

Logical Reasoning

1. The following question has a set of four statements. Each statement has three segments. Choose the alternative where the third segment in the statement can be logically deduced using both the preceding two, but not just from one of them.

A. All reptiles are egg-laying. Some birds are flightless. Some birds are reptiles.
 B. All birds are egg-laying. Some fish are not egg-laying. Some fish are birds.
 C. Some cattle are herbivorous. Some cattle are carnivorous. Some herbivorous can be carnivor.

- (a) C only
 (b) A only
 (c) B only
 (d) None of the above

2. Consider the following two statements.

Statement A: All women who are employed are happy.
 Statement B: All women are either employed or happy.

Assuming the above to be true, which of the following cannot be true?

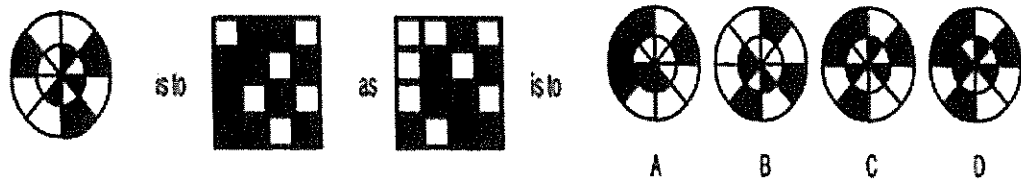
(I) Some women are not happy.
 (II) Some women who are happy are employed.
 (III) Some women who are employed are not happy.

- (a) II only
 (b) III only
 (c) I only
 (d) I and III only

3. When ANTICIPATION is coded as ICITNANOITAP, then PRODUCTIVITY is:-

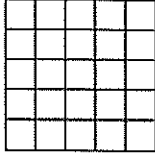
- (a) CUDORPYTIVIT
 (b) CUDOPRYTIVIT
 (c) CUDROPYTIVIT
 (d) CUDPROYTIVIT

4. Select the answer for the problem figures from the answer figures A to D.



- (a) C
 (b) D
 (c) B
 (d) A

5. The following figure shows a 5 by 5 square. How many rectangles are there in the figure?



- (a) 155
- (b) 225
- (c) 170
- (d) None of the above

Quantitative techniques

6. HCF and LCM of 24 and another number is 4 and 312 respectively. What is the other number?
- (a) 48
 - (b) 52
 - (c) 64
 - (d) 62
7. What remainder do you get when you divide 7^{125} by 342?
- (a) 49
 - (b) 7
 - (c) 349
 - (d) None of the above
8. A briefcase has a number-lock system containing a combination of 3-digits. Each of the 3 digits except the first digit can be numbers 0 to 9. The first digit can only be a numbers 1 to 9. If the correct combination is unknown, then how many minutes [maximum time] would be required to open the briefcase if each trial of combination takes 4 seconds?
- (a) 45
 - (b) 25
 - (c) 60
 - (d) 30
9. If $a = 2y + 8z - 8x$, $b = -10z + 7x + 5y$, $c = -2y + 7z + 6x$, then the value of $\frac{x + y + z}{a + b + c}$ is:-
- (a) 4
 - (b) 2
 - (c) $\frac{1}{5}$
 - (d) $\frac{1}{3}$
10. Let 'k' be a positive integer, less than 40, such that $(k - 2)$ is divisible by 9. Let 'n' be the smallest positive integer > 2 , and if $(k + n^2)$ is divisible by 7, then 'n' equals:-
- (a) 4
 - (b) 3
 - (c) 7
 - (d) 5

Mechanical

1. The refrigeration effect in a dry evaporator compared to flooded evaporator in a similar plant is:-
 - (a) More
 - (b) Same
 - (c) Less
 - (d) More or less depending on ambient conditions
2. Which of the following statements is true?
 - (a) For a given compression ratio, both Otto and Diesel cycles have same efficiency
 - (b) In actual practice, Otto cycle is more efficient than Diesel cycle
 - (c) Otto cycle is more efficient than Diesel cycle for a given compression ratio
 - (d) Diesel cycle is more efficient than Otto cycle for a given compression ratio
3. A composite shaft consists of copper rod of 3 cm diameter enclosed in a steel tube of external diameter 4 cm and 0.5 cm thick. The shaft is required to transmit a torque of 5000 Nm, if both the shafts have equal lengths and welded to a plane at each end so that their twists are equal. The shearing stress developed in the copper rod will be:- (Take $G_c = 4 \times 10^5 \text{ N/cm}^2$, $G_s = 8 \times 10^5 \text{ N/cm}^2$)
 - (a) 1773 N/cm²
 - (b) 4726 N/cm²
 - (c) 472.6 N/cm²
 - (d) 177.3 N/cm²

Structural (civil)

4. The minimum depth of exploration in case of gravity dam is:-
 - (a) Twice the height of the dam
 - (b) Height of the dam
 - (c) Twice the base of the dam
 - (d) Base of dam
5. The equivalence factor is equal to:-
 - (a) $\left[\frac{\text{axle load}}{\text{stanadard axle load}} \right]^{\frac{1}{2}}$
 - (b) $\left[\frac{\text{axle load}}{\text{stanadard axle load}} \right]^4$
 - (c) $\frac{\text{axle load}}{\text{stanadard axle load}}$
 - (d) $\left[\frac{\text{axle load}}{\text{stanadard axle load}} \right]^2$
6. If 7.5 cm bituminous concrete surface with $E_c = 1000 \text{ kg/cm}^2$ is equivalent to thickness t_b of base course, then the equivalent thickness t_b of base course having $E_b = 400 \text{ kg/cm}^2$ will be:-
 - (a) 10.2 cm
 - (b) 8.5 cm
 - (c) 6.5 cm
 - (d) 3.9 cm

Instrumentation

7. A synchro-transmitter receiver is:-
 - (a) Three phase ac device
 - (b) Single phase ac device
 - (c) Two phase ac device
 - (d) Dc device

8. Which of the following is true about an LVDT?

- A. It exhibits linear characteristics upto a displacement of ± 5 mm
- B. It has a linearity of 0.05 %
- C. It has an infinite resolution and a high sensitivity which is of the order of 40 V/mm
- (a) A, B and C
- (b) Only B
- (c) Only A and B
- (d) Only A

9. The p-n-p transistor is required to be biased in common emitter configuration in active region, then:-

- (a) The base terminal is to be connected to negative and collector terminal to positive of the sources
- (b) The base terminal is to be connected to positive and collector terminal to negative of the sources
- (c) The base terminal is to be connected to negative and collector terminal to negative of the sources
- (d) None of the above

Electronics & Communication

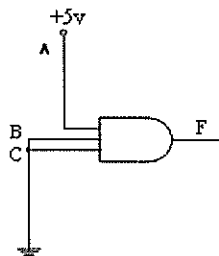
10. A router is one which _____.

- (a) Forwards a packet to the next free outgoing link
- (b) Determines on which outgoing link a packet is to be forwarded
- (c) Forwards a packet to all outgoing links
- (d) Forwards a packet to all outgoing links, except the link upon which the packet originated

11. The major application of chopper drive is in:-

- (a) Computers
- (b) Miniature motors
- (c) Traction
- (d) Heating furnaces

12. A three input AND gate is shown in figure. If the circuit works off the positive voltage made logic with logic levels 1 = +5 V and 0 = 0 V, the binary state output will be:-



- (a) F = 1
- (b) F = 011
- (c) F = 0
- (d) F = 100

Telecommunication

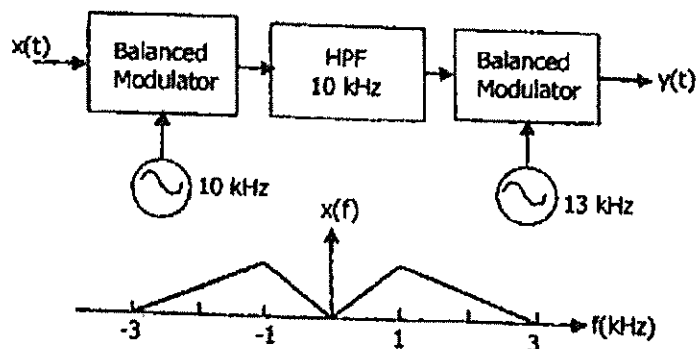
13. The orbital period of a satellite is proportional to:-

- (a) r^2
- (b) $r^{3/2}$
- (c) r
- (d) r^3

14. In a common emitter BJT amplifier, the maximum usable supply voltage is limited by:-

- (a) Avalanche breakdown of base-emitter junction
- (b) Collector-emitter breakdown voltage with base open (BVCEO)
- (c) Collector-base breakdown voltage with emitter open (BVCEO)
- (d) Zener breakdown voltage of the emitter-base junction

15. Consider a system shown in figure given below. Let $X(f)$ and $Y(f)$ denote the Fourier transforms of $x(t)$ and $y(t)$ respectively. The ideal HPF has the cut-off frequency 10 kHz.



The positive frequencies where $Y(f)$ has spectral peaks are:-

- (a) 1 kHz and 14 kHz
- (b) 2 kHz and 24 kHz
- (c) 2 kHz and 14 kHz
- (d) 1 kHz and 24 kHz

Computer Science

16. The logical structure of the entire database as seen by DBA at:-
- (a) Physical Level
 - (b) Conceptual Level
 - (c) External Level
 - (d) Logical Level
17. In CPU scheduling, the number of jobs the system completes in a specific time is called as:-
- (a) Throughput
 - (b) Turnaround Time
 - (c) Load Limit
 - (d) Job Frequency
18. Match the following:-

Column A	Column B
a) Session Layer	i) FTP
b) Application Layer	ii) UDP
c) Transport Layer	iii) Layer 5

- (a) a - ii, b - iii, c - i
- (b) a - ii, b - i, c - iii
- (c) a - i, b - iii, c - ii
- (d) a - iii, b - i, c - ii

Electrical & Electronics Engineering

19. According to KCL the incoming currents are taken as:-
- (a) Always positive
 - (b) Always negative
 - (c) Sometimes positive and sometimes negative
 - (d) None of the above
20. A cascade of 3 Linear Time Invariant systems is causal and unstable. From this, we conclude that:-
- (a) At least one system is unstable and at least one system is casual
 - (b) The majority are unstable and the majority are casual
 - (c) At least one system is causal and all systems are unstable
 - (d) Each system in the cascade is individually causal and unstable
21. A unit step current is applied to a network consisting of only passive elements. The voltage across the current source observed is $u(t)=1 + e^{-at}$. The simplest possible network will consist of the elements:-
- (a) 2 resistors and 1 capacitor
 - (b) 2 resistors and 1 inductor
 - (c) 1 resistor and 2 capacitors
 - (d) 1 resistor and 2 inductors

METALLURGY

22. Plug rolling is used to:
- 1] produce collapsible tubes
 - 2] produce seamless tubes
 - 3] reduce diameter of tubes
 - 4] reduce wall thickness and increase diameter of tubes

Ans: 4

- 23.** In order for an alloy system to be capable of precipitation hardening, it is essential that the equilibrium diagram shows a decreasing solubility of one component in another:
- 1] with constant temperature
 - 2] with decreasing temperature
 - 3] with increasing temperature
 - 4] below room temperature

Ans: 1

- 24.** A 0.2% C steel is equilibrated just above the eutectoid temperature and then quenched in iced brine. The room temperature microstructure will consist of:
- 1] 77% ferrite and 23% martensite
 - 2] 76% ferrite and 24% pearlite
 - 3] 60% ferrite and 40% martensite
 - 4] 97% ferrite and 3% pearlite

Ans: 2

Aeronautical

- 25.** Lateral stability is obtained by

- 1] Rudder
- 2] Elevators
- 3] Dihedral wings
- 4] None of them

Ans: 3

- 26.** Which of the following statements is true?

- 1] Ground effect increases static pressure
- 2] Ground effect decreases static pressure

3] Ground effect does not affect static pressure

4] None of these

Ans: 1

27. For a thin symmetric aerofoil, the lift and moment coefficients about leading edge at an angle 2.3° is respectively equal to

1] 0.252 and -0.126

2] 0.252 and -0.063

3] 0.191 and -0.0477

4] 0.191 and -0.095

Ans: 2