?  
A)  $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$                       B)  $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$   
C)  $[\text{Ni}(\text{NH}_3)_6]\text{Cl}_2$                       D)  $\text{K}_4[\text{Fe}(\text{CN})_6]$
93. Identify the compound amongst the following of which 0.1 M aqueous solution has highest boiling point.  
A) Glucose                      B) Sodium chloride  
C) Calcium chloride                      D) Ferric chloride
94. What is the reagent used in Etard reaction ?  
A) Chromyl chloride                      B) Ethanoyl chloride  
C)  $\text{SnCl}_2$  and HCl                      D) Cadmium chloride
95. The most abundant noble gas in atmosphere is  
A) Neon                      B) Argon                      C) Xenon                      D) Krypton
96. Identify an extensive property amongst the following  
A) Viscosity                      B) Heat capacity                      C) Density                      D) Surface tension
97. Which of the following carboxylic acids is a tricarboxylic acid ?  
A) Oxalic acid                      B) Citric acid                      C) Succinic acid                      D) Adipic acid
98. Average rate of reaction  $2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \longrightarrow 2\text{SO}_3(\text{g})$  is written as  
A)  $\frac{\Delta[\text{SO}_2]}{\Delta t}$                       B)  $-\frac{\Delta[\text{O}_2]}{\Delta t}$                       C)  $\frac{1}{2} \frac{\Delta[\text{SO}_2]}{\Delta t}$                       D)  $\frac{\Delta[\text{SO}_3]}{\Delta t}$
99. What is the amount of work done when 0.5 mole of methane,  $\text{CH}_4(\text{g})$ , is subjected to combustion at 300 K ? (given,  $R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$ )  
A) -2494 J                      B) -4988 J                      C) +4988 J                      D) +2494 J
100. Primary nitroalkanes are obtained in good yield by oxidising aldoximes with the help of  
A) trifluoroperoxyacetic acid                      B) acidified potassium permanganate  
C) concentrated nitric acid                      D) potassium dichromate and dilute sulphuric acid

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SPACE FOR ROUGH WORK



LOGARITHMS

|    | 0    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 1 | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
|----|------|------|------|------|------|------|------|------|------|------|---|---|----|----|----|----|----|----|----|
| 10 | 0000 | 0043 | 0086 | 0128 | 0170 |      |      |      |      |      | 5 | 9 | 13 | 17 | 21 | 26 | 30 | 34 | 38 |
|    |      |      |      |      |      | 0212 | 0253 | 0294 | 0334 | 0374 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 |
| 11 | 0414 | 0453 | 0492 | 0531 | 0569 |      |      |      |      |      | 4 | 8 | 12 | 16 | 20 | 23 | 27 | 31 | 35 |
|    |      |      |      |      |      | 0607 | 0645 | 0682 | 0719 | 0755 | 4 | 7 | 11 | 15 | 18 | 22 | 26 | 29 | 33 |
| 12 | 0792 | 0828 | 0864 | 0899 | 0934 |      |      |      |      |      | 3 | 7 | 11 | 14 | 18 | 21 | 25 | 28 | 32 |
|    |      |      |      |      |      | 0969 | 1004 | 1038 | 1072 | 1106 | 3 | 7 | 10 | 14 | 17 | 20 | 24 | 27 | 31 |
| 13 | 1139 | 1173 | 1206 | 1239 | 1271 |      |      |      |      |      | 3 | 6 | 10 | 13 | 16 | 19 | 23 | 26 | 29 |
|    |      |      |      |      |      | 1303 | 1335 | 1367 | 1399 | 1430 | 3 | 6 | 10 | 13 | 16 | 19 | 22 | 25 | 29 |
| 14 | 1461 | 1492 | 1523 | 1553 | 1584 |      |      |      |      |      | 3 | 6 | 9  | 12 | 15 | 19 | 22 | 25 | 28 |
|    |      |      |      |      |      | 1614 | 1644 | 1673 | 1703 | 1732 | 3 | 6 | 9  | 12 | 14 | 17 | 20 | 23 | 26 |
| 15 | 1761 | 1790 | 1818 | 1847 | 1875 |      |      |      |      |      | 3 | 6 | 9  | 11 | 14 | 17 | 20 | 23 | 26 |
|    |      |      |      |      |      | 1903 | 1931 | 1959 | 1987 | 2014 | 3 | 6 | 8  | 11 | 14 | 17 | 19 | 22 | 25 |
| 16 | 2041 | 2068 | 2095 | 2122 | 2148 |      |      |      |      |      | 3 | 6 | 8  | 11 | 14 | 16 | 19 | 22 | 24 |
|    |      |      |      |      |      | 2175 | 2201 | 2227 | 2253 | 2279 | 3 | 5 | 8  | 10 | 13 | 16 | 18 | 21 | 23 |
| 17 | 2304 | 2330 | 2355 | 2380 | 2405 |      |      |      |      |      | 3 | 5 | 8  | 10 | 13 | 15 | 18 | 20 | 23 |
|    |      |      |      |      |      | 2430 | 2455 | 2480 | 2504 | 2529 | 3 | 5 | 8  | 10 | 12 | 15 | 17 | 20 | 22 |
| 18 | 2553 | 2577 | 2601 | 2625 | 2648 |      |      |      |      |      | 2 | 5 | 7  | 9  | 12 | 14 | 17 | 19 | 21 |
|    |      |      |      |      |      | 2672 | 2695 | 2718 | 2742 | 2765 | 2 | 4 | 7  | 9  | 11 | 14 | 16 | 18 | 21 |
| 19 | 2788 | 2810 | 2833 | 2856 | 2878 |      |      |      |      |      | 2 | 4 | 7  | 9  | 11 | 13 | 16 | 18 | 20 |
|    |      |      |      |      |      | 2900 | 2923 | 2945 | 2967 | 2989 | 2 | 4 | 6  | 8  | 11 | 13 | 15 | 17 | 19 |
| 20 | 3010 | 3032 | 3054 | 3075 | 3096 | 3118 | 3139 | 3160 | 3181 | 3201 | 2 | 4 | 6  | 8  | 11 | 13 | 15 | 17 | 19 |
| 21 | 3222 | 3243 | 3263 | 3284 | 3304 | 3324 | 3345 | 3365 | 3385 | 3404 | 2 | 4 | 6  | 8  | 10 | 12 | 14 | 16 | 18 |
| 22 | 3424 | 3444 | 3464 | 3483 | 3502 | 3522 | 3541 | 3560 | 3579 | 3598 | 2 | 4 | 6  | 8  | 10 | 12 | 14 | 15 | 17 |
| 23 | 3617 | 3636 | 3655 | 3674 | 3692 | 3711 | 3729 | 3747 | 3766 | 3784 | 2 | 4 | 6  | 7  | 9  | 11 | 13 | 15 | 17 |
| 24 | 3802 | 3820 | 3838 | 3856 | 3874 | 3892 | 3909 | 3927 | 3945 | 3962 | 2 | 4 | 5  | 7  | 9  | 11 | 12 | 14 | 16 |
| 25 | 3979 | 3997 | 4014 | 4031 | 4048 | 4065 | 4082 | 4099 | 4116 | 4133 | 2 | 3 | 5  | 7  | 9  | 10 | 12 | 14 | 15 |
| 26 | 4150 | 4166 | 4183 | 4200 | 4216 | 4232 | 4249 | 4265 | 4281 | 4298 | 2 | 3 | 5  | 7  | 8  | 10 | 11 | 14 | 15 |
| 27 | 4314 | 4330 | 4346 | 4362 | 4378 | 4393 | 4409 | 4425 | 4440 | 4456 | 2 | 3 | 5  | 6  | 8  | 9  | 11 | 13 | 14 |
| 28 | 4472 | 4487 | 4502 | 4518 | 4533 | 4548 | 4564 | 4579 | 4594 | 4609 | 2 | 3 | 5  | 6  | 8  | 9  | 11 | 12 | 14 |
| 29 | 4624 | 4639 | 4654 | 4669 | 4683 | 4698 | 4713 | 4728 | 4742 | 4757 | 1 | 3 | 4  | 6  | 7  | 9  | 10 | 12 | 13 |
| 30 | 4771 | 4786 | 4800 | 4814 | 4829 | 4843 | 4857 | 4871 | 4886 | 4900 | 1 | 3 | 4  | 6  | 7  | 9  | 10 | 11 | 13 |
| 31 | 4914 | 4928 | 4942 | 4955 | 4969 | 4983 | 4997 | 5011 | 5024 | 5038 | 1 | 3 | 4  | 6  | 7  | 8  | 10 | 11 | 12 |
| 32 | 5051 | 5065 | 5079 | 5092 | 5105 | 5119 | 5132 | 5145 | 5159 | 5172 | 1 | 3 | 4  | 5  | 7  | 8  | 9  | 11 | 12 |
| 33 | 5185 | 5198 | 5211 | 5224 | 5237 | 5250 | 5263 | 5276 | 5289 | 5302 | 1 | 3 | 4  | 5  | 6  | 8  | 9  | 10 | 12 |
| 34 | 5315 | 5328 | 5340 | 5353 | 5366 | 5378 | 5391 | 5403 | 5416 | 5428 | 1 | 3 | 4  | 5  | 6  | 8  | 9  | 10 | 11 |
| 35 | 5441 | 5453 | 5465 | 5478 | 5490 | 5502 | 5514 | 5527 | 5539 | 5551 | 1 | 2 | 4  | 5  | 6  | 7  | 9  | 10 | 11 |
| 36 | 5563 | 5575 | 5587 | 5599 | 5611 | 5623 | 5635 | 5647 | 5658 | 5670 | 1 | 2 | 4  | 5  | 6  | 7  | 8  | 10 | 11 |
| 37 | 5682 | 5694 | 5705 | 5717 | 5729 | 5740 | 5752 | 5763 | 5775 | 5786 | 1 | 2 | 3  | 5  | 6  | 7  | 8  | 9  | 10 |
| 38 | 5798 | 5809 | 5821 | 5832 | 5843 | 5855 | 5866 | 5877 | 5888 | 5899 | 1 | 2 | 3  | 5  | 6  | 7  | 8  | 9  | 10 |
| 39 | 5911 | 5922 | 5933 | 5944 | 5955 | 5966 | 5977 | 5988 | 5999 | 6010 | 1 | 2 | 3  | 4  | 5  | 7  | 8  | 9  | 10 |
| 40 | 6021 | 6031 | 6042 | 6053 | 6064 | 6075 | 6085 | 6096 | 6107 | 6117 | 1 | 2 | 3  | 4  | 5  | 6  | 8  | 9  | 10 |
| 41 | 6128 | 6138 | 6149 | 6160 | 6170 | 6180 | 6191 | 6201 | 6212 | 6222 | 1 | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
| 42 | 6232 | 6243 | 6253 | 6263 | 6274 | 6284 | 6294 | 6304 | 6314 | 6325 | 1 | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
| 43 | 6335 | 6345 | 6355 | 6365 | 6375 | 6385 | 6395 | 6405 | 6415 | 6425 | 1 | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
| 44 | 6435 | 6444 | 6454 | 6464 | 6474 | 6484 | 6493 | 6503 | 6513 | 6522 | 1 | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
| 45 | 6532 | 6542 | 6551 | 6561 | 6571 | 6580 | 6590 | 6599 | 6609 | 6618 | 1 | 2 | 3  | 4  | 5  | 6  | 7  | 8  | 9  |
| 46 | 6628 | 6637 | 6646 | 6656 | 6665 | 6675 | 6684 | 6693 | 6702 | 6712 | 1 | 2 | 3  | 4  | 5  | 6  | 7  | 7  | 8  |
| 47 | 6721 | 6730 | 6739 | 6749 | 6758 | 6767 | 6776 | 6785 | 6794 | 6803 | 1 | 2 | 3  | 4  | 5  | 5  | 6  | 7  | 8  |
| 48 | 6812 | 6821 | 6830 | 6839 | 6848 | 6857 | 6866 | 6875 | 6884 | 6893 | 1 | 2 | 3  | 4  | 4  | 5  | 6  | 7  | 8  |
| 49 | 6902 | 6911 | 6920 | 6928 | 6937 | 6946 | 6955 | 6964 | 6972 | 6981 | 1 | 2 | 3  | 4  | 4  | 5  | 6  | 7  | 8  |



## LOGARITHMS

|    | 0    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|----|------|------|------|------|------|------|------|------|------|------|---|---|---|---|---|---|---|---|---|
| 50 | 6990 | 6998 | 7007 | 7016 | 7024 | 7033 | 7042 | 7050 | 7059 | 7067 | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 7 | 8 |
| 51 | 7076 | 7084 | 7093 | 7101 | 7110 | 7118 | 7126 | 7135 | 7143 | 7152 | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 7 | 8 |
| 52 | 7160 | 7168 | 7177 | 7185 | 7193 | 7202 | 7210 | 7218 | 7226 | 7235 | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 7 | 7 |
| 53 | 7243 | 7251 | 7259 | 7267 | 7275 | 7284 | 7292 | 7300 | 7308 | 7316 | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 6 | 7 |
| 54 | 7324 | 7332 | 7340 | 7348 | 7356 | 7364 | 7372 | 7380 | 7388 | 7396 | 1 | 2 | 2 | 3 | 4 | 5 | 6 | 6 | 7 |
| 55 | 7404 | 7412 | 7419 | 7427 | 7435 | 7443 | 7451 | 7459 | 7466 | 7474 | 1 | 2 | 2 | 3 | 4 | 5 | 5 | 6 | 7 |
| 56 | 7482 | 7490 | 7497 | 7505 | 7513 | 7520 | 7528 | 7536 | 7543 | 7551 | 1 | 2 | 2 | 3 | 4 | 5 | 5 | 6 | 7 |
| 57 | 7559 | 7566 | 7574 | 7582 | 7589 | 7597 | 7604 | 7612 | 7619 | 7627 | 1 | 2 | 2 | 3 | 4 | 5 | 5 | 6 | 7 |
| 58 | 7634 | 7642 | 7649 | 7657 | 7664 | 7672 | 7679 | 7686 | 7694 | 7701 | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 7 |
| 59 | 7709 | 7716 | 7723 | 7731 | 7738 | 7745 | 7752 | 7760 | 7767 | 7774 | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 7 |
| 60 | 7782 | 7789 | 7796 | 7803 | 7810 | 7818 | 7825 | 7832 | 7839 | 7846 | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 6 |
| 61 | 7853 | 7860 | 7868 | 7875 | 7882 | 7889 | 7896 | 7903 | 7910 | 7917 | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 6 |
| 62 | 7924 | 7931 | 7938 | 7945 | 7952 | 7959 | 7966 | 7973 | 7980 | 7987 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 6 |
| 63 | 7993 | 8000 | 8007 | 8014 | 8021 | 8028 | 8035 | 8041 | 8048 | 8055 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 |
| 64 | 8062 | 8069 | 8075 | 8082 | 8089 | 8096 | 8102 | 8109 | 8116 | 8122 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 |
| 65 | 8129 | 8136 | 8142 | 8149 | 8156 | 8162 | 8169 | 8176 | 8182 | 8189 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 |
| 66 | 8195 | 8202 | 8209 | 8215 | 8222 | 8228 | 8235 | 8241 | 8248 | 8254 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 |
| 67 | 8261 | 8267 | 8274 | 8280 | 8287 | 8293 | 8299 | 8306 | 8312 | 8319 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 |
| 68 | 8325 | 8331 | 8338 | 8344 | 8351 | 8357 | 8363 | 8370 | 8376 | 8382 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 5 | 6 |
| 69 | 8388 | 8395 | 8401 | 8407 | 8414 | 8420 | 8426 | 8432 | 8439 | 8445 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 6 |
| 70 | 8451 | 8457 | 8463 | 8470 | 8476 | 8482 | 8488 | 8494 | 8500 | 8506 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 6 |
| 71 | 8513 | 8519 | 8525 | 8531 | 8537 | 8543 | 8549 | 8555 | 8561 | 8567 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 5 |
| 72 | 8573 | 8579 | 8585 | 8591 | 8597 | 8603 | 8609 | 8615 | 8621 | 8627 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 5 |
| 73 | 8633 | 8639 | 8645 | 8651 | 8657 | 8663 | 8669 | 8675 | 8681 | 8686 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 5 |
| 74 | 8692 | 8698 | 8704 | 8710 | 8716 | 8722 | 8727 | 8733 | 8739 | 8745 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 5 |
| 75 | 8751 | 8756 | 8762 | 8768 | 8774 | 8779 | 8785 | 8791 | 8797 | 8802 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 5 | 5 |
| 76 | 8808 | 8814 | 8820 | 8825 | 8831 | 8837 | 8842 | 8848 | 8854 | 8859 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 5 | 5 |
| 77 | 8865 | 8871 | 8876 | 8882 | 8887 | 8893 | 8899 | 8904 | 8910 | 8915 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 78 | 8921 | 8927 | 8932 | 8938 | 8943 | 8949 | 8954 | 8960 | 8965 | 8971 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 79 | 8976 | 8982 | 8987 | 8993 | 8998 | 9004 | 9009 | 9015 | 9020 | 9025 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 80 | 9031 | 9036 | 9042 | 9047 | 9053 | 9058 | 9063 | 9069 | 9074 | 9079 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 81 | 9085 | 9090 | 9096 | 9101 | 9106 | 9112 | 9117 | 9122 | 9128 | 9133 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 82 | 9138 | 9143 | 9149 | 9154 | 9159 | 9165 | 9170 | 9175 | 9180 | 9186 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 83 | 9191 | 9196 | 9201 | 9206 | 9212 | 9217 | 9222 | 9227 | 9232 | 9238 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 84 | 9243 | 9248 | 9253 | 9258 | 9263 | 9269 | 9274 | 9279 | 9284 | 9289 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 85 | 9294 | 9299 | 9304 | 9309 | 9315 | 9320 | 9325 | 9330 | 9335 | 9340 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 86 | 9345 | 9350 | 9355 | 9360 | 9365 | 9370 | 9375 | 9380 | 9385 | 9390 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 87 | 9395 | 9400 | 9405 | 9410 | 9415 | 9420 | 9425 | 9430 | 9435 | 9440 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 88 | 9445 | 9450 | 9455 | 9460 | 9465 | 9469 | 9474 | 9479 | 9484 | 9489 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 89 | 9494 | 9499 | 9504 | 9509 | 9513 | 9518 | 9523 | 9528 | 9533 | 9538 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 90 | 9542 | 9547 | 9552 | 9557 | 9562 | 9566 | 9571 | 9576 | 9581 | 9586 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 91 | 9590 | 9595 | 9600 | 9605 | 9609 | 9614 | 9619 | 9624 | 9628 | 9633 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 92 | 9638 | 9643 | 9647 | 9652 | 9657 | 9661 | 9666 | 9671 | 9675 | 9680 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 93 | 9685 | 9689 | 9694 | 9699 | 9703 | 9708 | 9713 | 9717 | 9722 | 9727 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 94 | 9731 | 9736 | 9741 | 9745 | 9750 | 9754 | 9759 | 9763 | 9768 | 9773 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 95 | 9777 | 9782 | 9786 | 9791 | 9795 | 9800 | 9805 | 9809 | 9814 | 9818 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 96 | 9823 | 9827 | 9832 | 9836 | 9841 | 9845 | 9850 | 9854 | 9859 | 9863 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 97 | 9868 | 9872 | 9877 | 9881 | 9886 | 9890 | 9894 | 9899 | 9903 | 9908 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 98 | 9912 | 9917 | 9921 | 9926 | 9930 | 9934 | 9939 | 9943 | 9948 | 9952 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 99 | 9956 | 9961 | 9965 | 9969 | 9974 | 9978 | 9983 | 9987 | 9991 | 9996 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 4 |



ANTILOGARITHMS

|      | 0    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|------|------|------|------|------|------|------|------|------|------|------|---|---|---|---|---|---|---|---|---|
| 0.00 | 1000 | 1002 | 1005 | 1007 | 1009 | 1012 | 1014 | 1016 | 1019 | 1021 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 |
| 0.01 | 1023 | 1026 | 1028 | 1030 | 1033 | 1035 | 1038 | 1040 | 1042 | 1045 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 |
| 0.02 | 1047 | 1050 | 1052 | 1054 | 1057 | 1059 | 1062 | 1064 | 1067 | 1069 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 |
| 0.03 | 1072 | 1074 | 1076 | 1079 | 1081 | 1084 | 1086 | 1089 | 1091 | 1094 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 |
| 0.04 | 1096 | 1099 | 1102 | 1104 | 1107 | 1109 | 1112 | 1114 | 1117 | 1119 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| 0.05 | 1122 | 1125 | 1127 | 1130 | 1132 | 1135 | 1138 | 1140 | 1143 | 1146 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| 0.06 | 1148 | 1151 | 1153 | 1156 | 1159 | 1161 | 1164 | 1167 | 1169 | 1172 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| 0.07 | 1175 | 1178 | 1180 | 1183 | 1186 | 1189 | 1191 | 1194 | 1197 | 1199 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| 0.08 | 1202 | 1205 | 1208 | 1211 | 1213 | 1216 | 1219 | 1222 | 1225 | 1227 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 |
| 0.09 | 1230 | 1233 | 1236 | 1239 | 1242 | 1245 | 1247 | 1250 | 1253 | 1256 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 |
| 0.10 | 1259 | 1262 | 1265 | 1268 | 1271 | 1274 | 1276 | 1279 | 1282 | 1285 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 3 |
| 0.11 | 1288 | 1291 | 1294 | 1297 | 1300 | 1303 | 1306 | 1309 | 1312 | 1315 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| 0.12 | 1318 | 1321 | 1324 | 1327 | 1330 | 1334 | 1337 | 1340 | 1343 | 1346 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 |
| 0.13 | 1349 | 1352 | 1355 | 1358 | 1361 | 1365 | 1368 | 1371 | 1374 | 1377 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 |
| 0.14 | 1380 | 1384 | 1387 | 1390 | 1393 | 1396 | 1400 | 1403 | 1406 | 1409 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 |
| 0.15 | 1413 | 1416 | 1419 | 1422 | 1426 | 1429 | 1432 | 1435 | 1439 | 1442 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 |
| 0.16 | 1445 | 1449 | 1452 | 1455 | 1459 | 1462 | 1466 | 1469 | 1472 | 1476 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 |
| 0.17 | 1479 | 1483 | 1486 | 1489 | 1493 | 1496 | 1500 | 1503 | 1507 | 1510 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 |
| 0.18 | 1514 | 1517 | 1521 | 1524 | 1528 | 1531 | 1535 | 1538 | 1542 | 1545 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 |
| 0.19 | 1549 | 1552 | 1556 | 1560 | 1563 | 1567 | 1570 | 1574 | 1578 | 1581 | 0 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 |
| 0.20 | 1585 | 1589 | 1592 | 1596 | 1600 | 1603 | 1607 | 1611 | 1614 | 1618 | 0 | 1 | 1 | 1 | 2 | 2 | 3 | 3 | 3 |
| 0.21 | 1622 | 1626 | 1629 | 1633 | 1637 | 1641 | 1644 | 1648 | 1652 | 1656 | 0 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 |
| 0.22 | 1660 | 1663 | 1667 | 1671 | 1675 | 1679 | 1683 | 1687 | 1690 | 1694 | 0 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 |
| 0.23 | 1698 | 1702 | 1706 | 1710 | 1714 | 1718 | 1722 | 1726 | 1730 | 1734 | 0 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 4 |
| 0.24 | 1738 | 1742 | 1746 | 1750 | 1754 | 1758 | 1762 | 1766 | 1770 | 1774 | 0 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 4 |
| 0.25 | 1778 | 1782 | 1786 | 1791 | 1795 | 1799 | 1803 | 1807 | 1811 | 1816 | 0 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 4 |
| 0.26 | 1820 | 1824 | 1828 | 1832 | 1837 | 1841 | 1845 | 1849 | 1854 | 1858 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 4 |
| 0.27 | 1862 | 1866 | 1871 | 1875 | 1879 | 1884 | 1888 | 1892 | 1897 | 1901 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 3 | 4 |
| 0.28 | 1905 | 1910 | 1914 | 1919 | 1923 | 1928 | 1932 | 1936 | 1941 | 1945 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 0.29 | 1950 | 1954 | 1959 | 1963 | 1968 | 1972 | 1977 | 1982 | 1986 | 1991 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 0.30 | 1995 | 2000 | 2004 | 2009 | 2014 | 2018 | 2023 | 2028 | 2032 | 2037 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 0.31 | 2042 | 2046 | 2051 | 2056 | 2061 | 2065 | 2070 | 2075 | 2080 | 2084 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 0.32 | 2089 | 2094 | 2099 | 2104 | 2109 | 2113 | 2118 | 2123 | 2128 | 2133 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 0.33 | 2138 | 2143 | 2148 | 2153 | 2158 | 2163 | 2168 | 2173 | 2178 | 2183 | 0 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 |
| 0.34 | 2188 | 2193 | 2198 | 2203 | 2208 | 2213 | 2218 | 2223 | 2228 | 2234 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 0.35 | 2239 | 2244 | 2249 | 2254 | 2259 | 2265 | 2270 | 2275 | 2280 | 2286 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 0.36 | 2291 | 2296 | 2301 | 2307 | 2312 | 2317 | 2323 | 2328 | 2333 | 2339 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 0.37 | 2344 | 2350 | 2355 | 2360 | 2366 | 2371 | 2377 | 2382 | 2388 | 2393 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 0.38 | 2399 | 2404 | 2410 | 2415 | 2421 | 2427 | 2432 | 2438 | 2443 | 2449 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| 0.39 | 2455 | 2460 | 2466 | 2472 | 2477 | 2483 | 2489 | 2495 | 2500 | 2506 | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 5 | 5 |
| 0.40 | 2512 | 2518 | 2523 | 2529 | 2535 | 2541 | 2547 | 2553 | 2559 | 2564 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 5 |
| 0.41 | 2570 | 2576 | 2582 | 2588 | 2594 | 2600 | 2606 | 2612 | 2618 | 2624 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 5 |
| 0.42 | 2630 | 2636 | 2642 | 2649 | 2655 | 2661 | 2667 | 2673 | 2679 | 2685 | 1 | 1 | 2 | 2 | 3 | 4 | 4 | 5 | 6 |
| 0.43 | 2692 | 2698 | 2704 | 2710 | 2716 | 2723 | 2729 | 2735 | 2742 | 2748 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 5 | 6 |
| 0.44 | 2754 | 2761 | 2767 | 2773 | 2780 | 2786 | 2793 | 2799 | 2805 | 2812 | 1 | 1 | 2 | 3 | 3 | 4 | 4 | 5 | 6 |
| 0.45 | 2818 | 2825 | 2831 | 2838 | 2844 | 2851 | 2858 | 2864 | 2871 | 2877 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 |
| 0.46 | 2884 | 2891 | 2897 | 2904 | 2911 | 2917 | 2924 | 2931 | 2938 | 2944 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 |
| 0.47 | 2951 | 2958 | 2965 | 2972 | 2979 | 2985 | 2992 | 2999 | 3006 | 3013 | 1 | 1 | 2 | 3 | 3 | 4 | 5 | 5 | 6 |
| 0.48 | 3020 | 3027 | 3034 | 3041 | 3048 | 3055 | 3062 | 3069 | 3076 | 3083 | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 6 |
| 0.49 | 3090 | 3097 | 3105 | 3112 | 3119 | 3126 | 3133 | 3141 | 3148 | 3155 | 1 | 1 | 2 | 3 | 4 | 4 | 5 | 6 | 6 |



# ANTILOGARITHMS

|      | 0    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  |
|------|------|------|------|------|------|------|------|------|------|------|---|---|---|---|----|----|----|----|----|
| 0.50 | 3162 | 3170 | 3177 | 3184 | 3192 | 3199 | 3206 | 3214 | 3221 | 3228 | 1 | 1 | 2 | 3 | 4  | 4  | 5  | 6  | 7  |
| 0.51 | 3236 | 3243 | 3251 | 3258 | 3266 | 3273 | 3281 | 3289 | 3296 | 3304 | 1 | 2 | 2 | 3 | 4  | 5  | 5  | 6  | 7  |
| 0.52 | 3311 | 3319 | 3327 | 3334 | 3342 | 3350 | 3357 | 3365 | 3373 | 3381 | 1 | 2 | 2 | 3 | 4  | 5  | 5  | 6  | 7  |
| 0.53 | 3388 | 3396 | 3404 | 3412 | 3420 | 3428 | 3436 | 3443 | 3451 | 3459 | 1 | 2 | 2 | 3 | 4  | 5  | 6  | 6  | 7  |
| 0.54 | 3467 | 3475 | 3483 | 3491 | 3499 | 3508 | 3516 | 3524 | 3532 | 3540 | 1 | 2 | 2 | 3 | 4  | 5  | 6  | 6  | 7  |
| 0.55 | 3548 | 3556 | 3565 | 3573 | 3581 | 3589 | 3597 | 3606 | 3614 | 3622 | 1 | 2 | 2 | 3 | 4  | 5  | 6  | 7  | 7  |
| 0.56 | 3631 | 3639 | 3648 | 3656 | 3664 | 3673 | 3681 | 3690 | 3698 | 3707 | 1 | 2 | 3 | 3 | 4  | 5  | 6  | 7  | 8  |
| 0.57 | 3715 | 3724 | 3733 | 3741 | 3750 | 3758 | 3767 | 3776 | 3784 | 3793 | 1 | 2 | 3 | 3 | 4  | 5  | 6  | 7  | 8  |
| 0.58 | 3802 | 3811 | 3819 | 3828 | 3837 | 3846 | 3855 | 3864 | 3873 | 3882 | 1 | 2 | 3 | 4 | 4  | 5  | 6  | 7  | 8  |
| 0.59 | 3890 | 3899 | 3908 | 3917 | 3926 | 3936 | 3945 | 3954 | 3963 | 3972 | 1 | 2 | 3 | 4 | 5  | 5  | 6  | 7  | 8  |
| 0.60 | 3981 | 3990 | 3999 | 4009 | 4018 | 4027 | 4036 | 4046 | 4055 | 4064 | 1 | 2 | 3 | 4 | 5  | 6  | 6  | 7  | 8  |
| 0.61 | 4074 | 4083 | 4093 | 4102 | 4111 | 4121 | 4130 | 4140 | 4150 | 4159 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  |
| 0.62 | 4169 | 4178 | 4188 | 4198 | 4207 | 4217 | 4227 | 4236 | 4246 | 4256 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  |
| 0.63 | 4266 | 4276 | 4285 | 4295 | 4305 | 4315 | 4325 | 4335 | 4345 | 4355 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  |
| 0.64 | 4365 | 4375 | 4385 | 4396 | 4406 | 4416 | 4426 | 4436 | 4446 | 4457 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  |
| 0.65 | 4467 | 4477 | 4487 | 4498 | 4508 | 4519 | 4529 | 4539 | 4550 | 4560 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 8  | 9  |
| 0.66 | 4571 | 4581 | 4592 | 4603 | 4613 | 4624 | 4634 | 4645 | 4656 | 4667 | 1 | 2 | 3 | 4 | 5  | 6  | 7  | 9  | 10 |
| 0.67 | 4677 | 4688 | 4699 | 4710 | 4721 | 4732 | 4742 | 4753 | 4764 | 4775 | 1 | 2 | 3 | 4 | 5  | 7  | 8  | 9  | 10 |
| 0.68 | 4786 | 4797 | 4808 | 4819 | 4831 | 4842 | 4853 | 4864 | 4875 | 4887 | 1 | 2 | 3 | 4 | 6  | 7  | 8  | 9  | 10 |
| 0.69 | 4898 | 4909 | 4920 | 4932 | 4943 | 4955 | 4966 | 4977 | 4989 | 5000 | 1 | 2 | 3 | 5 | 6  | 7  | 8  | 9  | 10 |
| 0.70 | 5012 | 5023 | 5035 | 5047 | 5058 | 5070 | 5082 | 5093 | 5105 | 5117 | 1 | 2 | 4 | 5 | 6  | 7  | 8  | 9  | 11 |
| 0.71 | 5129 | 5140 | 5152 | 5164 | 5176 | 5188 | 5200 | 5212 | 5224 | 5236 | 1 | 2 | 4 | 5 | 6  | 7  | 8  | 10 | 11 |
| 0.72 | 5248 | 5260 | 5272 | 5284 | 5297 | 5309 | 5321 | 5333 | 5346 | 5348 | 1 | 2 | 4 | 5 | 6  | 7  | 9  | 10 | 11 |
| 0.73 | 5370 | 5383 | 5395 | 5408 | 5420 | 5433 | 5445 | 5458 | 5470 | 5483 | 1 | 3 | 4 | 5 | 6  | 8  | 9  | 10 | 11 |
| 0.74 | 5495 | 5508 | 5521 | 5534 | 5546 | 5559 | 5572 | 5585 | 5598 | 5610 | 1 | 3 | 4 | 5 | 6  | 8  | 9  | 10 | 12 |
| 0.75 | 5623 | 5636 | 5649 | 5662 | 5675 | 5689 | 5702 | 5715 | 5728 | 5741 | 1 | 3 | 4 | 5 | 7  | 8  | 9  | 10 | 12 |
| 0.76 | 5754 | 5768 | 5781 | 5794 | 5808 | 5821 | 5834 | 5848 | 5861 | 5875 | 1 | 3 | 4 | 5 | 7  | 8  | 9  | 11 | 12 |
| 0.77 | 5888 | 5902 | 5916 | 5929 | 5943 | 5957 | 5970 | 5984 | 5998 | 6012 | 1 | 3 | 4 | 5 | 7  | 8  | 10 | 11 | 12 |
| 0.78 | 6026 | 6039 | 6053 | 6067 | 6081 | 6095 | 6109 | 6124 | 6138 | 6152 | 1 | 3 | 4 | 6 | 7  | 8  | 10 | 11 | 13 |
| 0.79 | 6166 | 6180 | 6194 | 6209 | 6223 | 6237 | 6252 | 6266 | 6281 | 6295 | 1 | 3 | 4 | 6 | 7  | 8  | 10 | 11 | 13 |
| 0.80 | 6310 | 6324 | 6339 | 6353 | 6368 | 6383 | 6397 | 6412 | 6427 | 6442 | 1 | 3 | 4 | 6 | 7  | 9  | 10 | 12 | 13 |
| 0.81 | 6457 | 6471 | 6486 | 6501 | 6516 | 6531 | 6546 | 6561 | 6577 | 6592 | 2 | 3 | 5 | 6 | 8  | 9  | 11 | 12 | 14 |
| 0.82 | 6607 | 6622 | 6637 | 6653 | 6668 | 6683 | 6699 | 6714 | 6730 | 6745 | 2 | 3 | 5 | 6 | 8  | 9  | 11 | 12 | 14 |
| 0.83 | 6761 | 6776 | 6792 | 6808 | 6823 | 6839 | 6855 | 6871 | 6887 | 6902 | 2 | 3 | 5 | 6 | 8  | 9  | 11 | 13 | 14 |
| 0.84 | 6918 | 6934 | 6950 | 6966 | 6982 | 6998 | 7015 | 7031 | 7047 | 7063 | 2 | 3 | 5 | 6 | 8  | 10 | 11 | 13 | 15 |
| 0.85 | 7079 | 7096 | 7112 | 7129 | 7145 | 7161 | 7178 | 7194 | 7211 | 7228 | 2 | 3 | 5 | 7 | 8  | 10 | 12 | 13 | 15 |
| 0.86 | 7244 | 7261 | 7278 | 7295 | 7311 | 7328 | 7345 | 7362 | 7379 | 7396 | 2 | 3 | 5 | 7 | 8  | 10 | 12 | 13 | 15 |
| 0.87 | 7413 | 7430 | 7447 | 7464 | 7482 | 7499 | 7516 | 7534 | 7551 | 7568 | 2 | 3 | 5 | 7 | 9  | 10 | 12 | 14 | 16 |
| 0.88 | 7586 | 7603 | 7621 | 7638 | 7656 | 7674 | 7691 | 7709 | 7727 | 7745 | 2 | 4 | 5 | 7 | 8  | 11 | 12 | 14 | 16 |
| 0.89 | 7762 | 7780 | 7798 | 7816 | 7834 | 7852 | 7870 | 7889 | 7907 | 7925 | 2 | 4 | 5 | 7 | 9  | 11 | 13 | 14 | 16 |
| 0.90 | 7943 | 7962 | 7980 | 7998 | 8017 | 8035 | 8054 | 8072 | 8091 | 8110 | 2 | 4 | 6 | 7 | 9  | 11 | 13 | 15 | 17 |
| 0.91 | 8128 | 8147 | 8166 | 8185 | 8204 | 8222 | 8241 | 8260 | 8279 | 8299 | 2 | 4 | 6 | 8 | 9  | 11 | 13 | 15 | 17 |
| 0.92 | 8318 | 8337 | 8356 | 8375 | 8395 | 8414 | 8433 | 8453 | 8472 | 8492 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 15 | 17 |
| 0.93 | 8511 | 8531 | 8551 | 8570 | 8590 | 8610 | 8630 | 8650 | 8670 | 8690 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |
| 0.94 | 8710 | 8730 | 8750 | 8770 | 8790 | 8810 | 8831 | 8851 | 8872 | 8892 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |
| 0.95 | 8913 | 8933 | 8954 | 8974 | 8995 | 9016 | 9036 | 9057 | 9078 | 9099 | 2 | 4 | 6 | 8 | 10 | 12 | 15 | 17 | 19 |
| 0.96 | 9120 | 9141 | 9162 | 9183 | 9204 | 9220 | 9247 | 9268 | 9290 | 9311 | 2 | 4 | 6 | 8 | 11 | 13 | 15 | 17 | 19 |
| 0.97 | 9333 | 9354 | 9376 | 9397 | 9419 | 9441 | 9462 | 9484 | 9506 | 9528 | 2 | 4 | 7 | 9 | 11 | 13 | 15 | 17 | 20 |
| 0.98 | 9550 | 9572 | 9594 | 9616 | 9638 | 9661 | 9683 | 9705 | 9727 | 9750 | 2 | 4 | 7 | 9 | 11 | 13 | 16 | 18 | 20 |
| 0.99 | 9772 | 9795 | 9817 | 9840 | 9863 | 9886 | 9908 | 9931 | 9954 | 9977 | 2 | 5 | 7 | 9 | 11 | 14 | 16 | 18 | 20 |