PAPER ID-310161

Subject Code: KOE071

Roll No: | | | | | | | | | | | | | |

BTECH
(SEM VII) THEORY EXAMINATION 2023-24
FILTER DESIGN

TIME: 3 HRS **M.MARKS: 100**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

Q no.	Question	Marks
a.	Draw a voltage follower circuit.	2
b.	Define CMRR.	2
c.	Explain the concept of passband and stopband in filter specifications.	2
d.	Explain zeros and Poles.	2
e.	Give few applications of Integrators.	2
f.	Discuss the advantages and disadvantages of FIR filters.	2
g.	Define the term "selectivity" .	2
h.	Discuss the role of feedback in filter design	2
i.	Discuss the significance of the Q factor in filter design.	2
j.	What is the role of ripple in the design of a Chebyshev filter?	2

SECTION B

2. Attempt any *three* of the following: **10 x 3 = 30**

a.	What is a filter and its type? Explain ideal response and response of practical filter.	10
b.	Explain the frequency response of a Bilinear transfer function. Discuss its advantages and limitations compared to other transfer functions	10
c.	Describe the frequency response of second order low pass and band pass circuits and its applications.	10
d.	Compare and contrast the Butterworth response with other types of low-pass filter responses.	10
e.	What are the characteristics of Elliptical Response? Compare it with Chebyshev and inverse Chebyshev response.	10

SECTION C

3. Attempt any *one* part of the following: **10 x 1 = 10**

a.	Describe Inverting and Non-inverting configuration of operational amplifiers. Write applications of both types.	10
b.	Write a short note on: i) Circuit elements and scaling ii) Circuit simulation and modelling.	10

4. Attempt any *one* part of the following: **10 x 1 = 10**

a.	Describe effect of the amplifier function, A(s), on the overall performance of a first-order filter. How does the choice of A(s) impact the frequency response and other characteristics of the filter?	10
b.	Describe the construction and interpretation of Bode plots for first-order filters. Discuss the key features that can be observed from these plots.	10

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5. Attempt any *one* part of the following: 10 x 1 = 10

a.	Discuss biquads filters. Explain how the frequency response of a biquads filter can be calculated?	10
b.	Describe the design and design parameters of Second order low pass and band pass filters.	10

6. Attempt any *one* part of the following: 10 x 1 = 10

a.	Discuss the advantages and disadvantages of using second-order filters with arbitrary transmission zeros. How does the choice of pole locations affect the performance of a low-pass filter?	10
b.	Compare the summing approach and the voltage feed-forward approach in second-order filter design. Discuss the trade-offs involved in designing a low-pass filter with maximally flat magnitude.	10

7. Attempt any *one* part of the following: 10 x 1 = 10

a.	Describe in detail Chebyshev filter design and compare maximally flat & equal–ripple responses.	10
b.	Write a short note on: i) The chebyshev polynomial ii) Location of chebyshev poles	10