

# Sample Entrance Questions

## for BE/B.Arch

1. A simple pendulum swings with an amplitude  $A$  and period  $T$ . Assume at  $t = 0$ , bob is at extreme position. Then the time taken by bob to displace through half its amplitude from mean position, is
  - a.  $\frac{T}{6}$
  - b.  $\frac{T}{2}$
  - c.  $\frac{T}{4}$
  - d.  $\frac{T}{3}$
2. If the K.E. changes by 1%, then linear momentum of body changes by
  - a. 1%
  - b. 0.5%
  - c. 2%
  - d. 3%
3. The pressure  $P$  and volume  $V$  of gas are related by  $PV^\gamma = \text{constant}$ , then bulk modulus of gas is
  - a.  $\gamma P$
  - b.  $\frac{P}{\gamma}$
  - c.  $\gamma V$
  - d.  $\frac{\gamma}{P}$
4. The velocity of sound at NTP is 330m/s. The change in velocity when temp. is raised by unity is
  - a. 0.3m/s
  - b. 0.6m/s
  - c. 0.5m/s
  - d. 0.7m/s
5. A monochromatic light of wavelength  $\lambda$  is transmitted from vacuum to a medium of refractive index  $\mu$ . The wavelength of light in the medium is
  - a.  $\lambda\mu$
  - b.  $\frac{\lambda}{\mu}$
  - c.  $\lambda$
  - d.  $\lambda\mu^2$
6. If a copper wire is stretched to make 0.1% longer, then its resistance will increase by
  - a. 0.1%
  - b. 0.2%
  - c. 0.32%
  - d. 1.2%
7. The hall effect in solid-state physics is used to measure
  - a. specific charge of carriers
  - b. magnetic susceptibility
  - c. sign and concentration of charge carriers
  - d. width of gap between valance band and conduction band
8. An isolated conducting sphere is given positive charge. Its mass
  - a. gets increased
  - b. gets decreased
  - c. remains the same
  - d. mass is not involved during electrification
9. Radiation of energy 5eV is incident on metal of work-function 3eV. The minimum kinetic energy of photoelectrons is
  - a. 0eV
  - b. 2eV
  - c. 5eV
  - d. 3eV
10. The rest mass energy of electron is approximately
  - a. 0.3eV
  - b. 0.51eV
  - c. 0.3MeV
  - d. 0.51MeV
11. If  $f$  and  $g$  are two functions which are inverse of each other, then  $f \circ g(x)$  is
  - a.  $\frac{1}{x}$
  - b.  $x$
  - c.  $\frac{1}{x^2}$
  - d.  $x^2$
12. Value of  $\sum_{r=0}^6 C(6,r) 3^{6-r} 2^r =$ 
  - a.  $3^6$
  - b.  $2^5$
  - c.  $5^6$
  - d.  $6^5$

13. If  ${}^{2n}C_r = {}^{2n}C_{r+2}$ , then  $r =$   
 a.  $n$                       b.  $n + 1$                       c.  $n - 1$                       d.  $n + 2$
14. The lines represented by  $Ax^2 + 2Bxy + Hy^2 = 0$  are perpendicular if  
 a.  $A + B = 0$               b.  $A + H = 0$               c.  $A - B = 0$               d.  $A - H = 0$
15. If  $K$  is a scalar and  $I$  is a unit matrix of order 3, then  $\text{adj}(KI) =$   
 a.  $K^3I$                       b.  $K^2I$                       c.  $-K^3I$                       d.  $-K^2I$
16. For  $\cos^{-1}(-x)$  is equal to  
 a.  $-\cos^{-1}x$               b.  $\pi - \cos^{-1}x$               c.  $-\cos^{-1}(-x) - \pi$               d.  $\frac{\pi}{2} - \cos^{-1}x$
17. The locus of the equation  $xy = 0$  is  
 a. a st. line                  b. a pair of  $\perp$  lines                  c. a hyperbola                  d. none of these
18. The vector area of parallelogram whose adjacent sides are determined by the vectors  $\vec{a}$  and  $\vec{b}$  is  
 a.  $\vec{a} \times \vec{b}$                   b.  $|\vec{a} \times \vec{b}|$                   c.  $\frac{|\vec{a} \times \vec{b}|}{\vec{a} \cdot \vec{b}}$                   d.  $(\vec{a} \times \vec{b})^2$
19. Value of  $\int_{-1}^1 x \sin^2 x \, dx$  is  
 a.  $\frac{2}{3}$                           b.  $\frac{3}{2}$                           c. 0                              d. 1
20.  $\lim_{x \rightarrow 0} \frac{e^{2x} - 1}{x} =$   
 a. -1                          b. 1                              c. 2                              d.  $\infty$
21. The oxidation state of 'C' in HCN  
 a. +1                          b. +2                              c. +3                              d. -1
22. Calculate the number of  $\text{CO}_2$  molecules present in 100ml of  $\text{CO}_2$  gas at STP.  
 a.  $2.68 \times 10^{21}$               b.  $3.011 \times 10^{21}$               c.  $2.68 \times 10^{22}$               d.  $3.011 \times 10^{22}$
23. Ionization energy decreases down the group due to  
 a. increase in charge              b. increase in atomic size  
 c. decrease in atomic size              d. decrease in shielding effect
24. The oxide of carbon has molar mass equal to 28. Find the total no. of electrons in one molecule of the compound (At. Wt. of C = 6, O = 16)  
 a. 14                          b. 8                              c. 6                              d. 48
25.  $\text{H}_2\text{S}$  is more acidic than  $\text{H}_2\text{O}$ . The reason is  
 a. O-H bond is weak than S-H bond              b. O is more electronegative than S  
 c. H-S bond is weak than O-H bond              d. S is more electronegative than O -
26. Calculate time required to decompose 200ml of water completely by using amp. Current.  
 a. 108.18 hrs              b. 115.15 hrs              c. 119.14 hrs              d. 130.3 hrs
27. Which of these samples is example of hard water?  
 a. Mineral water              b. Rain water  
 c. Distilled water              d. Deionized water
28. Which of the following is strongest oxidant?  
 a.  $\text{F}_2$                           b.  $\text{Cl}_2$                               c.  $\text{Br}_2$                               d.  $\text{I}_2$
29. Which chemical compound produces  $\text{CO}_2$  gas on heating?

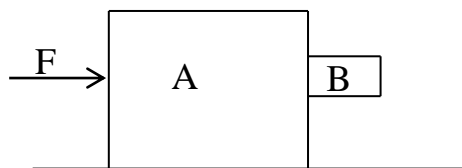
- a.  $\text{Li}_2\text{CO}_3$       b.  $\text{Na}_2\text{CO}_3$       c.  $\text{K}_2\text{CO}_3$       d.  $\text{Rb}_2\text{CO}_3$
30. Fire extinguishers contain  $\text{H}_2\text{SO}_4$  and  
 a.  $\text{NaHCO}_3$  &  $\text{Na}_2\text{CO}_3$       b.  $\text{NaHCO}_3$  sol<sup>n</sup>.  
 c.  $\text{Na}_2\text{CO}_3$  sol<sup>n</sup>.      d.  $\text{CaCO}_3$
31. Which of these can act as electrophile and nucleophile?  
 a.  $\text{CH}_3\text{-Cl}$       b.  $\text{CH}_3\text{-CN}$       c.  $\text{SO}_3$       d.  $\text{CH}_3\text{-O-CH}_3$
32. The IUPAC name of  $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3\text{-C-CH}_3 \\ | \\ \text{CH}_3 \end{array}$  is  
 a. tetramethyl methane      b. trimethyl ethane  
 c. 2, 2-dimethyl propane      d. 1, 1-dimethyl propane
33. Weapons are kept in \_\_\_\_\_  
 a. arsenal      b. museum      c. wardrobe      d. duck yard
34. The antonym of 'repulsive' is  
 a. attractive      b. smooth      c. reflexive      d. distinctive
35. The word 'judge' is transcribed as  
 a. /zʌʒ/      b. /zəʒ/      c. /dʒʌʒd/      d. /dʒʌʒ/
36. The word 'Kangaroo' has its primary stress on \_\_\_\_\_ syllable.  
 a. 1<sup>st</sup>      b. 2<sup>nd</sup>      c. 3<sup>rd</sup>      d. 4<sup>th</sup>
37. I hate \_\_\_\_\_ a film late in the night.  
 a. to see      b. seeing      c. see      d. to seeing
38. Only the blood-stained road was a witness \_\_\_\_\_ assistance.  
 a. of      b. to      c. at      d. on
39. I \_\_\_\_\_ this book in 2058.  
 a. wrote      b. have written      c. write      d. was writing
40. Today is \_\_\_\_\_.  
 a. so hot      b. much hot      c. more hot      d. much hotter
41. You, and not I, \_\_\_\_\_ guilty.  
 a. are      b. is      c. am      d. was
42. The passive of: This news surprises me.  
 a. I am surprised by this news.      b. I am surprised at this news.  
 c. I was surprised by this news.      d. I was surprised at his news.
43. 'Bravo! Well done' can be reported as  
 a. My papa said I did well.  
 b. My papa told me bravo as I did well.  
 c. My papa encouraged me on my excellent performance.  
 d. My papa told me bravo.
44. I shall inform \_\_\_\_\_ and \_\_\_\_\_ about the exam.  
 a. you, he      b. he, you      c. you, him      d. him, you
45. She talked to me \_\_\_\_\_.  
 a. yesterday at four in the morning      b. at four, in the morning, yesterday  
 c. yesterday, in the morning, at four      d. at four, yesterday, in the morning
46. He has been supporting us in every difficulty without any grievances is a

- a. complex sentence                      b. compound sentence
  - c. mixed sentence                        d. simple sentence
- 47.Choose the wrong statement.
- a. the 2 stroke engine have lighter flywheel.
  - b. the thermal efficiency of a two stroke cycle engine is less than that of four stroke engine
  - c. diesel engine is an internal combustion engine
  - d. compression ratio of an IC engine is the volume displaced by the piston per stroke and clearance volume in cylinder
- 48.Which one is the spark ignition engine?
- a. Petrol engine                          b. diesel engine
  - c. steam engine                          d. none
- 49.Energy which comes from natural resources is .....
- a. renewal energy                        b. non-renewal energy
  - c. natural energy                         d. none of the above
- 50.The lumps formed by heating lime stone and clay with other raw materials for cement is called.....
- a. clinker                      b. brick                      c. stone                      d. aggregate
- 51.A good building stone should be.....
- a. strong                                  b. good in appearance and color
  - c. hard and tough                        d. all of above
- 52.Generally normal bricks for wall has .....shape.
- a. prismatic                      b. pyramidal                      c. triangular                      d. circular
- 53.Which of the following signal indicates proceed with caution?
- a. Red                      b. Amber                      c. Green                      d. none
- 54.When two or more capacitors are connected in parallel, resultant capacitance goes on
- a. Decreasing                                  b. increasing
  - c. remains constant                              d. none of these.
- 55.Which of these is not a renewable source of energy?
- a. The sun                                  b. Natural gas
  - c. Wind                                        d. Ocean tidal energy
- 56.The main purpose of using core in a transformer is to
- a. Decrease iron losses.                      b. Prevent eddy current
  - c. eliminate magnetic hysteresis              d. decrease reluctance of the common magnetic circuit.
- 57.Binary system uses....
- a. 2 symbols                      b. 3 symbols                      c. 1 symbol                      d. 4 symbols
- 58.In the binary number system the number 100 represents ....
- a. one                                  b. three                                  c. four                                  d. hundred
- 59.Track ball is similar to that of ....
- a. mouse                                  b. joystick                                  c. OCR                                  d. graph plotter
- 60.DVD stands for ....

- a. direct video download                      b. digital versatile disk
- c. digital video disk                          d. dual visual data

61. Two blocks A and B of masses 16kg and 4kg are moving on a frictionless horizontal surface under the action of horizontal force F such that block B does not fall under the influence of gravity. If the coefficient of friction between two blocks is 0.5, the magnitude of F is

- a. 50N                      b. 100N
- c. 200N                      d. 400N



62. A thin uniform rod of mass M and length L is positioned vertically above ground and then allowed to fall on ground. With what velocity does the free end strike the ground?

- a.  $\sqrt{gL}$                       b.  $\sqrt{2gL}$                       c.  $\sqrt{3gL}$                       d.  $\sqrt{\frac{1}{3}gL}$

63. A rectangular block of ice 20m thick floating in lake water has a vertical hole drilled through it. The minimum length of rope required to scoop up a bucket full of water through hole (density of ice = 0.9 g/cc) is

- a. 1m                      b. 2m                      c. 18m                      d. 19m

64. A ball is shot from ground into air. At a height of 9.1m, its velocity is  $\vec{v} = (7.6\hat{i} + 6.1\hat{j})\text{m/s}$  with  $\hat{i}$  horizontal and  $\hat{j}$  vertical. To what horizontal distance did the ball travel?

- a. 18.5m                      b. 20m                      c. 25m                      d. 22.5

65. A Carnot engine takes 100 calories of heat from hot reservoir at 300°C and rejects certain amount to sink at 15°C. The work done by engine is

- a. 208J                      b.                      c.                      d.

66. A system absorbs 500cal of heat and at the same time 300J of work is done on it. The change in internal energy of system is

- a. 2400J                      b. -2400J                      c. 100J                      d. -200J

67. With what speed is a man approaching a sounding body if the observed pitch of sound is increased by 1% (velocity of sound = 330m/s)

- a. 5m/s                      b. 2m/s                      c. 3.3m/s                      d. 10m/s

68. In a Young's double slit experiment, the fringe width is found to be 0.4mm. If the whole apparatus is dipped in water of refraction index  $\frac{4}{3}$  without disturbing the arrangement, new fringe width is

- a. 0.30mm                      b. 0.40mm                      c. 0.53mm                      d. 0.2mm

69. An air-filled parallel-plate capacity has a capacitance 2.1μF. The separation of plates is doubled and wax is inserted between them. The new capacitance is 2.6μF. The dielectric constant of wax is

- a. 4.5                      b. 1.5                      c. 3.5                      d. 2.5

70. An α-particle is revolving in a circular orbit of radius 1Å with speed  $3.14 \times 10^6\text{m/s}$ . The magnetic induction at centre of orbit is

- a. 20T                      b. 10.04T                      c. 8T                      d. 15T

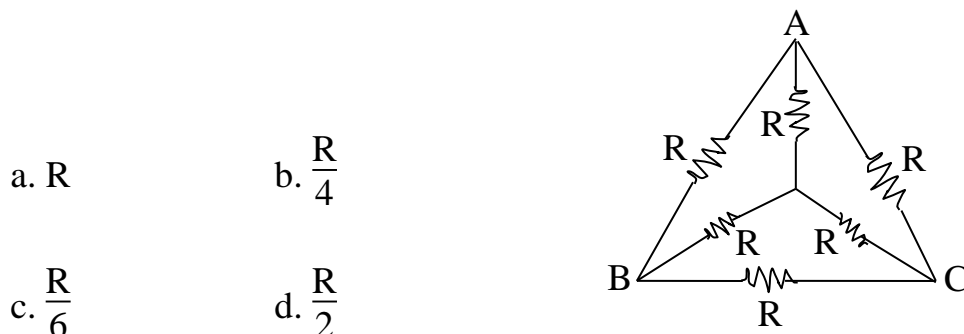
71. The sensitivity of galvanometer is 60 div/A. When the shunt is used its sensitivity become 10div/A. If the galvanometer resistance is  $20\Omega$ , the value of shunt used is

a.  $4\Omega$                       b.  $5\Omega$                       c.  $20\Omega$                       d.  $\left(\frac{20}{7}\right)\Omega$

72. A loop of antenna of area  $2\text{cm}^2$  and resistance  $5.21\mu\Omega$  is perpendicular to the uniform magnetic field of magnitude  $21.0\mu\text{T}$ . The field magnitude drops to zero in  $2.96\text{ms}$ . How much thermal energy is produced in loop by change in field

a.  $1.14 \times 10^{-6}\text{J}$     b.  $2 \times 10^{-6}\text{J}$             c.  $1.5 \times 10^{-6}\text{J}$             d.  $2.5 \times 10^{-6}\text{J}$

73. In the ckt, the equivalent resistance between points B and C is



74. Light photons  $2 \times 10^{20}$  are entering into your eye per second in cross-section area  $2\text{cm}^2$ . The wavelength of radiated photon is  $200\text{\AA}$ . Calculate the intensity of photons?

a.  $5 \times 10^5 \text{ w/m}^2$     b.  $5 \times 10^6 \text{ w/m}^2$             c.  $10 \times 10^{15} \text{ w/m}^2$             d.  $10 \times 10^6 \text{ w/m}^2$

75. A radioactive isotope X with a half life of 50 years decays to Y which is stable. A sample of rock taken from moon is found to contain both elements X and Y in ratio 1:7, the age of rock is

a. 100 years            b. 150 years            c. 200 years            d. 250 years

76. If 3, 4 are intercepts of a line  $L = 0$ , then the distance of  $L = 0$  from origin is

a. 5 units            b. 12 units            c.  $\frac{5}{12}$  units            d.  $\frac{12}{5}$  units

77. The equation  $4x^2 + 12xy + 9y^2 + 2gx + 2fy + c = 0$  will represents two parallel st. line is

a.  $g = 4, f = 9, c = 0$                       b.  $g = 2, f = 3, c = 1$   
c.  $g = 2, f = 3, c = \text{any number}$             d.  $g = 4, f = 9, c = 0$

78. If  $(-1, 4)$  and  $(3, -2)$  are end points of diameter of the circles, then equation of circle is

a.  $(x - 1)^2 + (y - 1)^2 = 13$             b.  $(x + 1)^2 + (y + 1)^2 = 13$   
c.  $(x - 1)^2 + (y + 1)^2 = 13$             d.  $(x + 1)^2 + (y - 1)^2 = 13$

79. For the parabola  $y^2 = 4x$ , the line  $ax - y = 2 = 0$  is

a. a tangent if  $a = \frac{1}{2}$                       b. a normal if  $a^3 + 2a + 2 = 0$   
c. a focal chord if  $a = -2$                       d. all above are correct

80. If the foci of the ellipse  $\frac{x^2}{9} + \frac{y^2}{16} = 1$  are  $(0, \pm\sqrt{7})$ , then foci of the ellipse

$$\frac{x^2}{9+t^2} + \frac{y^2}{16+t^2} = 1, t \in \mathbb{R} \text{ are}$$

a.  $(0, \pm\sqrt{7})$             b.  $(0, \pm 7)$             c.  $(0, \pm 2\sqrt{7})$             d.  $(\pm\sqrt{7}, 0)$

81. The angle between the plane  $3x + 4y = 0$  and the line  $x^2 + y^2 = 0$  is  
 a.  $90^\circ$                       b.  $60^\circ$                       c.  $45^\circ$                       d.  $0^\circ$
82. If  $2\sec 2\theta = \tan \alpha + \cot \alpha$ , then the value of  $\theta + \alpha$  equals  
 a.  $\frac{\pi}{2}$                       b.  $\frac{\pi}{3}$                       c.  $\frac{\pi}{6}$                       d.  $\frac{\pi}{4}$
83. If  $\tan(x + y) = 33$  and  $x = \tan^{-1}3$ , then  $y$  is equal to  
 a.  $\frac{3}{10}$                       b.  $\tan^{-1}\left(\frac{3}{10}\right)$                       c.  $\tan^{-1}\left(\frac{3}{8}\right)$                       d.  $\frac{10}{3}$
84.  $I = \int_0^{\frac{\pi}{2}} \frac{\cos x}{(1 + \sin x)(2 + \sin x)} dx =$   
 a.  $\log\left(\frac{3}{4}\right)$                       b.  $\log\left(\frac{4}{3}\right)$                       c.  $\log 4$                       d.  $\log 3$
85. The slope of tangent to the curve at a point is twice to that of the line joining that point to the origin then the curve is  
 a. a circle                      b. a parabola                      c. an ellipse                      d. a hyperbola
86. The ratio of the areas cut off from the parabola  $y^2 = 4ax$  by the LR and the tangent formed by the LR and tangent at vertex is  
 a.  $3 : 2$                       b.  $3 : 4$                       c.  $2 : 3$                       d.  $2 : 1$
87. The number of values of  $k$  so that the system of equations:  $(k + 1)x + 8y = 4k$ ,  $kx + (k + 3y) = 3k - 1$  will have infinite solution is  
 a. 0                      b. 1                      c. 2                      d. infinite
88. If  $z$  lies on  $|z| = 1$ , then  $\frac{2}{z}$  lies on  
 a. a circle                      b. an ellipse                      c. a straight line                      d. a parabola
89. Roots of the equations  $2x^2 - 5x + 1 = 0$  and  $x^2 + 5x + 2 = 0$  are  
 a. reciprocal and of same sign                      b. reciprocal and of opposite sign  
 c. equal in magnitude                      d. none of these
90. If  $y = 1 + \frac{x^2}{1!} + \frac{x^4}{2!} + \frac{x^6}{3!} + \dots$ , then  $x =$   
 a.  $e^{-y}$                       b.  $e^y$                       c.  $\sqrt{\log y}$                       d.  $\frac{e^y}{2}$
91. When  $H_2S$  gas is passed through nitric acid, the product is  
 a. rhombic S                      b. prismatic S                      c. monoclinic S                      d. colloidal S
92. How many number of moles are present in a reaction mixture of 4gm of  $H_2$  and 48gm of  $O_2$   
 a. 2 moles                      b. 2.5 moles                      c. 3 moles                      d. 3.5 moles
93. 7.2 gm of dibasic acid was dissolved in 250ml solution 25ml of the solution required 32ml of 0.5N NaOH for neutralization. Calculate the molecular wt. of the acid.  
 a. 30                      b. 60                      c. 90                      d. 120
94. The solubility of  $PbCl_2$  is  $2 \times 10^{-2}$  gm/litre calculate the  $K_{SP}$  of electrolyte ( $Pb = 207$ )  
 a.  $1.12 \times 10^{-12}$                       b.  $1.24 \times 10^{-12}$   
 c.  $1.36 \times 10^{-12}$                       d.  $1.48 \times 10^{-12}$

**Read the passage and answer the questions**

The most traditional American food may well be corn meal. Cornmeal, as we know it today, began as an Indian staple. The American Indians grew corn of six different colors-black, red, white, yellow, blue and multicolored. They ground the corn kernels into corn meal and mixed it with salt and water, then baked it. This recipe was introduced to the early colonists, who experimented with it and developed their own uses for cornmeal. Succotash, a meat stew with cornmeal added, and mush, leftover porridge cut and fried, are two meals invented by early colonists.

95. According to the passage, cornmeal was originally used by  
a. The early colonists                                      b. The New Englanders  
c. The American Indians                                      d. The people in the South
96. The word “their” in line refers to  
a. American Indians                                      b. Kernels                      c. Colonists      d. Visitors
97. According to the passage, mush is  
a. A batter that is fried in oil  
b. Fried leftovers from a cornmeal dish  
c. Added to meat stew to make succotash  
d. One of two meals developed by the American Indians
98. According to the passage, common forms of cornmeal are  
a. No longer popular                                      b. Restricted to certain regions  
c. Found nationwide                                      d. Multicolored

**Read the passage carefully and select the best alternatives:**

There is more than a modicum of truth in the assertion that “a working knowledge of ancient history is necessary to the intelligent interpretation of current events.” But the sage who uttered these words of wisdom might well have added something on the benefits of studying, particularly, the famous battles of history for the lessons they contain for those of us who lead or aspire to leadership. Such a study will reveal certain qualities and attributes which enabled the winners to win – and certain deficiencies which caused the losers to lose. And the student will see that the same pattern recurs consistently, again and again, throughout the centuries.

99. The expression “more than a modicum of truth” means  
a) Nothing but truth                                      b) some truth  
c) Much truth                                      d) more than a small amount of truth
100. In this context, “intelligent interpretation of current events” means  
a) Skillful interpretation of events                                      b) intellectual outlook on events  
c) Appropriate understanding of events                                      d) rational explanation of events