

**Section-I: General Aptitude**

- $2^{(x-1)} - 2^{(x-4)} = 7(2^{11})$, what is x?
(A) 9 (B) 11 (C) 13 (D) 15
- Length of a rectangle increases by 20%, while its breadth reduces by 10%. Find the percentage change in its perimeter.
(A) 10% increase (B) 8% increase (C) 5% increase (D) Can't say
- In a group, average weight of the females was 60kgs. The average weight of the entire group was twice as close to the average weight of the men as it was to the average weight of the women. What percentage of the group were women?
(A) 40 (B) 33.33 (C) 50 (D) 66.67
- Govind decided to walk down the escalator of a shopping mall. He found that if he walks down 25 steps, he requires 15 seconds to reach the bottom. However, if he steps down 13 steps, he requires 24 seconds to reach the bottom. Find out the height of the stairway in steps.
(A) 30 (B) 40 (C) 45 (D) 50
- Taps A and B, operating simultaneously, can fill a certain tank in 72 min; Taps A and C, operating simultaneously, can fill the tank in 90 min; and Taps B and C, operating simultaneously, can fill the tank in 2 hours. How many hours does it take Taps A, B, and C, operating simultaneously, to fill the tank ?
(A) $\frac{1}{3}$ (B) 1 (C) $\frac{2}{3}$ (D) $\frac{5}{6}$
- A customer at Paradise hotel calculates his tip by adding a constant amount to another sum that is directly proportional to the total bill for the meal. If the total bill for his meal had been 100/- greater, the customer would've calculated a tip of 60/-. If the total bill for his meal had been 150/- less, the customer would've calculated a tip of 40/-. If his total bill for the meal was 600/- what will be the amount of his tip?
(A) 48 (B) 56 (C) 52 (D) 50
- There are five hotels in a line. If 4 men go into a hotel at 11 am, then what will be the probability that each go into a different hotel?
(A) $\frac{124}{125}$ (B) $\frac{24}{125}$ (C) $\frac{42}{125}$ (D) $\frac{48}{625}$
- In a class of 40 students, 12 enrolled for both English & German. 22 enrolled for German. If students of class enrolled at least one of the subjects, then how many students enrolled for only English & not German?
(A) 30 (B) 12 (C) 18 (D) 40



9. Mr. Vikas buys some apples at 8 per rupee from one trader and a similar quantity at 5 per rupee from another trader. He mixes both the varieties and sell the whole at 9 per rupee. What is the profit or loss percentage that he makes?
(A) 31.62 % Profit (B) 31.62 % Loss (C) 46.25 % Profit (D) 46.25 % Loss

10.

Type of program ↓	AGE Group →		
	15-20	21-30	31+
Daily Serials	6	4	17
Comedy	7	5	5
Singing/dancing	6	12	14
Devotional	1	4	11
News	2	3	15
Sports	9	3	4
Quiz	2	2	2
Total	33	33	68

What percentage of respondents aged 21-30 indicated a favourite program other than singing/dancing?

- (A) 36 % (B) 46 % (C) 64 % (D) 60 %
11. **Analogy**
AESTHETICS : BEAUTY ::
(A) ethics: etiquette (B) epistemology : knowledge
(C) theology: morals (D) rhetoric : reasoning
12. Choose the appropriate antonym for the word **ABOMINATE**
(A) loathe (B) despise (C) adore (D) abhor
13. Choose the sentence that is grammatically correct:
(A) The serving bowl or the plates go on that shelf
(B) The serving bowls or the plate go on that shelf
(C) The serving bowl or the plate go on that shelf
(D) The serving bowls or the plates goes on that shelf
14. The management of the company had cordially invited its staff for the 25th Anniversary function.
Choose the best conclusion:
(A) The company is going to wind-up the next year
(B) It is mandatory for all the staff to attend the function
(C) The management of the company is spend-thrift
(D) The company is well-established



15. Find out the error part in the given sentence
Ram is junior / than shyam / and Ram is / older than shyam
(A) (B) (C) (D)
16. Find the proper meaning of the words given in bold letters.
After working for years in the same company, Ramu decided to **Jack it all**.
(A) Continue (B) Change (C) Stop (D) Cheat.
17. Urban services have not expanded fast enough to cope up with urban expansion. Low investment allocations have tended to be underspent. Both public and private infrastructure quality has declined. The impact of the environment in which children live and the supporting services available to them when they fall ill, seem clear. The decline in average food availability and the rise in absolute poverty, point in the same unsatisfactory directions.
Choose the weakest statement related to the above passage
(A) Though adequate provisions of funds were made but they were received under spent
(B) Low cost urban housing is on the priority
(C) There is nothing to boast about urban services
(D) Birth rate is higher in urban areas than in rural areas
18. **Sentence completion**
Data concerning the effects on a small population of high concentrations of a potentially hazardous chemical are frequently used to ----- the effects on a large population of lower amounts of the same chemical.
(A) verify (B) redress (C) predict (D) realize
19. **Select the best alternative for the underlined part:**
Currently 93,250,000 billion barrels a year, world consumption of oil is rising at a rate of 3 percent annually.
(A) world consumption of oil is rising at a rate of
(B) the world is consuming oil at an increasing rate of
(C) the world's oil is being consumed at the increasing rate of
(D) the rise in the rate of the world's oil consumption is
20. False currency is being supplied to India through buses that run between India and Pakistan.
Find out the course of action to be taken.
(A) The govt. should ban the buses
(B) The govt. should change the currency
(C) The govt. should strengthen the vigilance
(D) Indian govt. should warn the Pakistan govt.

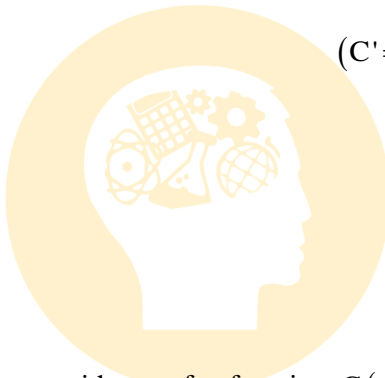


Section-II: Technical

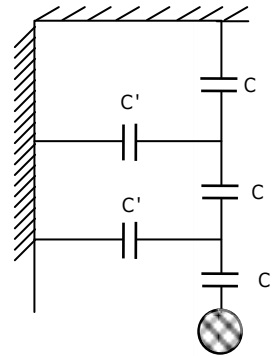
- What would be expectation of number of failures preceding the first success in an infinite series of independent trials with constant probability of success p ?
 (A) $\frac{1}{p}$ (B) $\frac{1}{q}$ (C) $\frac{q}{p}$ (D) None of these
- A 3-phase, star-connected alternator is rated at 1500 KVA, 6.6 KV. The synchronous reactance and armature effective resistance are 25Ω and 1.25Ω respectively per phase. Determine the % Regulation for a load of 992 KW at 0.8 P.f leading? [Take current as reference]
 (A) -18.6 % (B) +55.5% (C) -15.7% (D) -30.8%

- The maximum voltage (in kV) that the string of three insulators can withstand if maximum voltage per unit is 20 kV is

- (A) 48
 (B) 58
 (C) 65
 (D) 55



$(C' = C/6)$

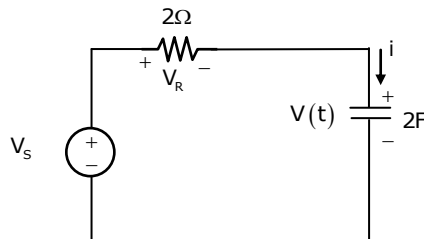


- The polar plot of a system with transfer function $G(s) = \frac{k}{s(s+T)}$ for positive T and negative k will lie in
 (A) First quadrant (B) Second quadrant
 (C) Third quadrant (D) Fourth quadrant

- Evaluate $\iint xy(x+y)dx dy$ taken over the area between $y = x^2$ and $y = x$.

- (A) 0 (B) 2/56 (C) 1/56 (D) 3/56

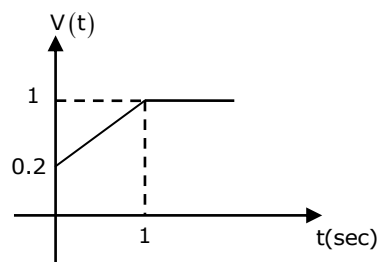
- For the given circuit $C = 2F$, $R = 2\Omega$



The voltage function is shown here:

The current $i(t)$ for $0 < t \leq 1$ is

- (A) 4.6A (B) 3.6A
 (C) 2.6A (D) 1.6A





7. A single-quadrant type A chopper is operated with $t_{on}=1$ msec and $t_{off}=1.5$ msec
Its Ripple factor is
(A) 1 (B) 0.5 (C) 0 (D) 1.23

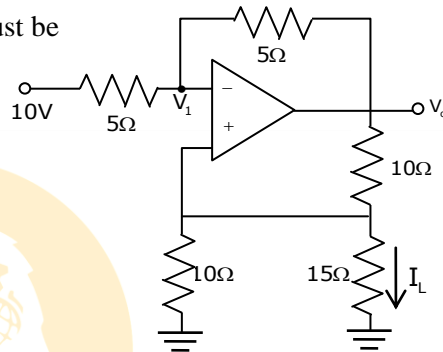
8. The state equation of a system is given below, the system is

$$\dot{x}_1 = x_1 + x_2 + U; \quad \dot{x}_2 = x_1 \quad \text{and} \quad y = x_2$$

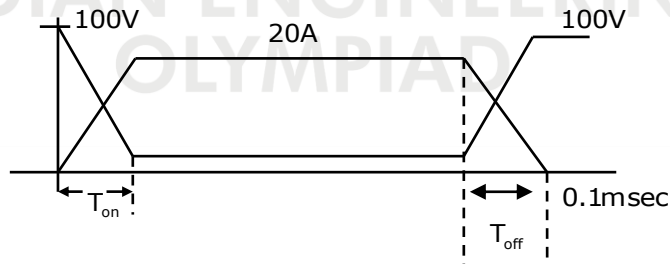
- (A) Controllable and not observable
(B) Observable and not controllable
(C) Not controllable and not observable
(D) Controllable and observable

9. For the circuit shown below, the value of I_L must be

- (A) 1 A
(B) -1 A
(C) -1.33 A
(D) 2 A

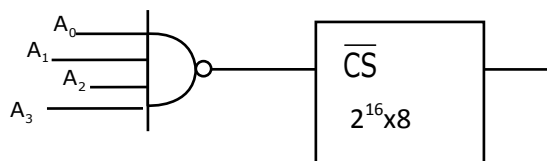


10. The voltage across and current through a device (MOSFET) is shown in figure. Temperature between junction and the base is 10°C and thermal resistance from junction to base is $0.1^\circ\text{C}/\text{W}$. Switching frequency is 5KHZ. $T_{on} = T_{off} = 0.1\mu\text{sec}$
The device can be realized as a fixed dc source V_d in series R_d , the value of $v_d=1\text{V}$. Then the value of R_d in ohms is.



- (A) 0.448 (B) 0.558 (C) 0.658 (D) 0.155

11. Consider the interfacing circuit shown below



The memory map is given by

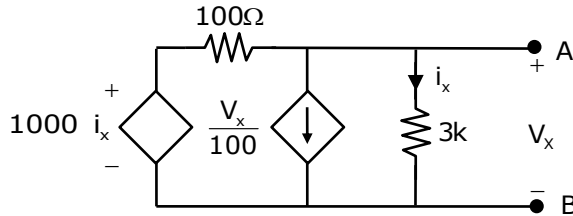
- (A) $000F - FFFF_H$ (B) $010F_H - FFFF_H$
(C) $001F_H - FFFF_H$ (D) $001F_H - EFFF_H$



12. The iterative root of $f(x) = 3x^2 + 2x + 1$ using Newton Raphson method is

- (A) $x_{n+1} = \frac{3x_n^2 + 1}{6x_n + 2}$ (B) $x_{n+1} = \frac{9x_n^2 + 4x_n + 1}{6x_n + 2}$
 (C) $x_{n+1} = \frac{3x_n^2 - 1}{6x_n + 2}$ (D) $x_{n+1} = \frac{9x_n^2 - 4x_n - 1}{6x_n + 2}$

13. The Thevenin's resistance between the terminals A and B is



- (A) 40.57Ω (B) 58.82Ω (C) 51Ω (D) 46.13Ω

14. An oscilloscope having $5 \times 5 \text{ cm}^2$ has its own sweep output fed to its input. If x and y plates having same sensitivities then oscilloscope will display a _____.

- (A) sweep wave (B) Circle (C) diagonal line (D) Triangular

15. A 3 phase full converter, fed from 2-phase, 440 V, 50 Hz source is connected to load $R = 20 \Omega$, $E = 300 \text{ V}$ and a large inductance so that output current is ripple free. Calculate the power delivered to load for $\alpha = 30^\circ$

- (A) 6250W (B) 7565.5W (C) 5521.5W (D) 2255.5

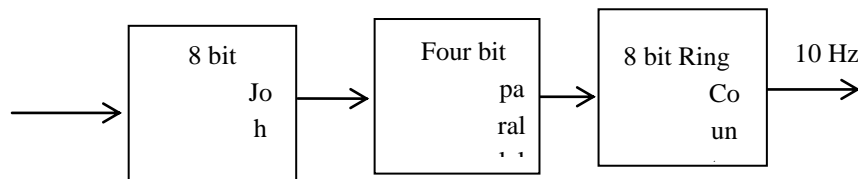
16. $\int_0^\infty \int_0^\infty x e^{-\frac{x^2}{y}} dx dy = \underline{\hspace{2cm}}$.

- (A) 0.5 (B) 1 (C) 1.5 (D) 2

17. A surge of 100 kV travels along an overhead line towards its junction with a cable. The surge impedance for the overhead line and cable are 400Ω and 50Ω respectively. The magnitude of surge transmitted through the cable is

- (A) 11.11 kV (B) 22.22 kV (C) 12.50 kV (D) 88.89 kV

18. For the diagram shown below, the frequency of output is 10Hz. The input frequency must be



- (A) 20480Hz (B) 15000Hz (C) 28000Hz (D) 50480Hz



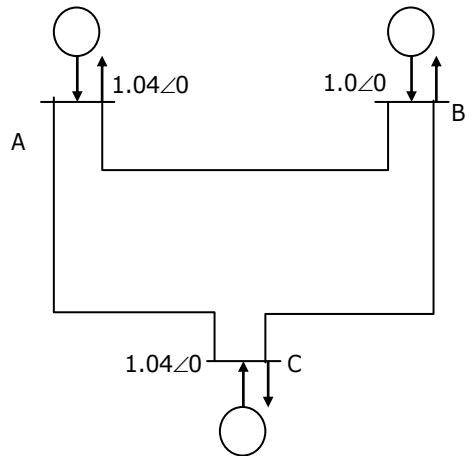
19. Find the Y_{Bus} of the below figure if admittance of each line is $(0.02+j0.08)PU$.

(A)
$$\begin{bmatrix} 0.04 + j0.16 & -0.02 - j0.08 & -0.02 - j0.08 \\ -0.02 - j0.08 & 0.04 + j0.16 & -0.02 - j0.08 \\ -0.02 - j0.08 & -0.02 - j0.08 & 0.04 + j0.16 \end{bmatrix}$$

(B)
$$\begin{bmatrix} 0.04 + j0.16 & 0.02 - j0.08 & 0.02 - j0.08 \\ 0.02 - j0.08 & 0.04 - j0.16 & 0.02 - j0.08 \\ 0.02 - j0.08 & 0.02 - j0.08 & 0.04 - j0.16 \end{bmatrix}$$

(C)
$$\begin{bmatrix} 0.04 + j0.16 & -0.02 + j0.08 & -0.02 + j0.08 \\ 0.02 + j0.08 & 0.04 + j0.16 & -0.02 + j0.08 \\ 0.02 + j0.08 & -0.02 + j0.08 & 0.04 + j0.16 \end{bmatrix}$$

(D)
$$\begin{bmatrix} 0.16 & -0.08 & -0.08 \\ -0.08 & 0.04 & -0.08 \\ -0.08 & -0.08 & 0.16 \end{bmatrix}$$



20. General solution of $\frac{xdy}{dx} = 2 - 4x^3$ is

(A) $y = 2 \ln x - \frac{4x^3}{3} + c$

(B) $y = \ln x - \frac{4x^3}{3} + c$

(C) $y = 2 \ln x + \frac{4x^3}{3} + c$

(D) $y = x^2 - \frac{4 \ln x^3}{3} + c$

21. Differential protection is used to protect the Δ/Y Transformer, then the connections of Current Transformers (CT) in primary and secondary sides is

(A) Δ/Y

(B) Y/Δ

(C) Y/Δ

(D) Y/Y

22. A 10 kW, 200V dc shunt motor has total no-load rotational loss of 500 W. The armature circuit resistance is 0.8Ω and field circuit resistance is 100Ω .

Find the efficiency at rated load.

(A) 70.4%

(B) 92.3%

(C) 84.2%

(D) 78.1%

23. A 230V, 60Hz, 4-pole Δ connected, three phase induction motor operates at full load speed of 1710 rpm. The power developed by the motor at this speed is 895 W. If the supply voltage decreases by 10%, then the torque developed by the motor will be

(A) 5 N-m

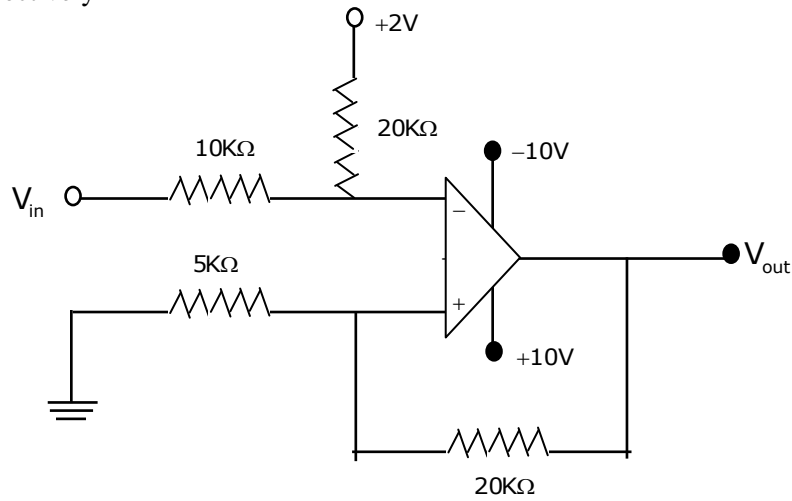
(B) 6.05 N-m

(C) 4.5 N-m

(D) 4.05 N-m

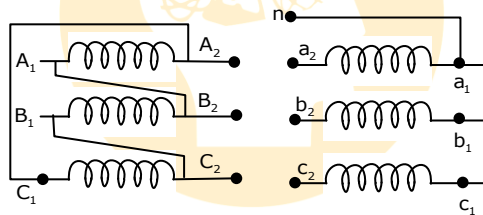


24. A Schmitt trigger circuit is shown below. The upper and lower threshold voltages are respectively



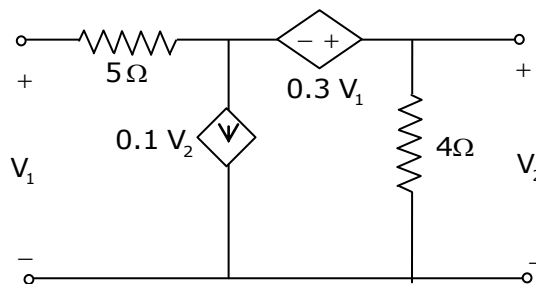
- (A) 2V, -4V (B) 2V, -2V (C) 4V, -4V (D) 4V, -2V

25. The below three phase transformer connection is of _____ type.



- (A) Dy1 (B) Dy5 (C) Dy7 (D) Dy11

26. The T-parameters of circuit shown below are



- (A) $\begin{bmatrix} 2.11 & -3.846 \\ -0.35 & 2.11 \end{bmatrix}$ (B) $\begin{bmatrix} 1 & 2.11 \\ 3.846 & 0.35 \end{bmatrix}$
 (C) $\begin{bmatrix} 2.11 & 3.846 \\ 0.35 & 1 \end{bmatrix}$ (D) $\begin{bmatrix} 0.35 & 1 \\ 2.11 & 3.846 \end{bmatrix}$



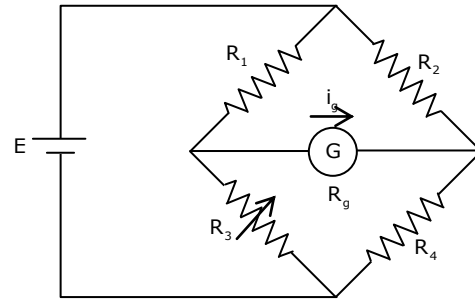
27. Find the expression for the galvanometer current for the circuit shown above.

(A) $I_g = \frac{E \left[\frac{R_1}{R_1 + R_3} - \frac{R_2}{R_2 + R_4} \right]}{R_g}$

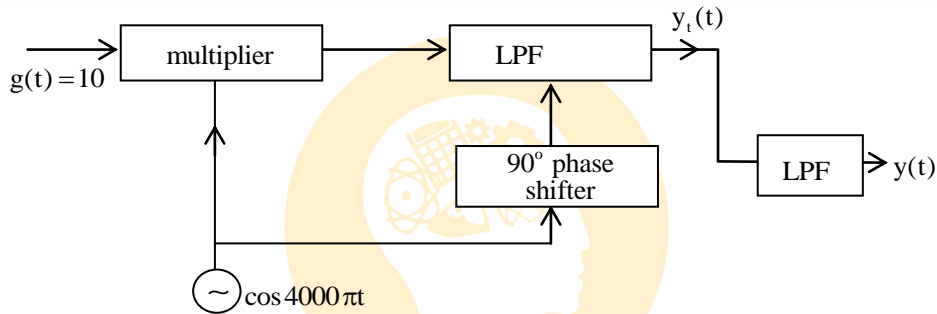
(B) $I_g = \frac{E \left[\frac{R_3}{R_1 + R_3} - \frac{R_4}{R_2 + R_4} \right]}{\frac{R_1 R_3}{R_1 + R_3} + \frac{R_2 R_4}{R_2 + R_4} + R_g}$

(C) $I_g = \text{zero}$

(D) None of these

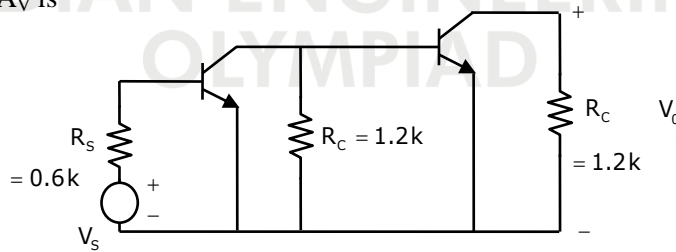


28. An LPF has cutoff frequency 3 KHz & pass-band gain of 2. It is being used in following circuit. The output $y(t)$ will be



- (A) $20\cos(4000\pi t)$ (B) $10\sin(4000\pi t)$ (C) $5\sin(4000\pi t)$ (D) 0

29. Both the transistors have $\beta_0 = 125$, $V_t = 25\text{mV}$ and operated at $I_C = 1\text{ mA}$. The overall voltage gain A_V is



- (A) 1400 (B) 1000 (C) 1650 (D) 1100

30. For diagram shown below

$$\begin{cases} J = 0 & \text{for } 0 < r < a \\ J = k & \text{for } a < r < b \\ J = 0 & \text{for } b < r < \infty \end{cases}$$

The magnetic intensity for $r > b$ would be

- (A) 0 (B) $\frac{k\pi(b^2)}{2r}$
 (C) $\frac{k\pi(b^2 - a^2)}{2r}$ (D) $\frac{k\pi(b^2 - a^2)}{2\pi r}$

