Q: No. 1: Encircle the best possible answer. **(10)**

i) We use ____ types of combination while dealing with star and delta w.r.t per phase impedance.
   a) 1
   b) 2
   c) 3
   d) Can't be determined

ii) Line voltage is greater than phase voltage in _____.
   a) Star combination
   b) Wye combination
   c) Delta combination
   d) Both (a) and (b)

iii) Semi-Logarithmic graph is used for _____.
   a) Converting non-linear function to linear
   b) Converting addition to multiplication
   c) Representing decimal number as a whole number
   d) All of the above
   e) Only (b) and (c)

iv) Quality factor is the reciprocal of _____.
   a) Diversity Factor
   b) Power Factor
   c) Line impedance
   d) None of the above

v) Transfer function gives us an insight of the system w.r.t _____.
   a) Input Signal
   b) Only Frequency of Input signal
   c) Structural components of the system
   d) Only (a) and (c)
   e) Only (b) and (c)

vi) In Parallel RLC circuit. The offered impedance of the circuit is ____ at the resonance frequency.
   a) Maximum
   b) Minimum
   c) Same as at non-resonating condition

vii) A signal is centered at **700Hz** with a deviation of 100Hz. What should be the tuning frequency fc (rad/s) of Series RLC circuit to pass the signal?
   a) 2π·700rad/s
   b) 2π·600rad/s
   c) 2π·800rad/s
   d) 2π·200rad/s
   e) 600rad/s

viii) System pole(s) determines the range of frequency where the input signal will be_____.
   a) Enhanced
   b) Degraded
   c) Doesn't affect

ix) Negative sign with logarithm quantity indicates _____
   a) Attenuation
   b) Gain
   c) Noise
   d) None of the above

x) The phase angle of a system having pole at **jω=5** and a zero at **jω=15** will reside between
   a) 90^o and 0^o
   b) -90^o and 0^o
   c) 90^o and -90^o
   d) Always at 0^o

Q: No. 2: (6)

i) What is the main difference between positive sequence and negative sequence current in 3 phase power system?
ii) What are the benefits of 3 phase delta over 3 phase star transmission lines?
iii) One phase of wye connected load is short-circuited with the help of a wire having **0 Ω** resistance. How can we suppose that it resembles to an open delta configuration?

Q: No. 3: A star configured load is connected through a 3 phase transmission line with a **120V rms** delta connected positive sequenced source configuration having $\theta_{ab} = 0^o$? Considering

load's per phase impedance of $\mathbf{Z_L = 2+j3\ \Omega}$ and line impedance of **0 Ω**, determine the phase voltages, currents and per phase total power **(S)** for the connected load. (4)

Q: No. 4: For the circuit in **Fig. 1**, find the voltage gain ($\mathbf{A_v(s)}$) and current gain ($\mathbf{A_i(s)}$) in terms of complex frequency **s=jω.** (10)

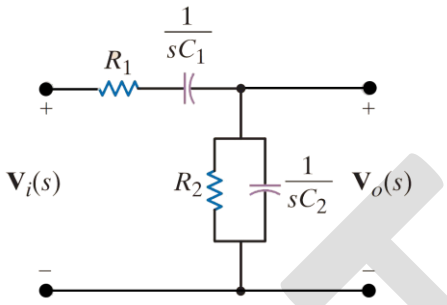

Fig. 1

Hint: Voltage and current dividend rules can find the ratios

Q: No. 5: (20)

The half power bandwidth of a series RLC circuit is **2kHz**. If the circuit is to be designed from an inductive component of 0.1mH and a capacitive component of 5µF:

i) What will be the central tuning frequency (f_c) of the circuit?
ii) What will be the lower bound (f_L) and upper bound (f_H) of the Bandwidth?
iii) Determine the quality factor of the filter for **R=20Ω, 30Ω and 100Ω**.
iv) Is the designed circuit useful in filtering out a voltage signal of **6.5kHz** from a noise band of **20Hz-20kHz**?
v) Draw the frequency vs gain plot for the designed filter.