



本試題共六題，每題得分如各題中所示，共計 100 分，請依題號作答並將答案寫在答案卷上，違者不予計分。

1. The amplifier in Fig. P1 is biased to operate at $I_D = 1$ mA and $g_m = 1$ mA/V.
- (a) (10 分) find the midband gain when neglecting r_o .
- (b) (10 分) find the value of C_S that places f_L at 10 Hz.

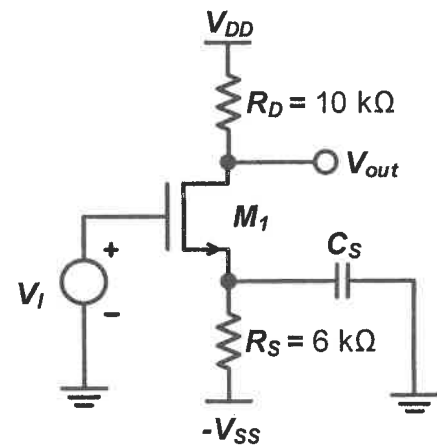


Fig. P1

2. Consider the operational rectifier or superdiode circuit of Fig. P2, with $R = 1$ kΩ. Assume that the op-amp is ideal and that its output saturates at ± 12 V. The diode has a 0.7 V drop at 1 mA current, and the voltage drop changes by 0.1 V per decade of current change. What are the voltages that result at the rectifier output V_{out} and at the output V_A of the op-amp A?
- (a) (5 分) when $V_I = 10$ mV
- (b) (5 分) when $V_I = 1.0$ V.
- (c) (5 分) when $V_I = -1.0$ V.

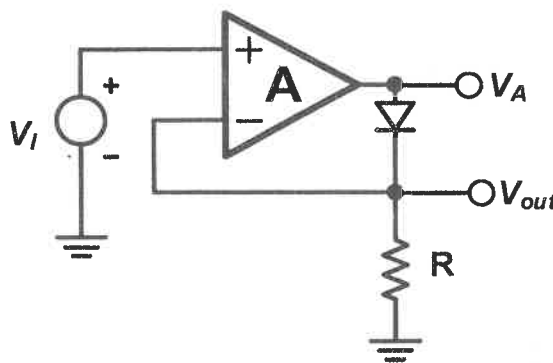


Fig. P2

3. Negative feedback having four basic topologies (Shunt-Series, Series-Series, Shunt-Shunt, and Series-Shunt) is to be used to modify the characteristics of a particular amplifier for various purpose. Identify the feedback topology to be used if:
- (a) (5 分) Input resistance is to be lowered and output resistance raised.
- (b) (5 分) Both input and output resistance are to be raised.
- (c) (5 分) Both input and output resistance are to be lowered.