Answers should be given in English.
No aids allowed except Danish-English / English-Danish dictionaries.
Answer weights are given in brackets.

1. (50%) Write briefly and concisely, no more than 2 pages per question.

   (a) Formulate the Median Voter Theorem. Define all the concepts you used in your formulation. Prove the theorem.

   (b) What is a media capture? Suggest several factors that are likely to diminish media capture. Motivate your answer.

   (c) Provide at least 2 possible explanations for the growth of the public sector in the 20th century.

   (d) Why would we observe an electoral cycle - higher government spending or lower taxes just before the elections? Provide intuition. Summarize the empirical findings on the relationship between the electoral cycles and fiscal transparency.

   (e) Discuss the impact of different electoral rules on the government spending.

2. (30%) Consider an economy populated by two groups of individuals, A and B. Group A is twice as numerous as group B. For simplicity, normalize the size of group B to 1, then the size of group A is 2 and the total population in the economy is 3. Individuals in each group have the same preferences over private consumption and group-specific publicly provided consumption. More precisely, the preferences of a member of group $J = A, B$ are given by

   \[ w^J = c^J + \sqrt{g^J}, \]

   where $c^J$ is private consumption,

   \[ c^J = y - \tau \]

   $y$ and $\tau$ are income level and tax rate, common among individuals and groups; $g^J$ is per-capita publicly provided consumption benefitting group $J$ only. The government budget constraint in this economy is thus

   \[ 3\tau = 2g^A + g^B. \]
(a) Derive the socially optimal allocation of public goods, taxation and private consumption in this economy

(b) Assume that each group is free to simultaneously and non-cooperatively decide on its own public good consumption \( g^i \), and the tax rate \( \tau \) is determined residually. Derive the respective equilibrium and show that there is an overspending on public consumption. Which group overspends more? Provide intuition supporting your answer.

(c) Assume now that the decision on public group spending is taken by majority voting, so that it is the median voter who decides on the amounts of \( g^A \) and \( g^B \). Derive the respective equilibrium and compare it to the outcome of b).

(d) Finally, assume that there is a coalition government with two parties A and B, which perfectly represent groups A and B respectively. Consider the following budget procedure:
   i. Party A proposes the tax level \( \tau \)
   ii. Party B may veto the proposition. If the proposition is vetoed, a default tax rate \( \tau < 0.75 \) is implemented.
   iii. Party B proposes the allocation of resulting tax revenue between the public goods \( g^A \) and \( g^B \).
   iv. Party A may veto the proposition. If the proposition is vetoed, a default allocation of the tax rate from stage (ii) is implemented in which \( 2/3 \) of the revenue are spent on public good in region A and \( 1/3 \) of revenue is spent on public good in region B.

Show that this budgeting procedure restores the social optimum.

3. (20%) There are \( N \) voters in country Swenmark and they can be of two types: either they are left-wing, which means their preferred position of a particular policy issue is \( L(left) = 0 \), or they are right-wing, meaning, they prefer \( R(right) = 1 \).
Consider an election with two office-motivated candidates, A and B, that can take one of only two possible positions on the issue, \( L = 0 \), or \( R = 1 \). The candidate who wins elections receives an exogenous rent of getting into the office \( r = 1 \), the candidate who loses, receives zero. Prior to the election the two candidates simultaneously announce positions on the issue. In the election each voter votes for the candidate who is closest to his preferred position. In case, voter’s best preferred choice gets implemented, voter receives \( v = 1 \), otherwise \( v = 0 \). The candidate that receives majority of votes wins and implements the announced position. If both candidates receive 50% of votes, then each of them gets to win with probability \( 1/2 \).Before the elections the candidates do not know the composition of the population preferences (i.e. they do not know what is the share of left-wing voters or right-wing voters in total population). However, they have a common belief that the median voter is right-wing with probability \( \pi = 1/3 \).
For example, the payoff of candidate A from choosing strategy L, while candidate B
chooses the strategy $R$ is

$$u_A(L, R) = (\text{prob. that median voter is } R)(\text{utility of losing the elections}) + (\text{prob. that median voter is } L)(\text{utility of winning the elections})$$

$$= \pi \cdot 0 + (1 - \pi) r = 1/3 \cdot 0 + 2/3 \cdot 1 = 2/3$$

Similarly, the payoff of candidate $A$ from choosing strategy $R$, while candidate $B$ chooses the strategy $R$ is

$$u_A(R, R) = (\text{prob. that median voter is } R)(\text{utility of tie in the elections}) + (\text{prob. that median voter is } L)(\text{utility of tie in the elections})$$

$$= \pi \cdot 1/2 + (1 - \pi) 1/2 = 1/2$$

(a) What is the elections outcome? (i.e. describe the equilibrium in terms of positions that candidates take and the resulting policy issue and show that it is the equilibrium). Hint: there is only one equilibrium in which the candidates converge to the same policy.

(b) Assume that there is a small (size $n = 1 \ll N$) organized group that has strong right-wing preferences and is willing to influence the choice of politicians. It can do so by paying a bribe to politician(s). The organized group is a perfect representative of group $R$ (in a sense that the payoff of the lobby group is the same as of any right-wing person). However, the lobby group is so small, that it cannot judge what is the preference of the median guy. Instead, it has the same beliefs as the politicians.

i. Assume first that only politician $A$ is "accessible". What is the minimum amount of bribe that would make politician $A$ change his mind? Is lobby group willing to pay this money?

ii. Assume now that the lobby can bribe both politicians. What are the minimal bribes? Again, is lobby group willing to pay this money?

(c) Now assume that voters are also very practical - they show up at the elections only if the candidates’ platforms are different (i.e. voters only vote if the election outcome actually matters for the future policy). Assume also that if nobody comes then candidate $A$ wins and implements the announced policy. How would this change the behavior of the lobby group from the previous question?

i. in case it can only bribe politician $A$?

ii. in case it can bribe both politicians?