Department of Higher Education
University of Computer Studies,Yangon
Third Year (B.C.Tech.)
Final Examination
Electronics I (CT 304)
September, 2018

Answer all questions. **Time allowed: 3 hours**

1(a) Find V_{DS} and V_{GS} in Fig 1(a). When I_D = 8 mA. (10 marks)

(b) Graphically determine the Q-point for the circuit in Fig1(a) using the transfer characteristic curve in Figure 1(b). (10 marks)

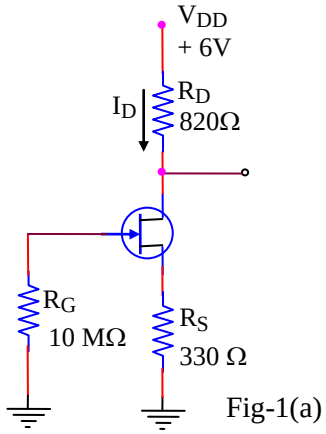


Fig-1(a)

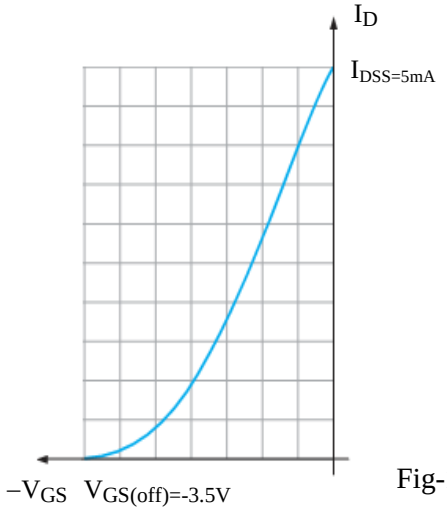


Fig-1(b)

2(a) For the unloaded amplifier in Fig 2(a), find V_{GS}, I_D, V_{DS} and the rms output voltage V_{ds}. $I_{D(on)}$=8 mA at V_{GS}=12 V, $V_{GS(th)}$=4V and g_m=4500µS. (10 marks)

(b) From datasheet I_{DSS} =3mA, $V_{GS(off)}$ = - 6V maximum and g_{m0} = 5000µS. Using these value , determine the forward transconductance for V_{GS} = - 4V and find I_D at this point. (10 marks)

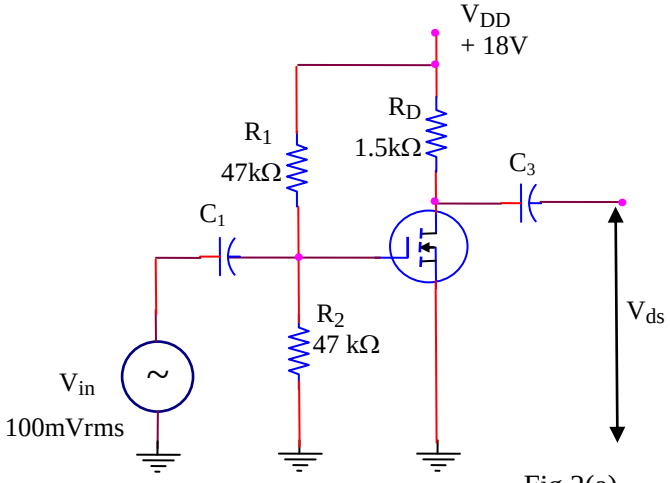


Fig 2(a)

3(a) If a signal voltage of 10mVrms is applied to each amplifier in Fig-3(a), what are the output voltages and what is their phase relationship with inputs? (10 marks)

(b) Determine A_{ol} for the following values of f. Assume $f_{c(ol)}$=200 Hz and $A_{ol(mid)}$=80000.
(i) f =2 Hz (ii) f =10 Hz (iii) f =100Hz (iv) f =2500 Hz

(10 marks)

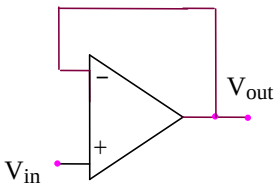


Fig 3(a-i)

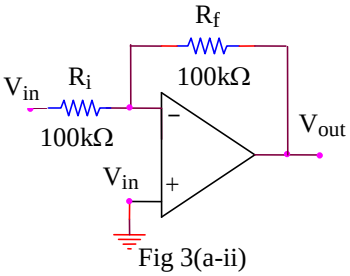


Fig 3(a-ii)

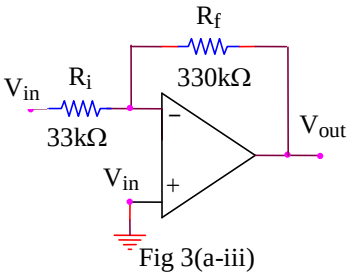


Fig 3(a-iii)

4(a) Determine the weight of each input voltage for the scaling adder in Fig4 (a) and find the output voltage. (10 marks)

(b) Determine the output voltage of the op-amp differentiator in Fig. 4(b) for the triangular-wave input shown. (10 marks)

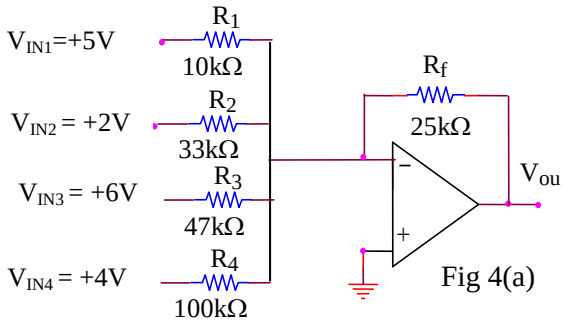


Fig 4(a)

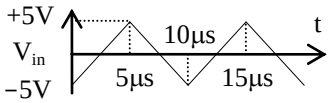
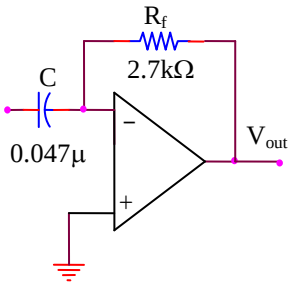


Fig. 4(b)



5(a) Determine the critical frequency of the Sallen-Key high-pass filter in Fig 5(a), and set the value of R_1 for an approximate Butterworth response. (DF=1.414) (10 marks)

(b) Determine the center frequency, maximum gain, and bandwidth for the filter in Fig. 5(b).

(10 marks)

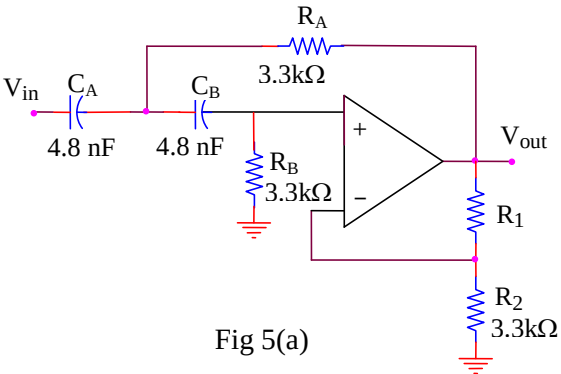


Fig 5(a)

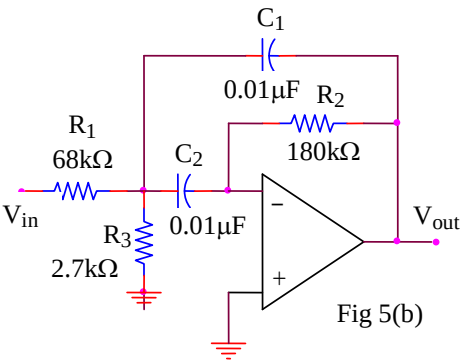


Fig 5(b)

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