

Engineer(Mechanical) Written Test Questions

BEL Technical Questions

1. Newton's law of viscosity relates

- A. Velocity gradient and rate of shear strain
- B. Rate of shear deformation and shear stress
- C. Shear deformation and shear stress
- D. Pressure and volumetric strain

Ans: B

2. Calculation of meta-centric height of a floating body involves second moment of area. The axis about which this moment is to be calculated passes through the

- A. Top horizontal surface of the body
- B. Bottom horizontal surface of the body
- C. Centre of gravity of the body
- D. Centre of buoyancy

Ans: B

3. The buoyancy force is

- A. Equal to volume of liquid displaced
- B. Force necessary to maintain equilibrium of a submerged body
- C. The resultant force acting on a floating body
- D. The resultant force on a body due to the fluid surrounding it

Ans: D

4. Navier - stokes equations are useful in the analysis of

- A. Turbulent flows
- B. Vortex flows
- C. Viscous flows
- D. Rotational flows

Ans: C

5. When air is adiabatically saturated, the temperature attained is the

- A. Dew point temperature
- B. Dry bulb temperature
- C. Wet bulb temperature
- D. Apparatus Dew-point temperature

Ans: C

6. Air vessels are used in reciprocating pumps in order to

- A. Increase the delivery head
- B. Reduce suction head
- C. Minimize delivery head fluctuation
- D. Reduce accelerating head

Ans: D

7. A Kaplan turbine is a

- A. Outward flow reaction turbine
- B. Inward flow impulse turbine
- C. Low head axial flow turbine
- D. High head mixed flow turbine

Ans: C

8. Clapeyron's equation is used for finding out the
- A. Dryness fraction of steam only
 - B. Entropy of superheater vapour only
 - C. Specific volume at any temperature and pressure
 - D. Total heat of superheated steam only

Ans: C

9. In a single stage reciprocating air compressor, the work done on air to compress it from suction pressure to delivery pressure will be minimum when the compression is
- A. Isothermal process
 - B. Adiabatic process
 - C. Polytropic process
 - D. Constant pressure process

Ans: A

10. The function of economizer in a boiler is to
- A. Superheat the steam
 - B. Reduce fuel consumption
 - C. Increase steam pressure
 - D. Maintain saturation temperature

Ans: B

11. Which one of the following represents open thermodynamic system?
- A. Manual ice cream freezer
 - B. Centrifugal pump
 - C. Pressure cooker
 - D. Bomb calorimeter

Ans: B

12. Isentropic flow is
- A. Irreversible adiabatic flow
 - B. Reversible adiabatic flow
 - C. Ideal fluid flow
 - D. Frictionless reversible flow

Ans: B

14. Lowest COP is of vapour
- A. Compression cycle with superheated vapour
 - B. Compression cycle with dry compression
 - C. Compression cycle with wet compression
 - D. Absorption cycle

Ans: D

15. Air injection in IC engine refers to injection of
- A. Air only
 - B. Liquid fuel only
 - C. liquid fuel and air
 - D. Supercharging air

Ans: B

16. In the SI engine, highest UBHC concentration is observed during
- A. Maximum load

- B. Acceleration
 - C. Deceleration
 - D. Idling
- Ans: D

17. In the film established along a vertical plate during condensation of any vapour over the plates, the temperature distribution curve is

- A. Concave upwards
- B. Concave downwards
- C. Parabolic
- D. Straight line

Ans: D

18. Ice is very close to a

- A. Gray body
- B. Black body
- C. White body
- D. Specular body

Ans: B

19. Which of the following is not an essential component of any refrigeration system, where refrigeration effect is produced by vaporization of refrigerant ?

- A. Compressor
- B. condenser
- C. Evaporator
- D. Expansion device

Ans: A

20. The centre of pressure for an inclined surface area

- A. Lies below the centroid of the surface strain
- B. Coincides with the centroid
- C. Lies above the centroid of the surface
- D. None of the above

Ans: (a)

BEL General Aptitude

1. The total number of digits used in numbering the pages of a book having 366 pages is

- A. 732
- B. 990
- C. 1098
- D. 1305

Ans: B

Explanation: Total number of digits = (No. of digits in 1- digit page nos. + No. of digits in 2-digit page nos. + No. of digits in 3- digit page nos.)
 $= (1 \times 9 + 2 \times 90 + 3 \times 267) = (9 + 180 + 801) = 990$

2. A and B together can do a piece of work in 30 days. A having worked for 16 days, B finishes the remaining work alone in 44 days. In how many days shall B finish the whole work alone?

- A. 30 days
- B. 40 days
- C. 60 days

D. 70 days

Ans:C

3. 39% of a number exceeds 19% of the same by 48. What is the number ?

A.180

B. 260

C. 240

D. 280

Ans:C

4. $(\sqrt{5}+\sqrt{3})/(\sqrt{5}-\sqrt{3})$ is equal to :

A. 1

B. 2

C. $4-\sqrt{15}$

D. $4+\sqrt{15}$

Ans:C

5. A is the son of C; C and Q are sisters; Z is the mother of Q and P is the son of Z. Which of the following statements is true?

A. P and A are cousins

B. P is the maternal uncle of A

C. Q is the maternal grandfather of A

D. C and P are sisters

Ans:B

Explanation: C and Q are sisters and A is the son of C. Hence, C is the mother of A or Z is the mother Q.Hence, Z is the maternal grandmother of A. P is the son of Z. Hence, P is the maternal uncle of

6. QAR, RAS, SAT, TAU, _____

A. UAV

B. UAT

C. TAS

D. TAT

Ans:A

Explanation: In this series, the third letter is repeated as the first letter of the next segment. The middle letter, A, remains static. The third letters are in alphabetical order, beginning with R.

7. ."School" is related to "Education" in the same way as "court" is related to

A. Lawyer

B. Criminal

C. Justice

D.Jugde

Ans:C

8. The sum of the first 47 terms of the series $1/4+1/5-1/6-1/4-1/5+1/6+1/4+1/5-1/6...$ is:

A. 0

B. $-(1/6)$

C. $1/6$

D. 1

Ans:B

9. The smallest value of m, for which $2m+1$ is not a prime number, is:

- A. 3
 - B. 4
 - C. 5
 - D. 6
- Ans: B

10. How big will an angle of one and a half degree look through a glass that magnifies things three times?

- A. $1\frac{1}{2}$
- B. $2\frac{1}{2}$
- C. $3\frac{1}{2}$
- D. $4\frac{1}{2}$

Ans: A. $1\frac{1}{2}$ degrees

Explanation : The magnifying glass cannot increase the magnitude of an angle.

11. Nitin's age was equal to square of some number last year and the following year it would be cube of a number. If again Nitin's age has to be equal to the cube of some number, then for how long he will have to wait?

- A. 10
- B. 38
- C. 39
- D. 64

Ans: B

Explanation: Clearly, we have to first find two numbers whose difference is 2 and of which the smaller one is a perfect square and the bigger one a perfect cube.

Such numbers are 25 and 27.

Thus, Nitin is now 26 years old. Since the next perfect cube after 27 is 64, so required time period = $(64 - 26)$ years = 38 years.

12. 1, 6, 24, 60, 120, 210

- A. 336
- B. 366
- C. 330
- D. 660

Ans: A. 336

13. A cylindrical container has a radius of eight inches with a height of three inches. Compute how many inches should be added to either the radius or height to give the same increase in volume?

- A. 13
- B. $16/3$
- C. $11/3$
- D. $17/3$

Ans: B. $16/3$ inches

Explanation : Let x be the amount of increase. The volume will increase by the same amount if the radius increased or the height is increased.

So, the effect on increasing height is equal to the effect on increasing the radius.

i.e., $(22/7)*8*8*(3+x) = (22/7)*(8+x)*(8+x)*3$

Solving the quadratic equation we get the $x = 0$ or $16/3$. The possible increase would be by $16/3$ inches.

14. 12 men take 36 days to do a work while 12 women complete $\frac{3}{4}$ th of the same work in 36 days. In how many days 10 men and 8 women together will complete the same work?

- A. 6
- B. 27
- C. 12
- D. Data inadequate

Ans: B

15. If the average marks of three batches of 55, 60 and 45 students respectively is 50, 55, 60, then the average marks of all the students is:

- A. 53.33
- B. 54.68
- C. 55
- D. None of these

Ans: B