Kafrelsheikh University
 Faculty of Engineering
Department of electrical eng.
Subject: Tests and electronic Measurements(1)
Examiners: **Dr. Bedir B. Yousif**
   Dr. Shamya Ghamry

Date: 9/1/2019
Time allowed: 3 Hours
Full mark: 85 Mark
Final term: Two pages,
Academic code: ECE3006
3rd year, communications

Course ILOs

Field	National Academic Reference Standards (NARS)			
	Knowledge & Understanding	Intellectual Skills	Professional Skills	General Skills
academic standards that the course contribute in achieving it	a.4, a. 5. , a.6 , a.8 ,a.12 , a.13 a.14 , a.17, a.23 and a.26	b.2, b.3, b.4 , b.5 , b.6 , b.8 , b.9 ,b.11, b.12 , b14, and b.16	c1 , c.3 ,c.4,c.5, c.6, c.15, c.16, c.17 and c.18	d.1, d.3, and d.6,

Solve the following questions:-

Question One:- (42 Mark)

1. Design a third order unity gain butterworth low pass filter with the corner frequency of 50 KHz. The coefficients of butterworth design are given as $a_1=1$, $b_1=0$, $a_2=1.618$, $b_2=1$, $a_3=0.618$, $b_3=1$. (8 M)

2. State the experimental steps that are followed to draw the frequency response of a certain filter. (8 M)

3. Write down a general form of low pass filter transfer function and indicate the meaning of each term. (8 M)

4. Analyze the circuit in Fig. 1 to decide the type of the filter and its cut off frequency. (8 M)
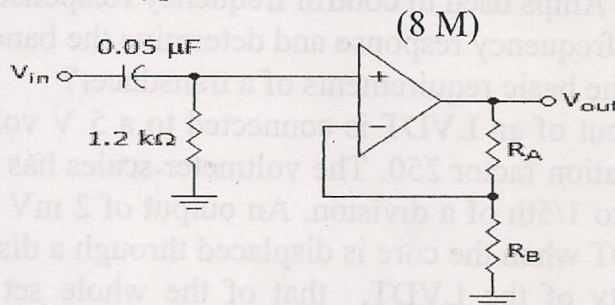

Fig. 1

5. Choose the correct answer (10 M)

   A _____ filter rejects all frequencies within a specified band and passes all those outside this band.

   a. Low pass   b. high pass   c. band pass   d. band stop

   he bandwidth in a _____ filter equals the cut off frequency.

   a. Low pass   b. high pass   c. band pass   d. band stop

   ilters with the _____ characteristic are useful when a rapid roll-off is required

   a. Butterworth   b. Chebyshev   c. Bessel

4. Which filter exhibits a linear phase characteristic?
   - a. Butterworth
   - b. Chebyshev
   - c. Bessel   d. all of them

5. Filters with the _____ characteristic provide a very flat amplitude in the passband
   - a. Butterworth
   - b. Chebyshev
   - c. Bessel

Question Two:- (43 Mark)

1. State the main differences between   (6 M)
   a- Graded index and step index fiber.
   b-Second and third windows in optical fiber communications.
2. Why optical fibers communication has greater transmission bandwidth than the conventional communication systems?   (6 M)
3. What are the main differences between transducers and sensors?   (6 M)
4. For potential resistance transducer in Fig. 2. Calculate the output voltage in each case in Fig. 2(a,b). and what the effect of load resistance?   (6 M)

Fig. 2.
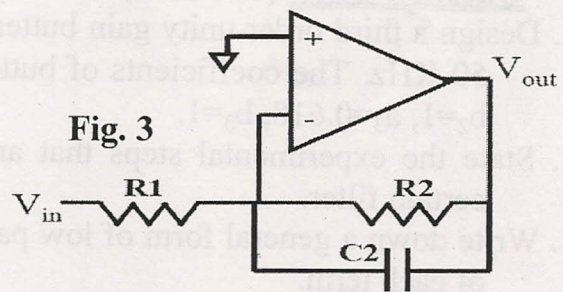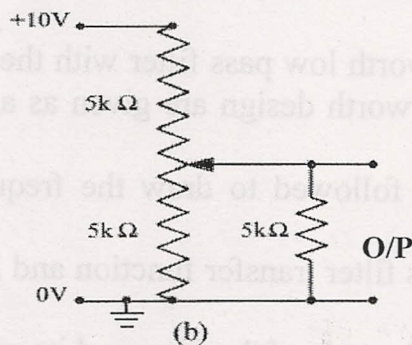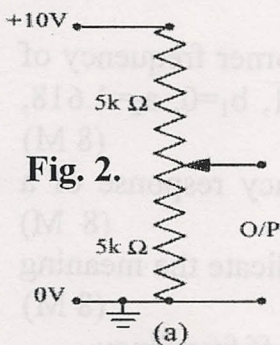
Fig. 3

5. Ideal Op Amps used to control frequency Response for the circuit in Fig. 3, plot the gain frequency response and determine the bandwidth.   (6 M)
6. Expain the basic requirements of a transducer?   (4 M)
7. The output of an LVDT is connected to a 5 V voltmeter through an amplifier of amplification factor 250. The voltmeter scales has 100 divisions and the scale can be read to 1/5th of a division. An output of 2 mV appears across the terminals of the LVDT when the core is displaced through a distance of 0.5 mm. Calculate :the sensitivity of the LVDT, that of the whole set up, and the resolution of the instrument in mm.   (4 M)
8. The resistance of a thermistor is 800 Ω at 50°C and 4 kΩ at the ice-point. The characteristic constants (A, B) for the thermistor and the variations in resistance between 30°C and 100°C are ....   (3 M)
9- Drive an expression for Poisson's ratio and gauge factor in strain gauges sensors
         (4 M)

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Best wishes of success
Dr. Bedir yousif

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