

**BCS THE CHARTERED INSTITUTE FOR IT**  
**BCS HIGHER EDUCATION QUALIFICATIONS**  
**BCS Level 5 Diploma in IT**

**IT PROJECT MANAGEMENT**

Thursday 31<sup>st</sup> March 2016 – Morning

Answer **any** FOUR questions out of SIX. All questions carry equal marks  
Time: TWO hours

**Answer any Section A questions you attempt in Answer Book A**  
**Answer any Section B questions you attempt in Answer Book B**

The marks given in brackets are **indicative** of the weight given to each part of the question.

Only **non-programmable** calculators are allowed in this examination.

**Section A**  
**Answer Section A questions in Answer Book A**

**Syllabus coverage**

<b>Question</b>	<b>Syllabus</b>
1 (a)	1.3 Project success criteria
1 (b, c, d)	4.3 Project control through monitoring
2 (a, b)	2.2 Network analysis (A-on-N)
2 (c)	2.4 Gantt charts
3 (a, b)	5.1 Risk identification, types of risk
3 (c)	5.3 Risk management tactics
4	1.6 Project management using an agile approach, with particular reference to iterative and incremental development
5	6. 2 ISO9001 and quality management systems: principles and features. 6.4 Process and product quality approaches: capability maturity models
6	3.6 management of relationships with the stakeholders within and outside the project team including users

## Section A

A1

- a) List and explain very briefly the FOUR main criteria for assessing the success of a project.  
**(4 marks)**
- b) As a project manager you will normally receive several different types of reports and other recorded information to help you control the progress of a project. Your project is falling behind schedule and you need to identify the main reason for this delay. Explain which reports, or other information, you might use to identify each of the following possible reasons:
- i) staff who are intended to be working full-time on the project are taken off sometimes to help resolve emergency situations on other projects;
  - ii) the original estimates of development times were too low
  - iii) the project scope has been extended to meet additional requests from users
  - iv) staff productivity is lower than expected.
- (8 marks)**
- c) Identify FOUR different options that are available for bringing such a project back on schedule when it has been found to be running late. Explain briefly the cost implications of each of these four options.  
**(13 marks)**

### Answer Pointers

- a) The 4 standard criteria for success are that a project should be completed:
- on time,
  - within budget,
  - meeting all agreed user requirements, and
  - within agreed quality standards

2 marks were awarded for listing all 4, plus 2 for good brief explanations of each.

Maximum 4

marks

- b) i) Timesheets, which record projects worked on in the time sheet period and the time recorded per project.
- ii) Again, mainly from timesheets and where actual time recorded per activity is greater than budget for several activities within the project. If more detailed records are kept, e.g. lines coded per program/task/activity, then these could also indicate an under estimate if the many such tasks are require more lines of code than the original estimates.
- iii) This could be similar to (ii) but would be supplemented by inspection of the change control log, which would then include several accepted changes – many of which requiring additional programming effort, etc.
- iv) This is another aspect of item (ii), but also requires lines coded per day (or some similar productivity parameter) to be recorded – for both experienced and inexperienced staff.

2 marks were awarded per section, with a sensible, brief explanation required for each.

Maximum 8 marks

- c) There are many possible options here, including:
- ensure that all staff are still fully scheduled (some might have completed a task early)
  - recruit/bring in additional, possibly more experienced, staff resources (but this would have a cost overhead?)
  - introduce (paid) overtime working for existing staff (extra cost)
  - reduce project scope (with client approval)
  - reduce quality checking, testing, etc (but consider risk of reducing quality)
  - incremental implementation (if possible, again needs client approval)
  - introducing an embargo on further requests for change

also agree a new completion date (i.e. accept the delay) – but see below.

Bear in mind that the last of these does not really meet the question as it does not “bring the project back on schedule”. However, it could be accepted as a possible option **if** this proviso is stated; stating also that it would need client approval.

Note that additional costs are not involved for all possible options, but candidates would need to state this. Otherwise specify and explain briefly the reason, and type of cost, for each of the 4 identified options.

2 marks, plus 1 for the cost implications, per option discussed and an extra 1 mark for a good, complete answer to part c).

Maximum **13 marks**

### **Examiners' Guidance Notes**

This Section A question was very popular and attempted by most candidates, as was question A3.

- a) Most candidates listed these 4 standard criteria. Some re-phrased them slightly, often using “scope” rather than “requirements” or “client satisfaction” rather than “quality”. “Scope” is a little vague (especially when used in phrases such as “within scope”), so needs to be defined more precisely. Some candidates took a longer-term client-based view of “project success”, such as “value for money” or “profitable for the organisation”, which again need more precision. There were also some very long answers, not really needed bearing in mind that only 4 marks were available for this part of the question.
- b) In general this part of the question was not answered very well. Many candidates concentrated on possible reasons why each of the named problems might have occurred, or on actions that could then be taken to remedy them, rather than how these problems could be identified in the first place.

Each instance required a very specific identification, and explanation, of the “information generated as part of project control reporting” that might be used, and how it might be used. More general suggestions such as “comparing with the diagram” or “the schedule” or the Gantt chart” were not acceptable. There was also a tendency to refer to reports that the project manager might have produced, such as “exception reports”, for the project board.

Very few mentioned time-sheets anywhere.

The need to distinguish between possible reason (ii) and possible reason (iv) was not often recognised.

- c) This part of the question A1 is independent of the previous part (b). Only 4 different options were required to be identified. Several candidates listed more than 4, for which no marks were awarded.

In many cases candidates had, in effect, answered most of this part of the question within their incorrect answer to part (b), and some marks were awarded where this had occurred.

Other options were frequently suggested, often relating to staff motivation, bonuses, and further training (especially if related to low staff productivity). These needed very careful explanation to be acceptable in this context.

If the recruitment of extra staff was suggested, then it should be noted that there would almost certainly be additional time delay (and additional cost, to be discussed in part d) for the recruitment process itself.

It is unlikely that it would be possible to outsource the whole project at this stage, though some individual outstanding tasks might be out-sourced, particularly if they required skills or experience not readily available within the project team.

Some candidates discussed specific actions that might be taken to address the 4 specific possible reasons listed in part b). These were only relevant if they addressed the stated requirement to “bring the project back on schedule”.

Several candidates mentioned “the Delphi method” without really explaining how this might be an option.

## A2

Your company has decided that it needs a new sales recording system and that an off-the-shelf package is the best solution. The main tasks have been identified and durations assessed as follows:

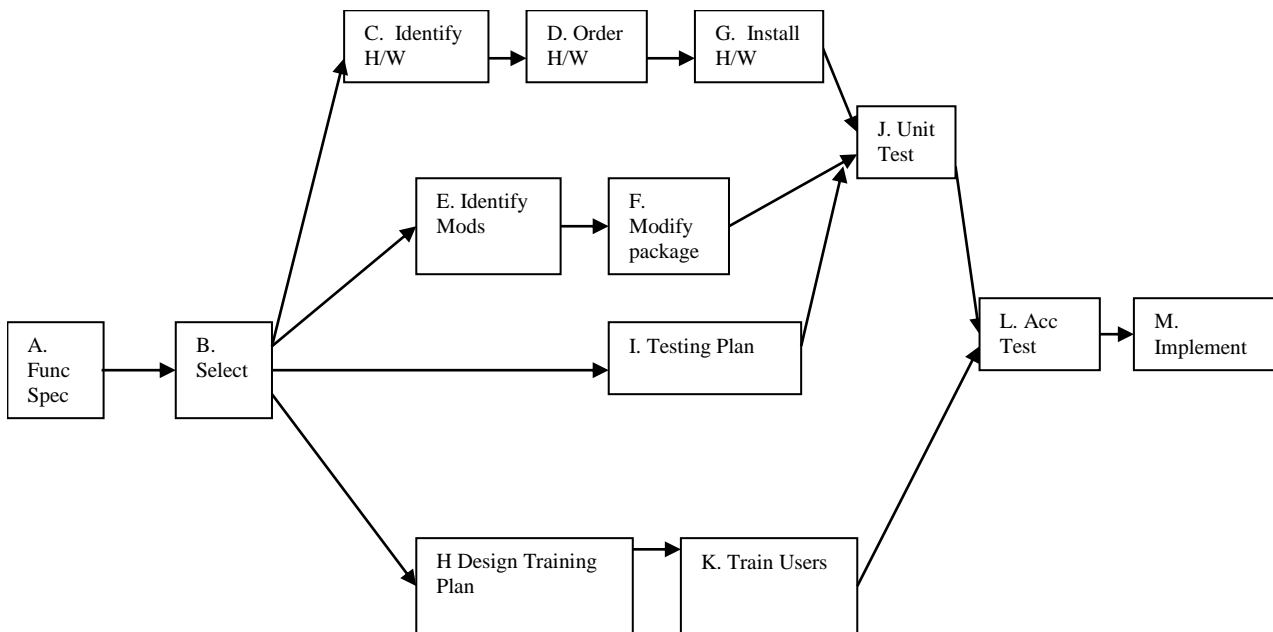
A	Draw up a functional requirements specification	4 weeks
B	Consider various relevant software packages and select one	3 weeks
C	Identify and specify the necessary hardware and communications equipment	2 weeks
D	Order the hardware and equipment	1 week
E	Identify the key package modifications needed to meet the functionality required	2 weeks
F	Modify the software package as necessary	8 weeks
G	Accept delivery and install all hardware and equipment needed for the package	10 weeks
H	Design a training plan	3 weeks
I	Set up a testing plan	3 weeks
J	Unit test all the amended package modules	4 weeks
K	Train the users	3 weeks
L	Full integration and acceptance testing	3 weeks
M	Implement the new system	1 week

B cannot start until A is completed  
 C, E, H and I cannot start until B is completed  
 D cannot start until C is completed  
 F cannot start until E is completed  
 G cannot start until D is completed  
 J cannot start until F, G and I are completed  
 K cannot start until H is completed  
 L cannot start until J and K are completed  
 M cannot start until L is completed

- a) Draw an activity-on-node diagram for these 13 project tasks (A to M). Calculate, display and clearly label on the diagram, the earliest and latest start and finish times and float of each task. **(11 marks)**
- b) Describe how each of the following changes to task durations (on their own) would affect the critical path and project duration.
- i) Task B - reduced to 1 week
  - ii) Task F - increased to 11 weeks
  - iii) Task G - reduced to 7 weeks
- (8 marks)**
- c) Identify THREE items of information regarding the planning and progress of a project that are not shown on an A-on-N diagram but could be displayed on a Gantt chart. **(6 marks)**

**Answer Pointers**

- a) An A-on-N diagram was expected similar to the following:



with a minimum of 13 nodes and with all dependencies shown clearly and correctly.

The following values **ALL** needed to be **shown in the diagram**. No specific node notation method was specified, but a known standard method, such as that shown on page 33 of the main course text, was expected.

	EST	LST	EFT	LFT		Duration	Float
A	0	0	4	4		4	0
B	4	4	7	7		3	0
C	7	7	9	9		2	0
D	9	9	10	10		1	0
E	7	10	9	12		2	3
F	9	12	17	20		8	3
G	10	10	20	20		10	0
H	7	18	10	21		3	11
I	7	17	10	20		3	10
J	20	20	24	24		4	0
K	10	21	13	24		3	11
L	24	24	27	27		3	0
M	27	27	28	28		1	0

Note that the critical path (A, B, C, D, G, J, L, M) and minimum duration (28 weeks) were not requested specifically here but were needed for part b.

A maximum of 5 marks were awarded for a correct, clear A-on-N diagram plus 5 marks for correct values throughout (to be shown ON the diagram within the Node design) and 1 for a Node key.

Overall maximum **11 marks**

- b) i) Reduce duration of B to 1 week: no change to critical path, but reduces the minimum duration of the project by 2 weeks to 26 weeks
- ii) Increase duration of F to 11 weeks: creates an additional critical path (A, B, E, F, J, L, M) but no change to minimum duration.
- iii) Reduce duration of G to 8 weeks: the same two critical paths as in part ii), but the minimum duration is reduced by 2 weeks to 25 weeks

2, 3 and 3 marks for each part respectively, **including** the required descriptions.

Maximum **8 marks**

c) Typical items here could include:

- Staff and other resources allocation
- A precise time scale for all tasks and the project overall
- Progress to date per task at a stated point in time
- Holidays (staff holidays and public holidays)
- Concurrent tasks are shown more obviously.

1 mark each for a valid item of information and 1 mark each for a clear explanation

Maximum **6 marks**

## Examiners' Guidance Notes

Unusually, this Activity network question was not the most popular question in part A of the paper.

- a) Most candidates produced a clear, well-designed A-on N diagram. There were far fewer A-on-A diagrams than in the past (though still some).

The most common problems included:

- the omission of any form of node structure (or key),
- lack of understanding of float and how to calculate it (sometimes confusing total float with task float),
- providing a key that referred to, say, "es" (for "Earliest Start Date"), etc
- omitting LST, EFT, LFT.

- b) This was usually a quite straightforward question for the candidates who had produced a good diagram and answer for part a. However, many supplied an answer but with no description of the changes concerned. As ever, it is important to read each question precisely and then answer it fully.

A disappointing number overlooked the words "on their own" in the question, which clearly divided it into three independent parts, and (if correct) a single reduced mark was awarded where all three changes were considered together.

Some candidates misread "reduced to" as "reduced by" in each part of the question. Others discussed possible reasons for such changes in task durations rather than the effect of such changes on the project schedule.

- c) This part of the question was often not well-answered, and many candidates provided more than three "items" when only 3 were requested in the question. Many mentioned "Float, which **IS** shown on an A-on-N diagram, as are dependencies. Indeed both are clearer on an A-on-N diagram than a Gantt chart.

## A3

- a) Describe FIVE techniques a project manager could use to identify risks  
(10 marks)
- b) Explain the difference between a project risk and a business risk  
(4 marks)
- c) Describe FIVE different tactics for managing a project risk.  
(11 marks)

## Answer Pointers

- a) Techniques that could be used for identifying risk might include:
- Examining previous projects' risk logs
  - Employing an expert consultant
  - Group Workshops
  - Examining Lessons Learned reports from previous projects
  - Brainstorming
  - Use of risk analysis software packages
  - Focused interviews
  - SWOT analysis (with an explanation of "how?")
  - Brainstorming

- Prototyping was sometimes suggested, this could be used to identify risks later in the project

Note that sometimes risks can emerge during the project and thus not be identified at the start of the project so, where appropriate, marks were awarded for recognising this.

2 marks were awarded per well-described method.

**Maximum 10 marks**

- b) Project risk is internal to the project, relating to activities and people within the project. Business risk is external to the project, relating to the activities of the business, the general economic and legal climate, etc. but it may have an effect the project.

Project risk management is the responsibility of the PM while business risk management is the responsibility of the project owner.

Project risk activities are likely to come from the project budget but business risks will be outside the project budget.

**Maximum of 4 marks for good clear differences**

- c) The main risk management tactics are:

- Acceptance
- Prevention (Avoidance)
- Reduction (with a possible bonus here for distinguishing here between probability and impact)
- Transference
- Contingency plan (with the emphasis on the need for an advance “plan”)

2 marks per well-described risk management method, plus possible bonus mark.

**Maximum 11 marks**

### **Examiners' Guidance Notes**

This question was very popular and attempted by most candidates, as was A1. However, there did appear often to be a lack of understanding of the theory underlying risk identification and, less often, risk management for parts a and c. A significant number of answers tended towards more general discussion of aspects of risk analysis or project (rather than risk) management.

- a) Nevertheless, this was quite well answered in the main but some candidates lost marks for making a list rather than providing a description, such as how each technique might be used, as the question asked. A list of single words doesn't allow for any meaning to be conveyed. Some one word answers suggested a possible technique but with no amplification it was impossible to award marks. Some candidates introduced techniques from 'estimating' (such as “Delphi” and “wide Delphi”). For these marks were awarded only where their use had been explained clearly in the context of identifying risks.

As noted above, many candidates tended to discuss risk assessment, and sometimes risk management, rather than risk identification.

- b) There are about four key differences between the two, candidates were expected to identify two. This was problematic for some students who didn't actually point out differences. Some candidates stated that business risks occurred only after the project is completed – which is not necessarily correct.



c) Many candidates listed and described all five main risk management tactics well, but a significant number of answers discussed project management rather than risk management. There was also a tendency to list more general management actions rather than the specific risk management tactics.

## Part B

### B4

- a) With the aid of suitable diagrams briefly explain
- i) Incremental building **(8 marks)**
  - ii) Iterative development **(8 marks)**
- b) Prototypes can be used in iterative agile development. Outline the advantages and disadvantages of using prototypes **(9 marks)**

### Answer pointers

- a) Suitable diagrams would be Fig 1.2/1.3 (Hughes(ed), pp 17-20). 3 marks for each diagram and 5 marks for identifying and explaining up to 5 key points. A satisfactory answer might include:
- i) This is developing a system in fragments: after creating a macro view of architecture and requirements there would be a decomposition to smaller increments, each of which (ideally) would be usable. This is a good with large projects with well-defined requirements. Acceptable answers could equally well be a candidate's description of Scrum (a more software development approach) process or similar.
  - ii) This is developing a system as a series of versions, each of which is assessed by user representatives who suggest improvements to be incorporated into the next version. Associated with prototype approaches, it is an effective way of dealing with ill-defined requirements and enhancing customer involvement, while its downside is the difficulty of monitoring and control of iterations and general progress.
- b) The advantages should include items such as learning, better involvement of users, clarification of requirements, and completeness of specification. Downsides include lack of control, expense, redundancy and integration amongst others. Up to 3 marks for a good description of a particular element, with 1 mark for a basic description.

### Examiner's Guidance Notes

Question 4 was the most popular choice of candidates in section B. This section of the syllabus has a focus on Agile development and it was disappointing to note that very few candidates gave any indication of a particular understanding of the development methodologies in relation to an Agile approach.

- a) Many candidates were not able to provide good explanations on key points of incremental/iterative development and it was apparent that many struggled to appreciate the basic distinction. In general, answers to this question were largely based on a rudimentary familiarity with software engineering models of waterfall/spiral development and showed little depth of understanding in the strengths /weaknesses of the approaches. A common mistake was to confuse an incremental approach with a waterfall one.

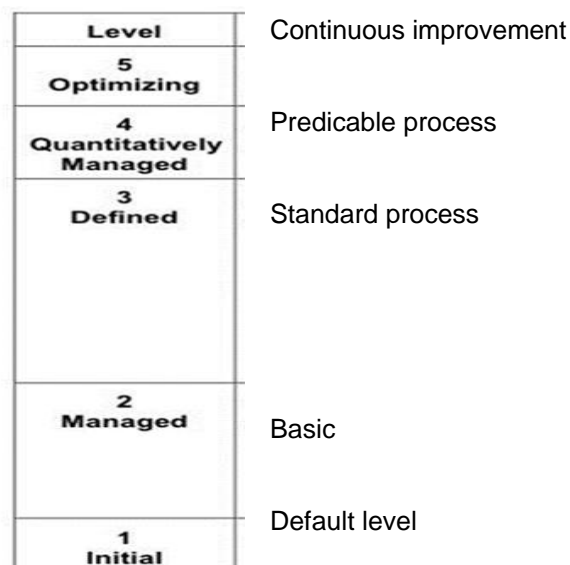
- b) In this part of the question, with very few exceptions, most candidates provided a standard software development lifecycle view of the role of a prototype. Marks from this part were therefore largely gained from a knowledge of prototypes in traditional development. With some few exceptions, candidates made no attempt to link Agile iterative development to the context.

### B5

- a) The Capability Maturity Model Integrated (CMMI) can be used to assess the level of process maturity for an organisation. With reference to CMMI
- i) Draw and label a diagram showing the five maturity levels. **(5 marks)**
  - ii) For each of the five CMMI levels, outline the typical practices you would expect to find. **(10 marks)**
- b) Quality management systems such as ISO9001 are concerned with the quality of organisational process. Critically evaluate up to five features of ISO9001. **(10 marks)**

### Answer pointers

- a) i) A typical diagram would be as shown below (figure 2) or a block list of the type shown in table 13.4 in Hughes & Yeates. 1 mark for each level/label  
fig 2.



- ii) For each level an outline should typically consider items such as:
1. Procedures haphazard, depends on individual skills, default level,
  2. Managed with basic PM procedures but still key persons focused,
  3. Defined each task is defined in the software development process.
  4. Quantitatively managed, processes subject to metrics etc'
  5. Optimising, process
- 2 marks for each outline

- b) Standard quality principles of ISO9001 include (by no means an exhaustive list):
- understanding customer requirements,
  - leadership
  - staff inclusion
  - focus on intermediate deliverables
  - relationship with suppliers

The focus on process rather than product is often identified as a challenge, together with additional costs. Some organisations have had problems with using accreditation as an indicator of the product quality provided by potential suppliers, as the actual product quality level is set by the supplier. This can perhaps be contrasted with *product* quality approaches such as ISO 9126. 2 marks for each critical evaluation.

### **Examiner's Guidance Notes**

This question was the least popular in section B attracting approximately one third of candidates. This question addresses two parts of the syllabus; ISO9001 and Capability Maturity models.

- a) In this part most candidates were able to provide a level diagram, with some variations and examples of confusion concerning the levels hierarchy. However many candidates could not relate the levels to particulars of CMMI and tended to equate to levels in ISO9000.
- b) In part b most candidates gave an adequate account of the quality standard and process, but most could not give any coherent critical evaluation, with many candidates simply listing the levels and erroneously confusing product quality with process quality. Answers here tended to concentrate on the developer's viewpoint of quality (a fairly narrow viewpoint) and did not take the management viewpoint. The manager needs an appreciation of an organizational process that surrounds a particular development project. The part of the syllabus which has focus in this question is particularly concerned with ISO9001 and its emphasis on process but many candidates gave answers which almost entirely focused on the criticism of ISO9000 based on its difference to product quality approaches.

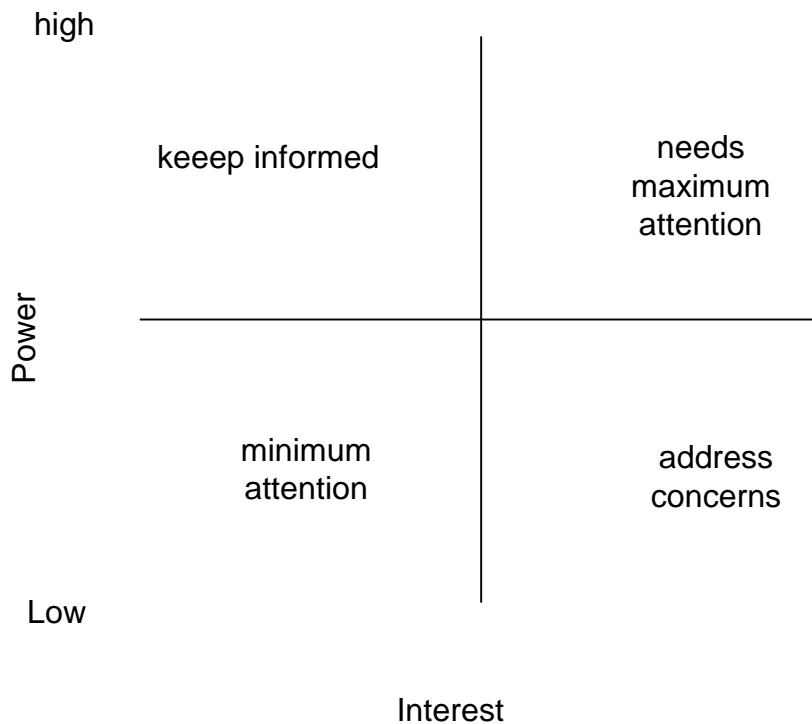
### **B6**

- a) It is possible to categorise the power and interest of a project stakeholder using a 2x2 matrix diagram.
- i) Sketch a suitable 2x2 matrix and label each category **(4 marks)**
- ii) For each of the four categories of stakeholder that you can identify outline a suitable management approach that you might take. **(12 marks)**
- b) A project manager needs to effectively deal with customer expectations. Describe any three steps you can use in managing expectations. (9 marks)

## Answer pointers

(a)

i) A suitable diagram is the Sholes and Johnson matrix – see below. 1 mark for each quadrant and label



ii) The broad headings would be

- High power/low interest impact. A good example of these would be investors in a project. The focus here is on keeping senior stakeholders informed, particularly of potential benefits and of risks and how they are being dealing with, and monitoring their interest levels. The risk is that if they become disgruntled they may intervene to protect their interests, effectively moving to the next quadrant.
- High/power high interest key stakeholders who have power to make or break a project. Typically these are senior managers with the power to modify or even terminate the project. They require maximum attention by the project management, while not over-whelming them with unnecessary detail.
- High interest/low power groups are usually directly affected by the project but have no power causing frustration. Individual concerns should be addressed with specific information. Dangers are that stakeholders in this quadrant may be able to win support of stakeholders in the high-power quadrants, and/or increase their influence by 'ganging up' with colleagues.
- Low interest low power. There are problems if this group changes categories during a project's lifetime. Would appear to require minimal attention, but developments could change their position e.g. system changes could particularly affect a stakeholder group, and need their co-operation.

1 mark for each basic identification and description and up to an additional 2 marks for fuller detail.

- b) Typically (non- exhaustive) answers will cover three from:
- Defining what it means what is customer satisfaction, what is the satisfactory end product, who needs to be satisfied
  - Discover source of expectations, does the project expect to save money, does the project expect to stretch frontiers, enhance business profile.
  - -Calibrate, where do you stand in relation to expectations, establish what's needed, what's wanted etc.'
  - -Create an action plan. Once needs are established the pm can plan for achieving requirements for success. Define project boundaries, define mechanisms for project team to achieve expectations
- 3 marks for each description

### **Examiner's Guidance Notes**

This question was the second most popular in section B.

- a) i) In this part a majority were able to provide the matrix although there was often confusion concerning the labels. Many knew the structure with high/low power and high/low interest, but had difficulty in identifying the approaches to be used in managing the categories.
- ii) Most of the candidates were able to describe forms of relationship and distinguish between internal and external relationships, although many had little idea on describing relationships and simply listed headings. It was very obvious that candidates have little exposure to the varying levels of importance that a given stakeholder has to a project. In terms of dealing with the power of a stakeholder v interest of a stakeholder, it seemed that most believed the greater the power the greater the interest in the project! This of course is not necessarily the case and would be obvious from a better understanding of the management of project stakeholders.
- b) For part b it was disappointing to note that many concentrated on internal staff handling and did not correctly read that the question focused on customer relations. It was apparent that candidates have a narrow focus on the role of the project manager in managing expectations. Many of the candidates did poorly on this sub part.