

PAKISTAN INSTITUTE OF ENGINEERING AND APPLIED
SCIENCES (PIEAS), ISLAMABAD

PG FELLOWSHIP Electronics Paper 2020

Total No. of Q: 60

Total Time allowed: 80Minutes

Q1) In second order control system if the damping ratio is decreased then, the percentage overshoot:

- A) Decreased
- B) Increased
- C) Zero
- D) None of the above

ANS) A

Q2) Determine the Rise Time for the system:

$$G(S) = \frac{25}{S^2 + 6S + 2}$$

- A) 1
- B) 0.5
- C) 3
- D) 0.7

ANS) B

Q3) The system $G(S) = \frac{1}{S^2}$ is:

A) Stable

B) Unstable

C) Marginally stable

D) None of the above

ANS) B

Q4) The Fourier transform of $\text{sgn}(t)$ is:

A) $\frac{2}{j\omega}$

B) $1 + \frac{2}{j\omega}$

C) $j\omega + \frac{1}{j\omega^2}$

D) $j\omega^2$

ANS) A

Q5) In root locus technique, angle between adjacent asymptote is:

A) $180^\circ / (m+n)$

B) $360^\circ / (m+n)$

C) $360^\circ / (m-n)$

D) $180^\circ / (m-n)$

ANS) C

Q6) An ideal transformer has:

A) Input voltage = output voltage

B) Input current = output current

C) Input power = output power

D) All of the above

ANS) D

Q7) Which language is used to program FPGA:

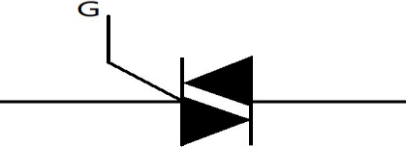
A) Verilog

B) VHDL

C) Both A and B

D) None of the above

ANS) C

Q8)  is symbol for:

- A) TRIAC
- B) DIAC
- C) IGBT
- D) Thyristor

ANS) A

Q9) The disadvantage of auto transformer is that:

- A) High cost
- B) No insulation between primary and secondary winding
- C) Both A and B
- D) None of the above

ANS) B

AUTO TRANSFORMER

Advantages of Auto transformer

- Less costly
- Better regulation
- Low losses as compared to ordinary two winding transformer of the same rating.

Disadvantages of Auto transformer

There are various advantages of the auto transformer, but then also one major disadvantage, why auto transformer is not widely used, is that

- The secondary winding is not insulated from the primary winding. If an auto transformer is used to supply low voltage from a high voltage and there is a break in the secondary winding, the full primary voltage comes across the secondary terminal which is dangerous to the operator and the equipment. So the auto transformer should not be used for interconnecting high voltage and low voltage systems.
- Used only in the limited places where a slight variation of the output voltage from input voltage is required.

Q10) The magnitude of plot in transform:

A) Is bounded by 1

B) 0.5

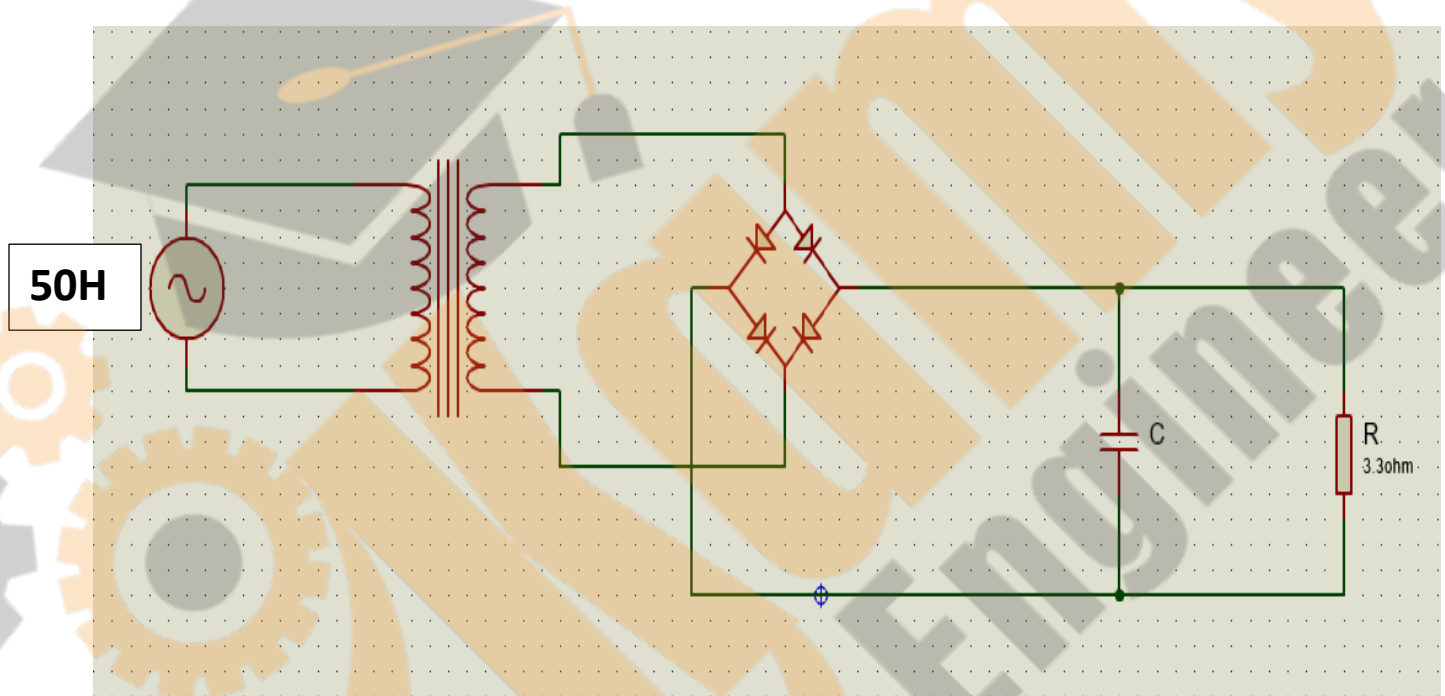
C) -

D)

ANS)

Q11) $R_L = 3.3\Omega$ and Frequency 50Hz, output wave form is also given, find the values of filtered capacitor C and output voltage V_{DC} is given:

Note: In output wave form un-filtered peak rectified voltage (V_p)_{rect} is given.



To find value of filtered capacitor we use formula

$$V_{DC} = \left(1 - \frac{1}{2fR_L C}\right)V_{P(rect)}$$

A)

- B)
- C)
- D)

ANS)

Q12) The sign of signed binary number is recognised by its:

- A) LSM
- B) MSB
- C) Nibble
- D) Bits

ANS) B

Q13) A 256 x 4 EPROM has:

- A) 8 address pins and 4 data pins
- B) 8 address pins and 8 data pins
- C) 4 address pins and 8 data pins
- D) 4 address pins and 4 data pins

ANS) A

**Q14) One question is about Number system conversion:
Note: (Octal to Decimal conversion is asked in paper)**

For Example $(1534)_8$ to $()_{10}$:

$$\begin{aligned}(1534)_8 &= 1 \times 8^3 + 5 \times 8^2 + 3 \times 8^1 + 4 \times 8^0 \\ &= 1 \times 512 + 5 \times 64 + 3 \times 8 + 4 \times 1 \\ &= 860\end{aligned}$$

- A) 160
- B) 760
- C) 860
- D) 890

ANS) C

Q15) If different signal are transmitted using one channel which is used:

- A) Multiplexer
- B) FDM
- C)
- D)

ANS)

Q16) A system response reaches 60% of its final value in 20 seconds. What is the time constant of the system:

A) 21.83 sec

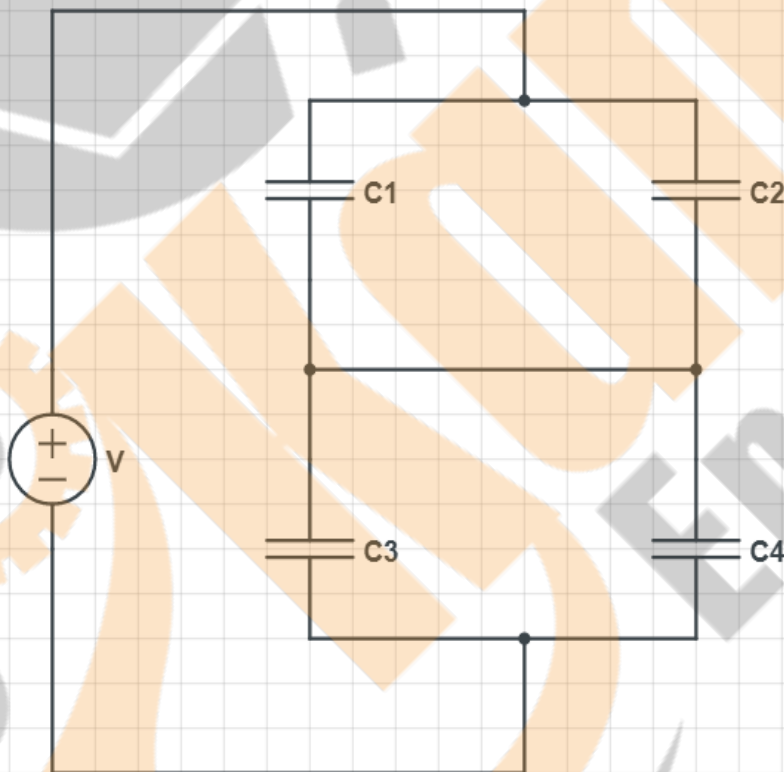
B) 18.33sec

C) 11.34sec

D) 0.03sec

ANS) B

Q17) In circuit:

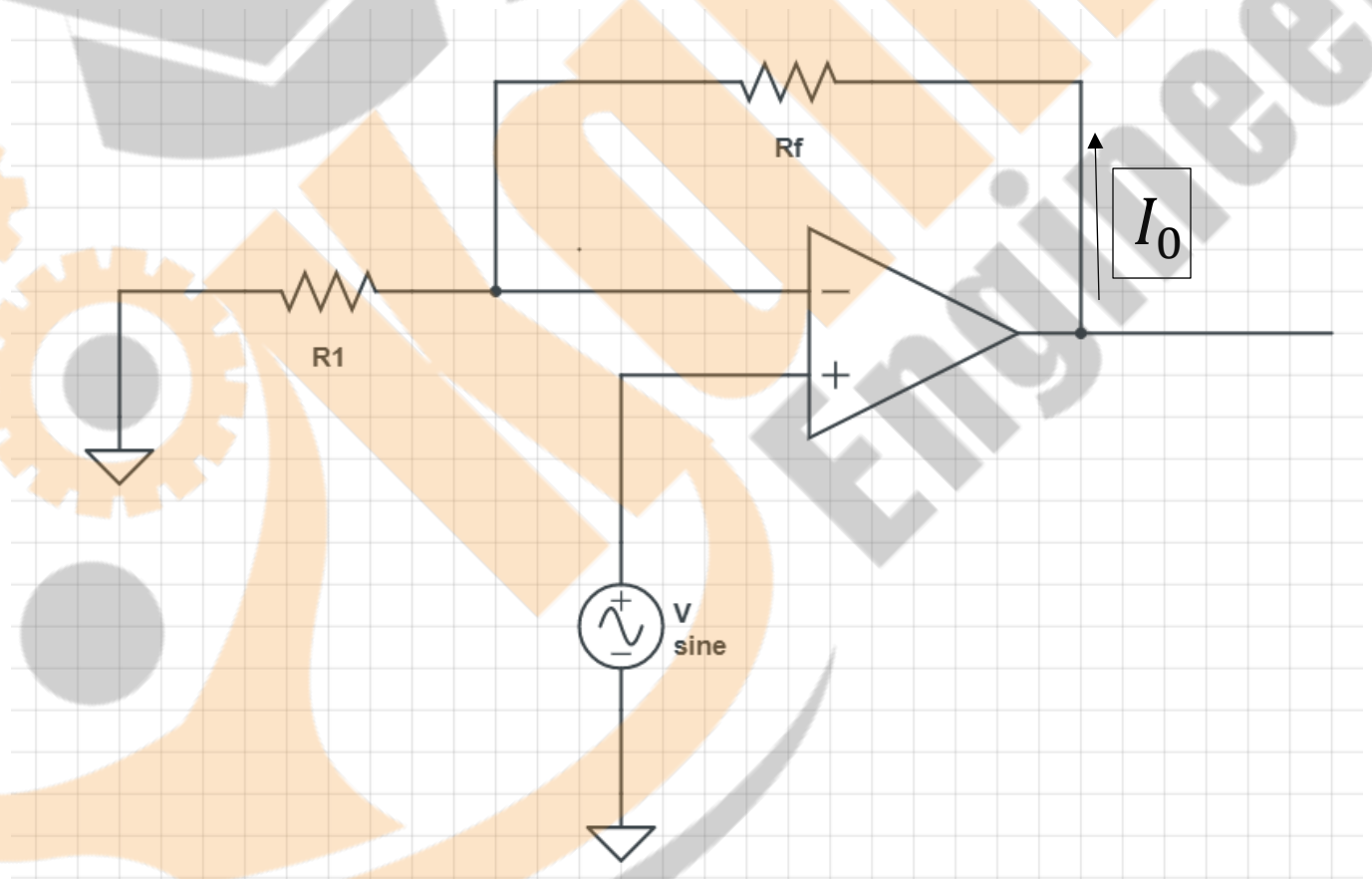


$C_1 = C_3$ and $C_2 = C_4$ Then

- A) Charge stored in C_1 is equal to that of C_2
- B) Charge stored in C_1 is not equal to that of C_2
- C) As input is DC, so no charge will be stored
- D) Can't say anything

ANS)

Q18) The circuit shown in figure,
Value of I_0 depends on:



A) Both R_f and R_1

B) R_1 only

C) Neither R_f and R_1

D) Only R_f

ANS)

Q19) A sum term in which each of the n variables appears (either its complemented or un complemented form) is called:

A) Minterm

B) Maxterm

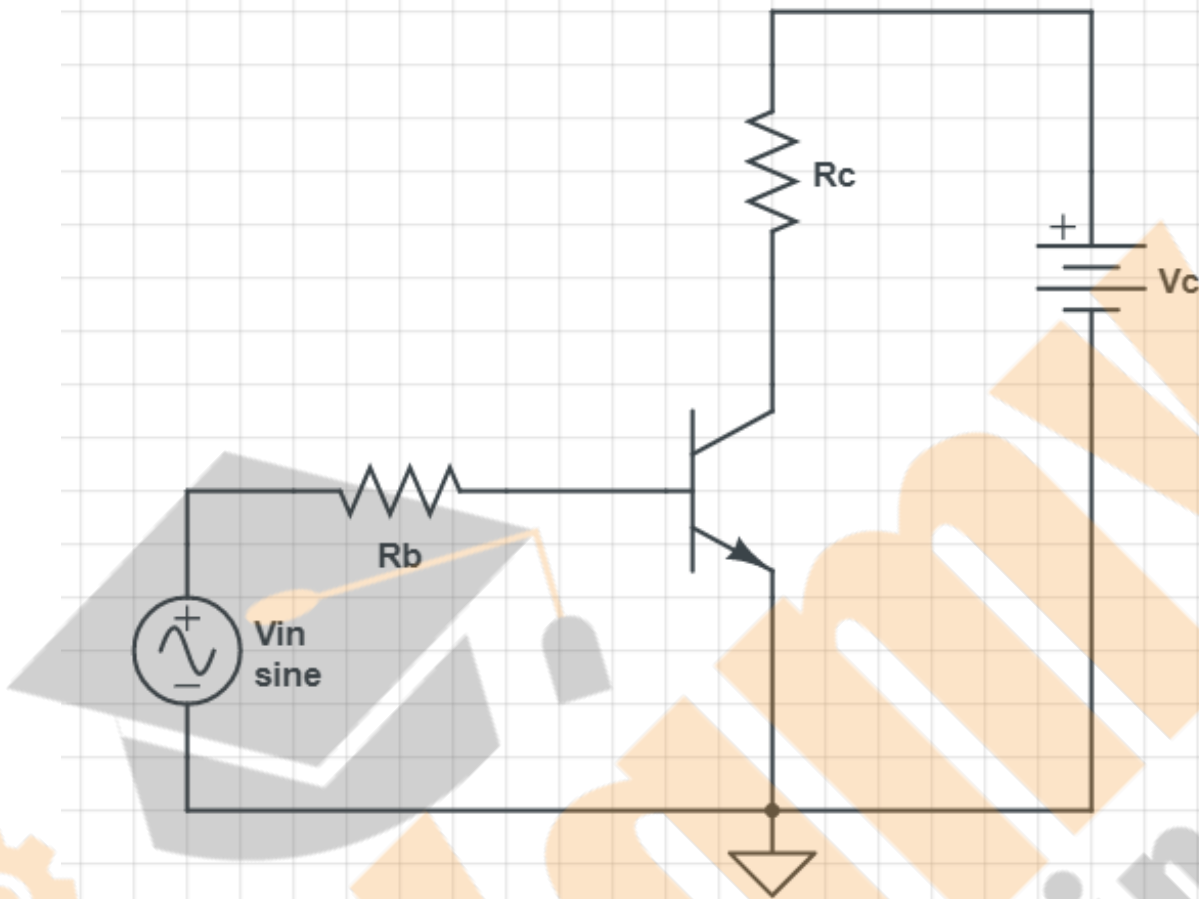
C) Midterm

D) $\sum i$

ANS) B

Q20) In given circuit configuration $\beta=10$ at 25°C , Now if the temperature is increased to 30°C then

Note: The value of V_{in} , R_b , R_c , V_c and V_{BE} are given



- A) Collector current will be decreased
- B) Collector current will be increased
- C) It is already in saturation
- D)

ANS)

Q21) A system with characteristics equation

$$s^5 + 2s^3 + 3s + 4 \text{ is:}$$

A) Stable

B) Unstable

C) Marginally stable

D) Nonlinear

ANS) B

Q22) For step input the steady state error of the following system:

$$G(s) = \frac{K}{s^2 + 2s + 1}$$

A) $\frac{1}{1+K}$

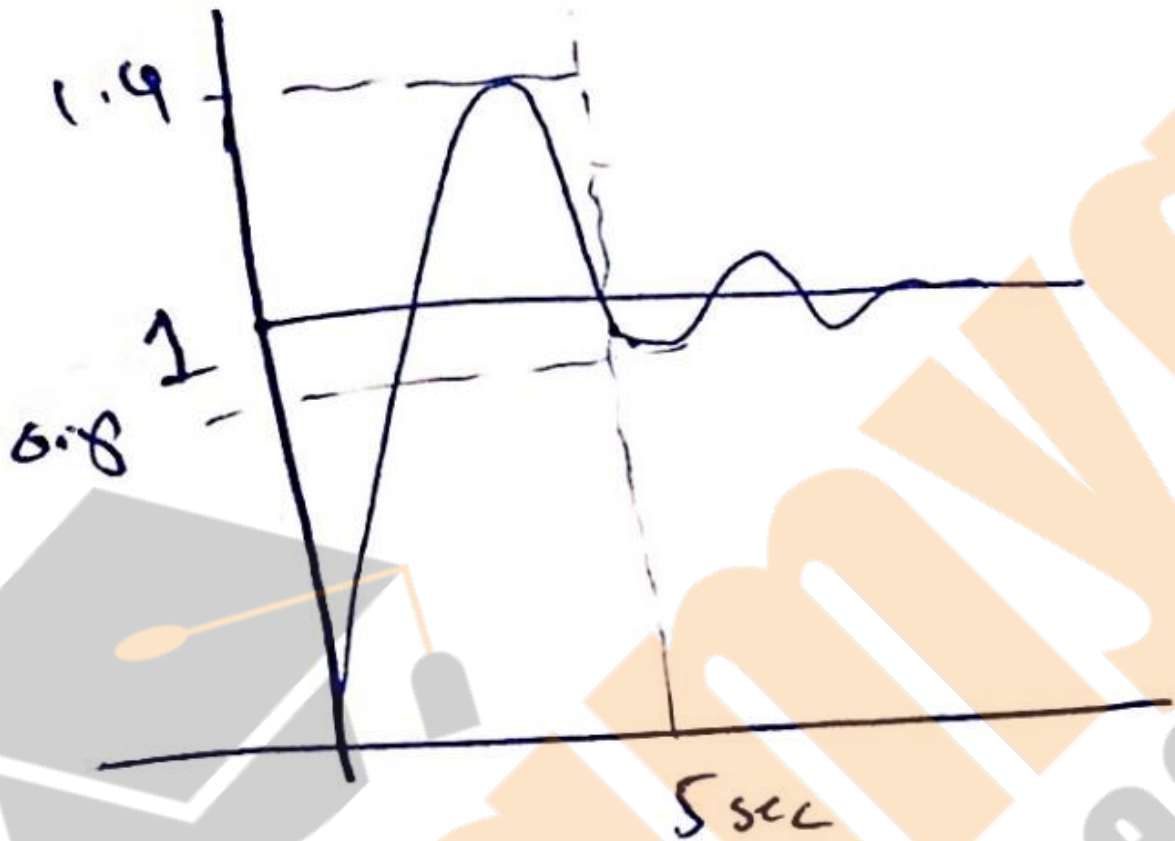
B) $\frac{1}{K}$

C) 0

D) ∞

ANS) A

Q23) A system response is follows, the damping ratio is:



A) 0.7

B) 3.7

C) 4

D) 0.6

ANS)

Q24) The complement of expression $(A'B + CD')$:

A) $(A' + B)(C' + D)$

B) $(A + B')(C' + D)$

C) $(A' + B)(C' + D)$

D) $(A + B')(C + D')$

ANS) B

Q25) Which of the following DC Motor work on AC Supply:

A) Shunt Motor

B) Series Motor

C)

D)

ANS)

DC MOTOR QUESTION

1. What will happen if DC shunt motor is connected across AC supply?

a) Will run at normal speed

b) Will not run

c) Will Run at lower speed

d) Burn due to heat produced in the field winding

[^ View Answer](#)

Answer: d

Explanation: In case of parallel field connection, it won't rotate at all and will start humming and will create vibrations, as a torque produced by positive and negative cycle will cancel out each other. DC motor will be heated up and it may burn.

Q26) In window method, primary parameter to control the stop band in designing of LPF is:

A) Widow length

B) Window size

C)

D)

ANS)

Q27) In a synchronous machine is called a doubly excited machine because:

- A) It can be over-excited**
- B) It needs twice the normal exciting current**
- C) It has two sets of rotor poles**
- D) Both its rotor and stator are excited**

ANS) D

Q28) If A and B are two independent events, then $P(A/B)$ is:

- A) $P(A)$**
- B) $P(B)$**
- C) 0**
- D) ∞**

ANS) A

$$P(A/B) = P(A \cap B) / P(B)$$

As, A and B are independent events, $P(A \cap B) = P(A) \cdot P(B)$

Therefore,

$$P(A/B) = [P(A) \cdot P(B)] / P(B)$$

$$P(A/B) = P(A).$$

Q29) Two heaters of 1kW rating was connected in series.
What is the total load:

- A) 1kW
- B) 2kW
- C) 4kW
- D) 0.5kW

ANS)

Q30) $x(t)=5\cos(1000\pi t)$ and $y(t)=x(t)\cos(500\pi t)$, the maximum frequency component in signal $y(t)$ is:

- A) 1000π
- B) 5000π
- C) 6000π
- D) 500π

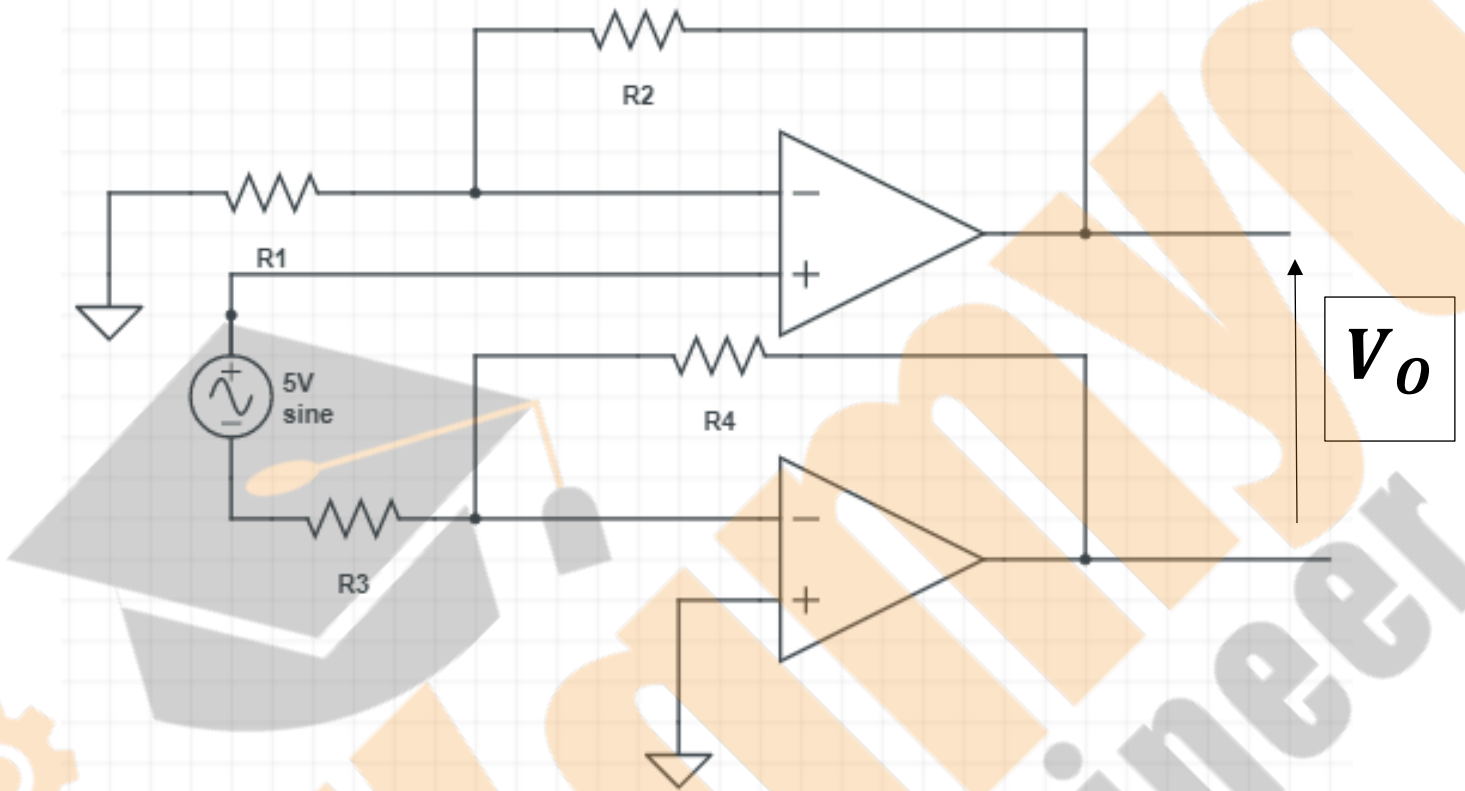
ANS)

Q31) Electrical resistance is analogous to:

- A) Inertia
- B) Dampers
- C) Spring
- D) Fluid capacity

ANS) B

Q32) In given circuit with sinusoidal input, what will be the output given that $R_1 = R_2 = R_3 = 10\text{K}\Omega$ and $R_4 = 20\text{K}\Omega$:



- A)
- C)

- B)
- D)

ANS)

Q33) $y[n] = x[n] + 2x[n-2] + 3x[n-3]$, then $x[n]$ is:

A) (1, 0, 2, 3)

B) (1, 2, 3, 0)

C) (0, 1, 2, 3)

D)

ANS)

Q34) $y[n] = 0.5y[n-2] + x[n]$:

A) IIR stable

B) IIR unstable

C) FIR stable

D) IIR unstable

ANS)

Q35) Maximum overshoot is the function of:

A) Damping

B) Natural frequency of oscillation

C) Both A and B

D) Damped frequency of oscillation

ANS) B

Q36) How many Fourier Non-zero coefficient are possible in

$$\sum_{k=-\infty}^{\infty} \delta(t - T):$$

- A) T B) $\frac{1}{T}$
C) KT D) ∞

ANS)

Q37) Which of the following operation has to be performed to increase the sampling rate:

- A) Interpolation B) Decimation
C) Quantization D) None

ANS) A

Q38) Inverse transform of $\frac{az}{(z-a)^2}$ $|z| > a$:

- A) B)
C) D)

ANS)

Q39) What type of filter is an antialiasing filter:

A) Band pass

B) High pass

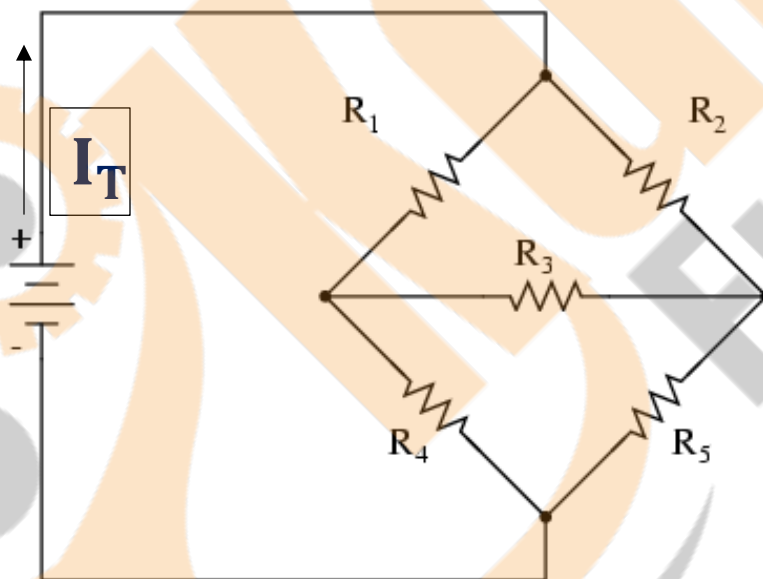
C) Low pass

D) Band stop

ANS) C

Q40) For bridge network shown in figure, Determine the current I_T if the source voltage is 13V, the values of resistances are:

$$R_1 = R_2 = R_3 = R_4 = 1\Omega \text{ and } R_5 = 2\Omega$$



A) 11A

B) 10A

C) 9A

D) 13A

ANS) A

Q41) The ratio of $\frac{\omega_1}{\omega_2}$ in octave:

A) 2

B) 4

C) 5

D) 8

ANS) D

Q42) To avoid loading during read operation, the device used is:

A) Latch

B) Flip-Flop

C) Buffer

D) Tri-state buffer

ANS) D

Q43) Given the system below find the range of the gain K that will lead to stability:

$$\frac{k}{s(s + 7)(s + 11)}$$

- A) $K > 1386$, the system will remain stable
- B) $K < 1386$, the system will remain stable
- C) Don't say any thing
- D) None of the above two

ANS) B

Q44) For steady state transient improvement, compensator used is:

- A) Lead compensator
- B) Lag compensator
- C) Lead lag compensator
- D) None of these

ANS) C

Q45) As the storing of data words onto the stack is increased, the stack pointer is:

A) Incremented by 1

B) Decremented by 1

C) Incremented by 2

D) Decremented by 2

ANS) D

Q46) Question related to **ALU Working**:

Q47) If we amplify an ECG signal before digitizing it, which one of these we will probably improve:

A) Frequency resolution

B) Voltage resolution

C) Time resolution

D) Angular resolution

ANS) C

Q48) If the fastest oscillations that we want to measure are at 120 Hz, which of the following is the most reasonable sampling rate:

A) 60 Hz

B) 60 kHz

C) Anything over 0.833 Hz

D) 250 Hz

ANS) D

Q49) Voltage-divider bias provides:

- A) An unstable Q point
- B) A stable Q point
- C) A Q point that easily varies with changes in the transistor's current gain
- D) A Q point that is stable and easily varies with changes in the transistor's current gain

ANS) B

Q50) The condition that all the roots of polynomial

$a_0s^3 + a_1s^2 + a_2s + a_3$ have negative real part is:

- A) $a_1a_3 > a_0a_2$
- B) $a_0a_1 > a_2a_3$
- C) $a_1a_2 > a_0a_3$
- D) $a_2a_0 > a_1a_3$

ANS)

Q51) Verilog, standardized by:

- A) IEEE
- B) IEC, the International Electro technical Commission

C) Both A and B

D) ISO, the International Organization for Standardization

ANS) A

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.....Thanks.....