STEP Exams - Preparation (6 pages, 15/7/25)

Contents

(A) Topics to specialise in

(1) No candidate is expected to have studied all of the topics in the papers to sufficient depth, and it would seem to be a sensible strategy to specialise in a certain number of areas.

Also, given that there will be many rival candidates of a similar standard, one way of gaining the upper hand is by specialising in particular topics. Another way is to be good at choosing questions!

(2) It probably pays to specialise in topics that have some of the following characteristics:

(i) they are likely to crop up

(ii) they are easily recognisable (eg Integration, Vectors)

(iii) they are limited in scope

(iv) they involve standard techniques

(v) they generally don't involve long answers

(vi) they can often be checked in some way

(vii) they are not generally popular (eg Mechanics or Probability questions), but are nevertheless do-able with moderate preparation

(3) Some 'ancillary' topics are quite likely to feature in questions mainly concerning other topics. Examples are:

Trigonometry

Sequences & Series

Inequalities

Curve Sketching

(4) The following is a list of other topics, in roughly decreasing order of 'reliability' (taking account of the various favourable features mentioned in (A)(2) above):

Integration [Pure] (P1/P2/P3)

- limited amount of essential knowledge

- easily recognisable

- questions tend to be quick to read

- lengthy solutions are not usually required

Poisson [Stats & Prob] (P1/P2/P3)

Collisions [Mechanics] (P1/P2/P3)

Projectiles [Mechanics] (P1/P2/P3)

Induction [Pure](P1/P2/P3)

- easily recognisable

Differential Equations [Pure] (P1/P2/P3)

Differential Equations [Mechanics] (P2/P3)

Forces [Mechanics](P1/P2/P3)

Energy [Mechanics] (P2/P3)

Power [Mechanics] (P2/P3)

Hooke's Law [Mechanics] (P3)

Circular Motion [Mechanics] (P2/P3)

Rotation [Mechanics] (usually P3)

Kinematics [Mechanics] (P1/P2)

Recurrence relations [Pure](P1/P2/P3)

Random variables & Distributions (P1/P2/P3)

The distribution in question will be given, unless it is a simple one such as Poisson.

Questions sometimes amount to no more than simple integration.

Probability [Stats & Prob] (P1/P2/P3)

Complex Numbers [Pure] (P3)

Vectors [Pure](P1/P2/P3)

These can be time-consuming; especially when the information given has to be converted to a number of simultaneous equations.

Vectors [Mechanics] (P1/P2/P3)

Hyperbolic functions [Pure](P3)

Difficult to prepare for, as questions tend to be of a one-off nature.

Polar Coordinates [Pure](P3)

Difficult to prepare for, as questions tend to be of a one-off nature.

Polynomials [Pure](P1/P2/P3)

Integers [Pure](P1/P2/P3)

Difficult to prepare for, as questions tend to be of a one-off nature.

Matrices [Pure] (P2/P3)

Difficult to prepare for, as questions tend to be of a one-off nature.

Functions [Pure] (P1/P2/P3)

Difficult to prepare for, as questions tend to be of a one-off nature.

Geometry [Pure] (P1/P2/P3)

Difficult to prepare for, as questions tend to be of a one-off nature.

(B) Questions to target

In addition to the above considerations about specialisation:

(i) It is generally reckoned that Q1 on each of STEP 2 & 3 is intended to be easier than the other questions. However, nothing in STEP is guaranteed. You don't want to skip Q1 if everyone else is doing well on it. On the other hand, if it happens to be the occasion when the second part of the question is too difficult, you don't want to be amongst the candidates who waste too much time on it.

(ii) 'Show that ...' (ie self-checking) questions

(iii) Questions with a clear topic and/or method (that you are happy with)

(iv) Questions without curves to be sketched

(v) Short questions! (less time spent reading; especially if the question is not chosen)

(C) Practice questions

For candidates new to a topic, there are suggested past STEP questions (with links to my solutions) on the STEP page. In some cases, further questions have been listed. The Pure, Mechanics and Prob & Stats Indexes also list questions by topic (* indicates a recommended question; ** indicates a highly recommended question). [Note though that it may be advisable to tackle the 'suggested' questions before embarking on some of the ** questions, which may be geared more towards students who have already practised the topic.]

Note that the STEP 1 questions, whilst usually easier than those in STEP 2 and STEP 3, can provide a good introduction to a topic, and approaches generally.

(D) Suggested Strategy

Pick at least half a dozen topics, and arrange them in the order that you would attempt them in the exam. After attempting a paper under exam conditions, conduct a post-mortem to decide whether your selection of topics needs to be refined, and whether the order is still appropriate.

Whatever strategy you adopt, it is probably best to allow it to develop gradually over the course of the preparation period, so that by the time you come to the exam the strategy has been tested.

(E) Other issues

(1) Note the following wording included with the syllabus:

"Normally, a candidate who answers at least four questions well will be awarded a grade 1. The marking scheme for each question

will be designed to reward candidates who make good progress towards a complete solution."

Unfortunately, it isn't clear what is meant by this. It could just mean that there is a strong correlation between answering four questions well and being awarded a grade 1; or it could - perhaps - mean that some discretion is available to the examiners when awarding a grade 1.

Candidates' scripts may be available to college and university tutors, for them to judge the quality of solutions in borderline cases.