ECON5002 Macroeconomic Theory

SCHOOL OF ECONOMICS · UNIVERSITY OF SYDNEY · POSTGRADUATE

CLOSED-BOOK MEMORY SHEET
Semester 2, 2026 · **SIDE 1 OF 2**
Final focus · Topics 4–8
Full guide + ask Sia about ECON5002

SIDE 1/2 WHAT MUST BE IN YOUR HEAD · formulae · curve shifts · assumptions · policy comparisons **MEMORY FIRST** Final: 2 hr + 10 min reading · 20 MCQ + two essays from four

1 · Exam Map

OFFICIAL COURSE DATA

Mid-Sem 30% | Quizzes 20% | Final 50%

In-Semester (Mid-Semester) Test 30% · Online Quizzes (x4) 20% · Final Exam 50%.

"Closed book exam" — ECON5002 Info on Final Exam slides, 2026 (PPT_Info_on_Final_Exam_ECON5002_2026_ppt.txt).

FINAL SECTION	TASK	WEIGHT
A	20 MCQ	20%
B	Choose 2 essays from 4; /20 each	30%

Coverage: Topics 4–8. For every essay: draw and label the model, name the assumption, shift the right curve, read short run, then long run.

2 · AD–AS Core

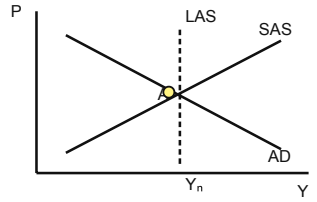
TOPIC 4

REACTION RULE → AD SLOPE

$i = i_n + a(P - P^T)$

P↑ above target → i↑ → C,I↓ → Y↓

AD is the (P,Y) locus consistent with goods- and money-market equilibrium. Lead with the **monetary-policy reaction effect**; international competitiveness reinforces it, wealth is weak. Under endogenous money, the textbook real-balance channel is switched off.



Source-derived AD–AS frame: short-run P,Y at AD×SAS; long run anchored at Y_n.

2b · AD Shift Audit

TOPIC 4

IMPULSE	AD DIRECTION	TRANSMISSION TO NAME
G↑ or T↓	Right	Autonomous demand and multiplier
Policy rule easier / i lower	Right	Interest-sensitive C and I
Depreciation	Right	Competitiveness → NX↑
Confidence/wealth fall	Left	Autonomous C or I↓

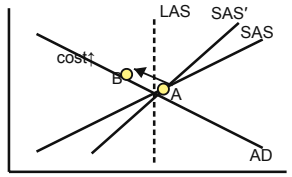
Do not double-count: a change in P itself creates a *movement along* AD through the policy reaction. A change in the rule, autonomous spending or the exchange rate shifts the *whole* curve. In the short run, read P and Y at the new AD×SAS point; in the long run, ask what moves wages/P^e and whether Y returns to Y_n.

3 · AS & Shock Logic

TOPIC 4

SAS slopes up: capital is fixed; extra variable inputs face diminishing returns; unit costs rise; firms protect the mark-up with higher P. *LAS* is vertical at natural output Y_n once wages/prices adjust. Demand cannot permanently change real output.

IF THE STEM CHANGES…	DO THIS	READ-OFF
Fiscal stance, autonomous spending, exchange rate	Shift AD	P and Y move together along SAS
Wages, material cost, technology, P^e	Shift SAS	Adverse: P↑, Y↓
Labour, capital, productivity structure	Shift LAS/Y_n	Natural output changes



Source-derived cost shock: SAS left, P↑ and Y↓ — stagflation, not a movement along SAS.

SELF-CORRECTION

If Y<Y_n: labour slack → W and P^e↓ → SAS right → Y returns to Y_n at lower P; the bank lowers i as P falls.

Keynesian objection: downward wage rigidity can strand output below Y_n. A cost shock gives no cheap demand-policy cure: restoring Y by AD expansion means still higher P.

RECITE *Shock → curve → short-run P,Y → wage/expectations adjustment → long-run Y_n.*

3b · Supply-Side Checks

TOPIC 4

- **Favourable cost shock:** SAS right/down → P↓, Y↑ at unchanged AD.
- **Adverse cost shock:** SAS left/up → P↑, Y↓; name it *stagflation*.
- **Demand recession:** AD left → P↓, Y↓; do not shift SAS immediately.
- **Natural output:** only structural/supply change moves Y_n and LAS. A real-wage cut or demand expansion does not permanently move the anchor.
- **Money neutrality:** once adjustment is complete, monetary demand affects nominal P, not real Y or employment.

Long-run crowding-out logic: if demand pushes Y beyond Y_n, price pressure induces a tighter policy reaction; interest-sensitive private spending is displaced as output returns to its natural level.

4 · Phillips Curve

TOPIC 5

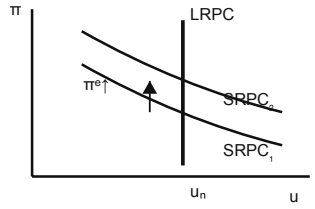
EXPECTATIONS-AUGMENTED PC

$\pi_t = \pi_t^e - \beta(u_t - u_n)$

Adaptive: $\pi_t^e = \pi_{t-1}$

Fisher: $r \approx i - \pi^e$

For fixed π^e, the *SRPC* slopes down. As expected inflation rises, the whole SRPC shifts up. Where $\pi^e=\pi$, unemployment is u_n at any inflation rate: LRPC vertical at the NAIRU; no permanent inflation–unemployment trade-off.



Source-derived EAPC: expectations shift SRPC; the long-run curve remains vertical at u_n.

DIAGNOSIS	MECHANISM	POLICY JUDGEMENT
Demand-pull	AD>Y_n; P and u move along SRPC	Restrictive demand policy works
Cost-push	Input cost/SAS shock; P↑ and u↑	Tightening adds unemployment; source remains

DISINFLATION COST

Sacrifice ratio = Σ(u_t - u_n) ÷ fall in inflation (percentage points)

Adaptive expectations → expectations adjust slowly, u>u_n is needed, ratio positive. **Rational + credible policy** → potentially near-zero cost. Add *hysteresis*: prolonged unemployment can raise u_n through skill and attachment loss.

4b · Inflation Answer Grid

TOPIC 5

OBSERVATION	INFERENCE	DIAGRAM MOVE
u<u_n and π accelerates	Demand pressure	Move up one SRPC; π^e later shifts SRPC up
u↑ and π↑ together	Adverse supply shock	SRPC/short-run relation shifts unfavourably
π falls with u>u_n	Disinflation	Move down/right while expectations adapt
$\pi=\pi^e$	Long-run consistency	u=u_n on vertical LRPC

The original stable curve failed because repeated attempts to hold u below u_n raised π^e and shifted the curve. Name the expectation assumption before judging cost. With Fisher, keep expected—not necessarily current—inflation in $r \approx i - \pi^e$; a rise in nominal i can still mean a lower real rate if π^e rises by more.

5 · Swan–Solow

TOPIC 6

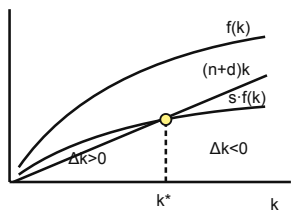
STATE EQUATION

$y = A \cdot f(k)$, $f' > 0$, $f'' < 0$

$\Delta k = s \cdot A \cdot f(k) - (n+d)k$

Steady state: $s \cdot f(k^*) = (n+d)k^*$

Break-even investment (n+d)k replaces depreciation and equips new workers. Left of k*: saving exceeds break-even, so k↑. Right: saving falls short, so k↓. At k*, per-worker k and y are constant while aggregate K,Y,N grow at n.



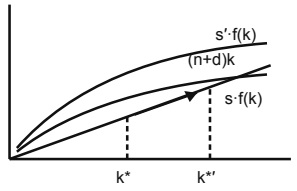
Source-derived steady state: stable crossing of saving and break-even investment.

GOLDEN RULE ≠ ANY STEADY STATE

$c^* = f(k^*) - (n+d)k^* = (1-s)y^*$

Golden rule: MPK = n+d

$k^* < k_{gold}$ → under-saving; $k^* > k_{gold}$ → over-saving/dynamic inefficiency. The golden rule maximises **consumption**, not output.



Source-derived saving shift: higher s raises k* and y* levels, not long-run per-person growth.

Population growth n↑ steepens break-even and lowers k*,y*. **Technology A↑** lifts production and saving; sustained per-person growth needs exogenous technical progress. **AK contrast:** y=Ak gives g=sA−d, so constant returns let s affect growth permanently.

5b · Growth Essays

TOPIC 6

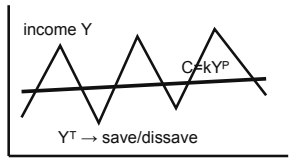
CLAIM	VERDICT
Save more → grow forever	False: only a transition burst without technology.
Poor countries catch up	Conditional on s,n,d, technology and institutions.
Faster n makes richer workers	False: k*,y* per worker fall.
More capital always raises c*	False beyond k_{gold}.

6 · Consumption

TOPIC 7

THEORY	RULE/RESOURCE	TEMPORARY INCOME
Keynesian	Current disposable income	Relatively strong C response
Permanent income	$C=kY^P$; $Y=Y^P+Y^T$	Short-run MPC=k·j, far below k
Life cycle	Lifetime wealth + labour income	Spread over remaining life

PIH and LCH both predict consumption smoothing: a one-off windfall is mostly saved; a permanent change moves consumption much more. LCH pattern: young borrow, middle-aged save, retired dissave; ageing lowers the aggregate saving ratio.



Source-derived PIH: volatile income, smooth consumption; transitory MPC is small.

7 · Investment

TOPIC 7

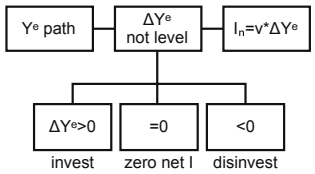
THREE DECISION RULES

Accelerator: $I_n = v* \cdot \Delta Y^e$

User cost: v = r+δ; invest while MPK≥v

Tobin: q = market value/replacement cost; invest if q>1

The accelerator makes investment volatile because it follows the **change** in expected output, not its level: slower positive growth can collapse I; flat expected Y gives zero net I; falling expected Y gives disinvestment, bounded by depreciation.



Accelerator decision tree redrawn from Topic 7 rules.

Capital-controversy mark: heterogeneous capital must be valued, but valuation already depends on i; MPK is not independent of i and the empirical interest–investment link is weak. Do not merely assert "lower i raises I"; pair user cost with this critique and lean on accelerator + expectations.

8 · Open Economy

TOPIC 8

FOUR ANCHORS

CA + KA = 0

ε = E·P/P*

k = 1/(1-c+ct+m)

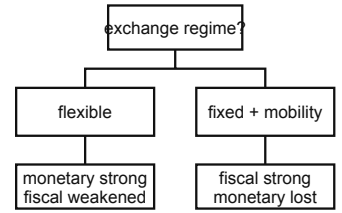
(S-I)+(T-G)=NX

A current-account deficit equals a capital/financial-account surplus: foreign saving funds the gap. A rise in ε is a real appreciation and worsens competitiveness/NX. Import propensity m is an extra leakage, so the open multiplier is smaller.

UNCOVERED INTEREST PARITY

i ≈ i* + expected depreciation

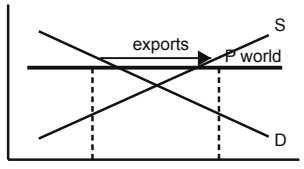
i>i* → expected domestic depreciation offsets yield



Mundell–Fleming decision tree: policy effectiveness flips with the exchange-rate regime.

REGIME	MONETARY EXPANSION	FISCAL EXPANSION
Flexible	i↓ → depreciation → NX↑: strong	appreciation crowds out NX: weak
Fixed + mobile capital	reserves defend peg: impotent	reserve accommodation: strong

Trilemma: free capital mobility + fixed rate leaves no independent monetary policy. If claiming depreciation raises NX, add **Marshall–Lerner**: |ηX|+|ηM|>1. State the exchange-rate convention before calling appreciation/depreciation.



Source-derived open-economy figure: world price above autarky makes Qs−Qd exports.

Exchange-rate sign check: with ε=E·P/P*, a rise in ε is a real appreciation in the guide's convention, so domestic output becomes less competitive and NX falls. Never announce the direction until the quoted-currency convention is explicit.

9 · Drill: AD–AS Shock

TOPIC 4 WORKED

Given: AD Y=900−20P; SAS Y=300+40P; Y_n=700. Oil shock → SAS′ Y=120+40P. Find both equilibria and classify.

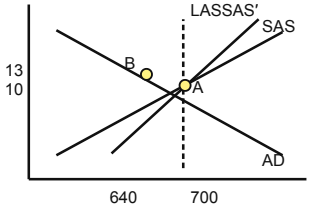
BEFORE

```
900-20P = 300+40P
600=60P → P*=10
Y*=900-20(10)=700=Yn
```

AFTER COST SHOCK

```
900-20P = 120+40P
780=60P → P′=13
Y′=900-20(13)=640
```

Answer: starts in long-run equilibrium; after the shock P rises 10→13 and Y falls 700→640<Y_n: **stagflation**. Check SAS′: 120+40(13)=640.



Source-derived answer sketch: the oil shock shifts SAS left, not along itself.

TRAP	REPAIR
Solve for Y first and lose track	Set AD=AS, solve P, back-substitute Y, check both.
Call it a demand move	Oil is input cost → SAS shifts.
Promise painless demand cure	AD expansion restores Y only at higher P.

SAY THE CAUSAL CHAIN

Oil raises material cost independently of current output → at every Y firms require a higher P to preserve the mark-up → SAS shifts left/up. AD is unchanged. The new intersection has lower Y and higher P. Because Y′<Y_n there is cyclical slack, but expanding AD would trade still more inflation for output.

Long-run fork: with flexible money wages and expected prices, slack lowers W and P^e, shifting SAS back right towards Y_n. With downward rigidity, that correction can be slow or absent. Do not move LAS: an oil-price spike is a short-run cost disturbance here, not a demonstrated structural change in natural output.

30-SECOND REDRAW TEST

1. Axes P,Y; LAS at 700.
2. AD down; SAS up; mark A=(700,10).
3. Shift SAS left; mark B=(640,13).
4. Arrow A→B; write "cost↑: stagflation".
5. Under the diagram, show both back-substitution checks.

10 · Drill: Sacrifice Ratio

TOPIC 5 WORKED

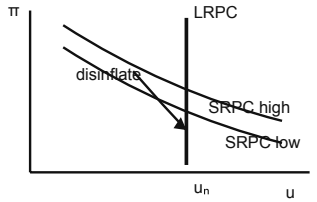
Given: inflation 12%→6% over four years; u_n=4.5%; unemployment 8.5%, 7%, 6%, 4.5%.

YEAR	U	U−U_n POINT-YEARS
1	8.5	4.0
2	7.0	2.5
3	6.0	1.5
4	4.5	0.0
TOTAL		8.0

```
Inflation fall = 12-6 = 6 points
Sacrifice ratio = 8.0÷6 ≈ 1.33
```

Say the unit: about 1.33 excess-unemployment point-years per one-percentage-point inflation reduction.

Hysteresis: long unemployment can erode skills/attachment and raise u_n, making true long-run cost larger.



Source-derived disinflation path: adaptive expectations imply time with u>u_n.

JUDGEMENT CARD

If you see demand-pull → restrain demand. **If cost-push** → say tight demand mainly raises u. **If credible rational expectations** → ratio may approach zero. **If output gaps** → convert with the stated Okun relation first; never invent one.

TRAP *Divide by the percentage-point fall in inflation, not by years and not by the percentage change in inflation.*

EXPECTATION REGIMES

REGIME	DISINFLATION PATH	EXAM CONCLUSION
Adaptive	π^e follows lagged π; SRPC shifts down slowly	Sustained u>u_n; positive sacrifice ratio
Rational + credible	π^e can reset with announced regime	Near-costless in the benchmark
Hysteresis	Prolonged u damages skills/matching	u_n itself may rise; simple ratio understates cost

Fisher recall: r≈i−π^e. Always identify which inflation expectation applies to the horizon. The nominal cash rate is not the real stance by itself. If expectations fall during a credible disinflation, the real rate can rise even without a further rise in i.

Essay close: in the long run π=π^e and u=u_n, so demand policy selects inflation, not a permanently lower unemployment rate. Only supply-side change can lower the NAIRU.

11 · Drill: Swan–Solow

TOPIC 6 WORKED

Given: y=√k, s=.45, d=.04, n=.05. Find k*, y*, c*, k_{gold}, then diagnose saving.

1 · STEADY STATE

```
.45√k = (.04+.05)k = .09k
.45=.09√k → √k=5 → k*=25
```

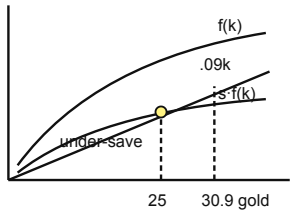
2 · OUTPUT & CONSUMPTION

```
y*=√25=5
c*=(1-.45)5=.55×5=2.75
```

3 · GOLDEN RULE

```
MPK=.5k^-.5=.09
√k=.5/.09≈5.56 → kgold≈30.9
```

Answer: k*=25<k_{gold}≈30.9, so the economy **under-saves**; higher s would raise steady-state consumption. Sanity check: .45×5=2.25=.09×25.



Source-derived check: actual steady state lies left of the golden-rule capital stock.

STEM CHANGE	CURVE/RESULT
s↑	saving up → k*,y* levels↑; long-run per-person growth unchanged
n↑	break-even steeper → k*,y*↓
A↑	production + saving up; lasting per-person growth comes from technology
AK constant returns	g=sA−d; s can raise growth forever

FOUR-LINE SOLUTION TEMPLATE

1. Write **s·f(k*)=(n+d)k*** before inserting values.
2. Solve k*, then derive y*=f(k*) and c*=(1−s)y*.
3. Differentiate f(k); solve **MPK=n+d** for k_{gold}.
4. Compare k* with k_{gold}; name under- or over-saving and the direction of the saving-rate change.

Stability check: for k below the crossing, s·f(k)>(n+d)k, so net investment per worker is positive; above it the inequality reverses. If your diagram does not show arrows back towards k*, it has not shown the steady state.

Level/growth sentence: raising s lifts the saving curve and the eventual levels k*,y*, with a temporary transition burst; diminishing returns close the saving–break-even gap, so long-run per-worker growth returns to zero. Technology, not extra saving, sustains per-person growth in this model.

Golden-rule direction: k*<k_{gold} means MPK>n+d at the actual state, so the extra output from more capital exceeds its break-even cost: consume less now to reach higher steady-state consumption. If k*>k_{gold}, saving less can raise consumption immediately and permanently.

12 · Drill: Permanent Income

TOPIC 7 WORKED

Given: long-run MPC k=.8; learning weight j=.25; permanent income $60,000; one-off $4,000 rebate versus permanent $4,000 pay rise.

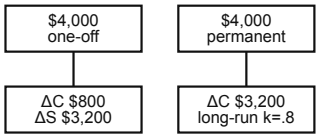
TRANSITORY RESPONSE

```
short-run MPC = k·j = .8×.25 = .20
ΔYP=.25×$4,000=$1,000
ΔC=.8×$1,000=$800
ΔS=$4,000-$800=$3,200
```

PERMANENT RESPONSE

```
ΔYP=$4,000
ΔC=.8×$4,000=$3,200
```

Judgement: the permanent rise produces four times the consumption response. A temporary tax cut works through MPC .20, so its multiplier is small; most of the windfall is saved.



same dollars ≠ same consumption response

PIH judgement card redrawn from the worked values: persistence determines spending.

CLASSIC TRAP	CORRECTION
Use long-run k=.8 on a one-off shock	Use k·j=.20.
Call all current income permanent	Split $Y=Y^P+Y^T$.
Stop at arithmetic	State the multiplier verdict and forward-looking mechanism.

ACCELERATOR MICRO-DRILL

Source example: v*=2.5; Y 400→440 gives ΔY^e=40, so I_n=$100m. Then 440→450 gives ΔY^e=10, so I_n=$25m. Output still rises, yet net investment collapses because growth slows.

THEORY COMPARISON TO RECITE

MODEL	RESOURCE HORIZON	POLICY IMPLICATION
Keynesian	Current disposable income	Temporary tax change has the larger textbook demand effect.
PIH	Expected permanent income	One-off rebate mostly saved; permanent change matters.
LCH	Lifetime assets + labour income	Windfall spread over remaining years; demographic saving effects.

Investment chooser: if the stem gives expected output changes, use the accelerator. If it gives real interest and depreciation, compute user cost v=r+δ and compare MPK. If it gives market and replacement values, compute q and use q>1. Then add the course's capital-controversy caution before claiming a robust interest-elastic investment schedule.

13 · Drill: Open Economy

TOPIC 8 WORKED

Given: C=120+.8Yd; I=180; G=240; X=180; T=50+.25Y; M=80+.10Y; Yd=Y−T.

1 · MULTIPLIER

```
k=1/(1-.8+.8×.25+.10)
=1/(.2+.2+.10)=2
```

2 · AUTONOMOUS SPENDING & Y

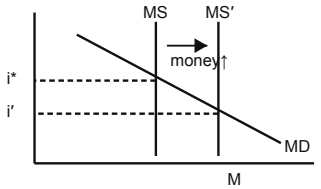
```
A=120-.8(50)+180+240+180-80=600
Y=kA=2×600=1200
```

3 · BALANCES

```
T-G=(50+.25×1200)-240=+110
NX=180-(80+.10×1200)=-20
S-I=NX-(T-G)=-20-110=-130
```

Answer: budget surplus 110, trade deficit 20. The nation still borrows abroad because private investment exceeds private saving by 130; the public surplus only partly offsets that gap.

BALANCE	VALUE	READING
S−I	−130	Private investment exceeds saving
T−G	+110	Public budget surplus
NX	−20	Current-account deficit
−130 + 110 = −20; FOREIGN CAPITAL FINANCES THE REMAINING NATIONAL GAP.		



Source-derived UIP channel: monetary expansion lowers i; under a float, capital flow and depreciation reinforce demand.

IF YOU SEE…	IMMEDIATE MOVE
c,t,m	Put ct and m in multiplier denominator.
CA deficit	Equal KA surplus/capital inflow.
i>i*	UIP implies expected domestic depreciation.
Depreciation → NX↑	State Marshall–Lerner condition.

POLICY-REGIME ANSWER PATH

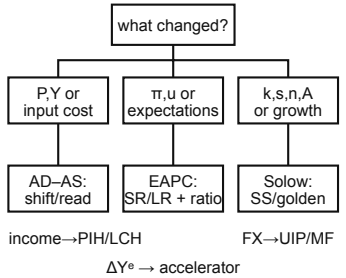
Flexible + monetary expansion: i↓ → capital outflow/depreciation → NX↑ → IS/AD right. The exchange-rate channel reinforces the domestic interest channel, so monetary policy is strong.
Flexible + fiscal expansion: upward pressure on i attracts capital and appreciates the currency, weakening NX and the fiscal effect.

Fixed + perfect mobility: i cannot persist away from i*. A monetary expansion threatens the peg and is reversed by reserve operations, so independent monetary policy is lost. Fiscal expansion is accommodated to defend the peg and is strong. State the trilemma explicitly.

IDENTITY READING	WHAT IT DOES NOT PROVE
CA deficit = capital inflow	Not automatically unsustainable or harmful.

14 · Method Chooser

TOPICS 4–8



Question-stem decoder: name the changed variable before choosing the model.

PROMPT	MANDATORY FINISH
"Explain/illustrate shock"	Label axes/curves; start A; shift; new B; short and long run.
"Compute equilibrium"	Condition first; substitute; solve; back-check; economic label.
"Compare theories"	Assumption → mechanism → prediction → policy implication.
"Evaluate policy"	Diagnose shock/regime; transmission; limitation/caveat.

15 · Classic Traps

FINAL CHECKLIST

- AD slope: lead with the policy reaction; do not import the fixed-money real-balance story.
- Cost change shifts SAS; demand change moves along SAS.
- SRPC trade-off is not permanent; LRPC is vertical at u_n.
- Steady state condition is not golden rule condition.
- Higher s raises a level, not long-run per-person growth.
- Transitory MPC is k·j, not k.
- Accelerator uses ΔY^e, not Y.
- User cost includes depreciation; pair it with the capital critique.
- Open multiplier includes ct and m.
- Flexible=favours monetary; fixed=favours fiscal.

16 · Exam-Morning Plan

RECALL ROUTINE

1. From blank paper, draw AD–AS, EAPC, Solow and the regime chooser; label every axis and anchor.
2. Recite the five quantitative conditions: AD=AS; sacrifice ratio; s·f(k*)=(n+d)k*; MPK=n+d; open multiplier.
3. Run one sign audit: cost shock, n↑, temporary income, i>i*, fixed versus flexible.
4. In reading time, map each essay to **model + assumption + diagram + caveat**; choose the two you can complete.
5. Budget by marks; show identities before numbers; finish each answer with the economic judgement.

FINAL RECALL *The marks sit in the named assumption and the correctly labelled diagram as much as in the arithmetic.*