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1. Coefficient of discharge is equal to
  - (a)  $C_c \times C_v$
  - (b)  $C_c \times C_r$
  - (c)  $C_v \times C_r$
  - (d)  $C_c / C_r$
2. The loss of head at entrance in a pipe is
  - (a)  $v^2 / 2g$
  - (b)  $0.5v^2 / 2g$
  - (c)  $0.375v^2 / 2g$
  - (d)  $0.75v^2 / 2g$
3. The kinematic viscosity of an oil (in stokes) whose specific gravity is 0.95 and viscosity 0.011 poise is
  - (a) 0.0116
  - (b) 0.116
  - (c) 0.0611
  - (d) 0.611
4. Whenever a plate is held immersed at some angle with the direction of flow of the liquid, it is subjected to some pressure. The component of this pressure, at right angles to the direction of flow of the liquid is known as
  - (a) Lift
  - (b) Drag
  - (c) Stagnation pressure
  - (d) Bulk modulus
5. The loss of head due to friction in a pipe of uniform diameter in which a viscous flow is taking place is
  - (a)  $1 / R_N$
  - (b)  $4 / R_N$
  - (c)  $16 / R_N$
  - (d)  $64 / R_N$
6. The process occurring in open system which permit the transfer of mass to and from the system are known as
  - (a) Flow processes
  - (b) Non-flow processes
  - (c) Adiabatic Processes
  - (d) None of the above
7. The gas constant (R) is equal to the \_\_\_\_\_ of two specific heats.
  - (a) Sum
  - (b) Difference
  - (c) Product
  - (d) Ratio
8. The area under the temperature entropy curve (T-s curve) of any thermodynamic process represents
  - (a) Heat absorbed
  - (b) Heat rejected
  - (c) Both (A) and (B)
  - (d) None of the above
9. Carnot cycle consists of
  - (a) Two constant volumes and
  - (b) Two isothermal and two isentropic processes
  - (c) Two constant pressures and two isentropic processes
  - (d) One constant volume, one constant pressure and two isentropic processes
10. Otto cycle is also known as
  - (a) Constant pressure cycle
  - (b) Constant volume cycle
  - (c) Constant temperature cycle
  - (d) Constant temperature cycle and pressure cycle
11. The efficiency of diesel cycle approaches to Otto cycle efficiency when
  - (a) Cutoff is increased
  - (b) Cutoff is decreased
  - (c) Cutoff is zero
  - (d) None of the above
12. The coefficient of coupling between two coils is 0.45. The first coil has an inductance of 75 mH and the second coil has an inductance of 105 mH. What is the mutual inductance between the coils?
  - (a) 3.54 mH
  - (b) 39.9 mH
  - (c) 7.88 mH
  - (d) 189.3 mH



13. What would happen if a power transformer designed for operation on 50 Hz (frequency) were connected to a 5 Hz (frequency) source of the same voltage?
- (a) No effect  
(b) Eddy current and hysteresis loss will be excessive  
(c) Transformer may start to smoke  
(d) Current will be too much low
14. In three-phase transformer, the load current is 139.1 A, and secondary voltage is 415 V. The rating of the transformer would be
- (a) 50 kVA  
(b) 57.72 kVA  
(c) 100 kVA  
(d) 173 kVA
15. Thevenin resistance  $R^{Th}$  is found
- (a) By removing voltage sources along with their internal resistances  
(b) By short circuiting the given two terminals  
(c) Between any two open terminals  
(d) Between same open terminals as for  $E_{th}$
16. What happens to the MMF when the magnetic flux decreases?
- (a) Increases  
(b) Decreases  
(c) Remains constant  
(d) Becomes zero
17. The compressive strength of a good portland cement and standard sand mortar after 3 days of curing should not be less than
- (a) 7 MN / m<sup>2</sup>  
(b) 11.5 MN / m<sup>2</sup>  
(c) 17.5 MN / m<sup>2</sup>  
(d) 21 MN / m<sup>2</sup>
18. Eminently hydraulic lime is one in which the percentage of silica, alumina and iron oxide is
- (a) 5% - 10%      (b) 10% - 25%  
(c) 25% - 30%      (d) 30% - 40%
19. With increase in moisture content, bulking of sand
- (a) Increases  
(b) Decreases  
(c) First increases to a certain maximum value and then decreases  
(d) First decreases to a certain minimum value and then increases
20. The vehicle used in bronze paints is usually
- (a) Linseed oil  
(b) Naphtha  
(c) Water  
(d) Nitrocellulose lacquer
21. The number of vertical joints in a stretcher course is  $x$  times the number of joints in the header course, where  $x$  is equal to
- (a)  $\frac{1}{2}$   
(b) 1  
(c) 2  
(d)  $\frac{1}{4}$
22. The maximum total settlement for isolated foundations on clayey soils should be limited to
- (a) 25 mm      (b) 40 mm  
(c) 65 mm      (d) 100 mm
23. 'Killed steels' are those steels
- (a) Which are destroyed by burning  
(b) Which after their destruction are recycled to produce fresh steel  
(c) Which are deoxidized in the ladle with silicon and aluminium  
(d) Which have poor properties due to improper manufacturing

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24. Eutectoid steel contains which of the following percentage of carbon?
- (a) 0.02% (b) 0.3%  
(c) 0.63% (d) 0.8%
25. The amount of water used for 1 kg of distemper is
- (a) 0.2 liter (b) 0.4 liter  
(c) 0.6 liter (d) 0.8 liter
26. What is used to make paints odourless to some extent?
- (a) Flat latex  
(b) Celluloid sheets  
(c) Acrylic compound  
(d) Ploway resins
27. Which of the following units is not used to measure turbidity of water?
- (a) NTU  
(b) ATU  
(c) JTU  
(d) FTU
28. A sewer pipe contains 1 mm sand particles of specific gravity 2.65 and 5 mm organic particles of specific gravity 1.2, the minimum velocity required for removing the sewerage, is
- (a) 0.30 m/s  
(b) 0.35 m/s  
(c) 0.40 m/s  
(d) 0.45 m/s
29. If 2% solution of a sewage sample is incubated for 5 days at 20°C and depletion of oxygen was found to be 5 ppm, BOD of the sewage is
- (a) 200 ppm (b) 225 ppm  
(c) 250 ppm (d) None of the above
30. The width of a rectangular sewer is twice its depth while discharging 1.5m/sec. The width of the sewer is
- (a) 0.68 m (b) 0.88 m  
(c) 1.36 m (d) 1.76 m
31. The dimension of a rectangular settling tank is—length 24 m, width 6 m and depth 3 m. If 2-hour detention period for tank is recommended, the rate of flow of sewage per hour, is
- (a) 204 cu m (b) 208 cu m  
(c) 212 cu m (d) 216 cu m
32. A circular solid disc of uniform thickness 20 mm, radius 200 mm and mass 20 kg, is used as a flywheel. If it rotates at 600 r.p.m., the kinetic energy of the flywheel, in joules is
- (a) 395 (b) 790  
(c) 1580 (d) 3160
33. A steel wheel of 600 mm dia on a horizontal steel rail carries a load of 500 N. The coefficient of rolling resistance is 0.3. The force in newton, necessary to roll the wheel along the rail is
- (a) 0.5 (b) 5  
(c) 1.5 (d) 150
34. During inelastic collision of two particles, which one of the following is conserved?
- (a) Total linear momentum only  
(b) Total kinetic energy only  
(c) Both (A) and (B)  
(d) None of the above
35. An annular disc has a mass  $m$ , inner radius  $R$  and outer radius  $2R$ . The disc rolls on a flat surface without slipping. If the velocity of the centre of mass is  $v$ , the kinetic energy of the disc is
- (a)  $9/16 mv^2$  (b)  $11/16 mv^2$   
(c)  $13/16 mv^2$  (d)  $15/16 mv^2$
36. A circular object of radius  $r$  rolls without slipping on a horizontal level floor with the point of contact between the object and the floor is
- (a) Zero  
(b)  $V$  in the direction of motion  
(c)  $V$  opposite to the direction of motion  
(d)  $V$  vertically upward from the floor



37. If the Young's modulus and Poisson's ratio of the container material are 100 GPa and 0.3, respectively, the axial strain in the cylinder wall at mid-depth is
- (a)  $2 \times 10^{-5}$  (b)  $6 \times 10^{-5}$   
(c)  $7 \times 10^{-5}$  (d)  $1.2 \times 10^{-4}$
38. Two bars of different materials and same size are subjected to the same tensile force. If the bars have unit elongation in the ratio of 2 : 5, then the ratio of modulus of elasticity of the two materials will be
- (a) 2 : 5 (b) 5 : 2  
(c) 4 : 3 (d) 3 : 4
39. The ratio of bulk modulus to Young's modulus for a poisson's ratio of 0.25 will be
- (a)  $\frac{1}{3}$  (b)  $\frac{2}{3}$   
(c) 1 (d)  $\frac{3}{2}$
40. The total strain energy stored in a body is termed as
- (a) Resilience  
(b) Proof resilience  
(c) Impact energy  
(d) Modulus of resilience
41. The bending moment of a cantilever beam of length  $l$  and carrying a uniformly distributed load of  $w$  per unit length is \_\_\_\_\_ at the fixed end.
- (a)  $wl / 4$  (b)  $wl / 2$   
(c)  $wl$  (d)  $wl^2 / 2$
42. A line joining the apex of a triangle to some fixed point on the opposite side is called a
- (a) Check line (b) Tie line  
(c) Base line (d) None of the above
43. The angle of intersection of the horizon glass and index glass in an optical square is
- (a)  $30^\circ$  (b)  $45^\circ$   
(c)  $60^\circ$  (d)  $75^\circ$
44. An imaginary line tangential to the longitudinal curve of the level at the center of the tube is called
- (a) Horizontal axis  
(b) Vertical axis  
(c) Axis of the level tube  
(d) Line of collimation
45. In order to measure a horizontal angle more accurately than a vernier, a method of
- (a) Repetition is used  
(b) Reiteration is used  
(c) Deflection angles  
(d) Double observation is used
46. Collimation method is used in
- (a) Profile levelling  
(b) Differential levelling  
(c) Check levelling  
(d) Both (A) and (B)
47. A bar chart is drawn for
- (a) Time versus activity  
(b) Activity versus resources  
(c) Resources versus progress  
(d) Progress versus time
48. CPM is
- (a) Activity oriented (b) Even oriented  
(c) Time oriented (d) Resource oriented
49. PERT requires
- (a) Single time estimate  
(b) Double time estimate  
(c) Triple time estimate  
(d) None of the above
50. In CPM the cost slope is determined by
- (a) Crash cost / Normal cost  
(b) Crash cost – Normal cost / Normal time – Crash time  
(c) Normal cost / Crash cost  
(d) Normal time – Crash time / Crash cost – Normal cost.



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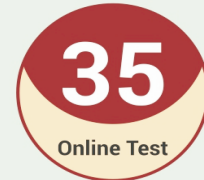
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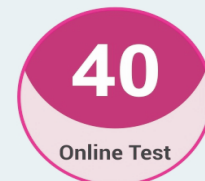
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## ANSWERS KEY

1. **Ans. (a)**

$$C_d = C_c \times C_v$$

$$= \sqrt{3} \times 415 \times 139.1$$

$$= 100 \text{ kVA}$$

2. **Ans. (b)**

3. **Ans. (a)**

$$v = \frac{\mu}{\rho} = \frac{.011}{0.95}$$

$$v = 0.01157 \text{ stokes}$$

$$v = 0.116 \text{ stokes}$$

4. **Ans. (a)**

Lift

5. **Ans. (c)**

$$f = \frac{f}{4} = \frac{64}{4R_N}$$

$$f = \frac{16}{R_N}$$

6. **Ans. (a)**

7. **Ans. (b)**

8. **Ans. (c)**

9. **Ans. (b)**

10. **Ans. (b)**

11. **Ans. (c)**

12. **Ans. (b)**

Coefficient of coupling (k) = 0.45

$$\text{inductance } (L_1) = 75 \times 10^{-3} \text{ H}$$

$$\text{inductance } (L_2) = 105 \times 10^{-3} \text{ H}$$

$$\text{mutual inductance } (M) = k\sqrt{L_1 L_2}$$

$$= 0.45 \sqrt{75 \times 10^{-3} \times 105 \times 10^{-3}}$$

$$= 39.93 \text{ mH}$$

13. **Ans. (c)**

14. **Ans. (c)**

$$\text{Rating} = \sqrt{3} V_L I_L$$

15. **Ans. (d)**

16. **Ans. (b)**

17. **Ans. (b)**

**Reason :-**

Comp. strength at the end of 3-days should not be less than 115 kg/cm<sup>2</sup> or 11.5 N/mm<sup>2</sup>, and at the end of 7 days should not be less than 175 kg/cm<sup>2</sup> or 17.5 N/mm<sup>2</sup>.

18. **Ans. (c)**

**Reason :** Feebly hydraulic lime → 5 to 10%

Moderately hydraulic lime → 11 to 20 %

Eminently HL → 21 to 30%

19. **Ans. (c)**

20. **Ans. (d)**

21. **Ans. (a)**

22. **Ans. (c)**

23. **Ans. (c)**

24. **Ans. (d)**

25. **Ans. (c)**

26. **Ans. (d)**

**Reason :** These eliminate the odour present in alkyd, stain blocking primers. It also aims to reduce VOC content, which is harmful.

27. **Ans. (b)**

28. **Ans. (d)**

29. **Ans. (c)**

30. **Ans. (c)**

31. **Ans. (d)**

$$\text{Detention time} = \frac{\text{Volume of tank}}{\text{Rate of flow}}$$

$$\text{ROF} = \frac{24 \times 6 \times 3}{2}$$

$$\text{ROF} = 216 \text{ cu m}$$



32. Ans. (b)

33. Ans. (a)

34. Ans. (a)

35. Ans. (b)

36. Ans. (a)

37. Ans. (a)

$$e = \frac{1}{E} \left( \sigma_a - \frac{\sigma_c}{m} \right)$$

$$e = \frac{1}{100 \times 10^3} (5 - 10 \times 0.3)$$

$$= 2 \times 10^{-5}$$

38. Ans. (b)

39. Ans. (b)

40. Ans. (a)

41. Ans. (d)

42. Ans. (a)

43. Ans. (b)

44. Ans. (c)

45. Ans. (a)

46. Ans. (a)

47. Ans. (a)

48. Ans. (a)

49. Ans. (c)

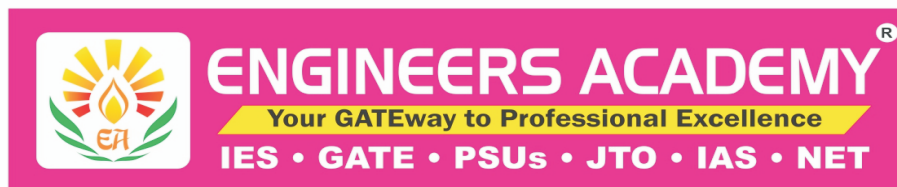
50. Ans. (b)

○○○



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