Sample Examination Questions 2: Bullet Point Answers

1.1 Project Management
Definition of project in BS 6079-1
Introduction of change to meet specific benefits
Defined start and finish
Time, cost, and quality/performance requirements
Project management is:
Planning, monitoring, and controlling all aspects of a project
Motivation of all involved to achieve objectives

1.2 Programme Management
Definition of a programme:
A collection of related projects
Advantages:
Coordinate resources
Assign priorities
Oversee project managers
Reduce risk
Prepare overall milestone plan
Resolve conflicts between project managers

1.3 Portfolio Management
If projects are not related, it is portfolio management
Prioritize projects against needs of organization
Allocate resources and eliminate bottlenecks
Assess risks of projects in portfolio
Decide on timing of project starts
Monitor performance of all projects
Ensure good cash flow and profitability
Carry out cost–benefit analysis of projects
1.4 **Project Context Environment**

- Context within which project is undertaken
- Takes account of internal and external forces
- Client, company, contractors, suppliers, consultants, public, end users, etc.
- PESTLE (Political, Economic, Sociological, Technical, Legal, Environmental)

1.6 **Project Office**

- Collection and collation of reports and time sheets, etc.
- Administrative support to project manager
- Dissemination of instructions
- Operation of configuration management (CM) system
- Administration of change control
- Library for standards and procedures
- Records progress information
- Produces curves and tabular information for use by project manager
- Writes up and distributes minutes of meetings

2.1 **Project Success and Benefit Analysis**

- Identify and assess benefits
- Define benefits and agree on method to measure benefits
- Set success criteria
- Set and monitor key performance indicators

2.1a **Why Do Projects Fail?**

- Poor planning and cost control
- Incompetent project management
- Sponsor support lacking
- Client makes too many changes
- Changes too large or extensive
- Late safety requirements
- Costs underestimated
- Lack of change control
- Lax CM
- Environmental changes
- Unforeseen climatic conditions
- Integration problems
- Technical and teething problems
- Inadequate resources of staff and equipment
- Poor working conditions
Uncooperative line management
Sabotage and political upheaval
Cost, time, and performance requirements not met
Inadequate support from top management
Inadequate specification
Loose agreement with client
Loose contractual conditions
Ill-trained staff or operatives
Fundamental design faults
Late deliveries of information and equipment
Insufficient inspection and expediting
Poor cash flow
Insolvency of subcontractor
Unclear original brief causing misunderstanding
Commissioning problems

2.2 Stakeholder Management
Positive stakeholders: project team, client, contractors
Negative stakeholders: pressure groups, environmental groups, planning authorities
Influence of stakeholders to be assessed, e.g.:
  - Power to affect project
  - Financial muscle
  - Malleability
  - Personal involvement
  - Vested interest
  - Political bias or affinity
  - Stakeholder prioritization

2.4 Project Management Plan
Plan reflects PM's understanding of project
Should be written by PM. This enables him to fully understand the sponsor's requirements
Must be updated regularly with good CM
Is in effect ‘bible’ of project and is owned by PM
Not to be confused with a time schedule (plan)
Can be known by other names by different companies
Contents well set out in BS 6079 page 32 (copy in manual)
Contents to include:
Reasons for planning, baseline programme, responsibility matrix, document
distribution schedule, procedures for monitoring and control, resource allocation,
network preparation, estimating, risk management, health and safety, change control,
CM, etc.

2.5 Risk Management
Risk management plan, diagrams, P-I 3×3 matrix, risk log, techniques
Risk management process, software tools, Monte Carlo, @ Risk, Predict, 3-point estimating
Types of risk, political, economic, technical, security, environmental
Identification, techniques, brainstorming, checklist, prompt list, interviews, work
breakdown structure (WBS), Delphi
Assessment, priorities, impact, probability, SWOT (strengths, weaknesses,
opportunities, threats), decision trees, Ishikawa diagrams
Qualitative analysis, quantitative analysis, risk owner, risk register
Risk management should be initiated at start of project
All projects have risk
Risks can be:
Commercial, political, technical, safety, security, resources, approvals, environmental,
climatic, cultural
Risk identification
Risk history or diary
Risk owner
Risk log or register
Qualitative analysis
Quantitative analysis, Monte Carlo, @Risk, Predict,
3-point estimating
Impact/probability matrix
H, M & L assessment
Risk identification, brainstorming, checklists (See 2.3b)
Managing risk
Mitigation, transference, insurance, reduction, elimination, deference, acceptance
Contingency

2.5a Risk Management Plan
Introduction. Why risk management, company policy
Purpose of process. Client requirement, environmental, health and safety, project viability
Sample Examination Questions 2: Bullet Point Answers

Scope of process. Political, Economic, Sociological, Technical, Environmental, Legal
Description of project
Specific aspects to be covered. Innovations erection, finance, sabotage, security
Type of organization. Functional matrix, task force
Roles and responsibilities. Managers, risk owners
Tools and techniques required. Monte Carlo, @Risk, Predict, etc.
Deliverables. Risk register, matrix, action plans, contingency plans, etc.

2.5b Risk Identification

Assumption Analysis
Specific, quick
Subjective, related to assumptions, restricted

Brainstorming
Cost effective, wide ranging, involves participants, assists communication and understanding
Throws up wild ideas, requires good facilitation, risks may be exaggerated, group must be restricted, participants must be chosen

Check Lists
Past experience tapped, good coverage, focused on right areas, rapid response
Restricted to items on list, lacks originality, could miss new problems

Delphi Technique
Can be conducted by mail or fax, taps expert opinion, possibility of agreement
Requires the relevant experts, takes time, requires good co-ordination

Document Reviews
Simple to do, authoritative, very useful if document is a close-out report
Could take a long time, identification of risks may be difficult

Interviews
Confidential, specific, enables risks to be analyzed, allows discussion
Requires good interviewing technique, time consuming, requires subsequent comparison of results

Prompt List
Similar to checklists
Questionnaires

Structured questions and answers, encourage originality, can be answered at any time, allows for additional ideas if requested

Repetitions have to be compared, responses could be fatuous, could take time

SWOT Analysis

Highly focused, lists opportunities as well as threats, structured

Needs good control, parts not necessarily risks

WBS

Each stage or task can be investigated for risk content.

2.6 Quality Management

Quality planning
Quality assurance
Quality control
Quality standards
Fitness for purpose
Meets acceptance criteria
Total quality management
Right first time and zero defect
Quality circles
ISO 9000
Quality audits

2.6A Quality Tools

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<thead>
<tr>
<th>Quality Objectives</th>
<th>Specifications</th>
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<tbody>
<tr>
<td>Quality systems</td>
<td>Company systems, ISO 9000</td>
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<tr>
<td>Quality plan</td>
<td>Analysis, inspection, recording, degree of testing</td>
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<td>Quality assurance</td>
<td>Procedures, processes</td>
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<td>Quality control</td>
<td>Checking</td>
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<td>Quality manual</td>
<td>Contains all the above</td>
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<td>Checking and testing</td>
<td>Verification, sampling, validation, certificates</td>
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<td>Quality audit</td>
<td>Check that procedures are being adhered to</td>
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<td>Quality reviews</td>
<td>Adamant</td>
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<td>Pareto analysis 80/20</td>
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### Quality Objectives

- Cause and effect analysis, Ishikawa or fishbone diagram, decision trees
- Brainstorming (could lead to risk assessment)
- Check lists
- Process flow sheets
- Concentration diagrams
- Activity sampling
- Ranking and rating
- Bathtub curves
- Poka Yoke
- Qualification certificates e.g., welders qualification tests

### Specification

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### 2.7 Health and Safety

- H and S standards
- Laws: HSWA 1974 (Health and Safety at Work Act)
- Management of health and safety
- Regulations 1992 covers:
  - Safe plant and equipment
  - Dangerous substances
  - Safe workplace and access
  - Protective clothing
  - Safe environment
  - Information and training
  - Reporting
- CDM (Construction, Design, and Management) Regulations
- Consumer Protection Act 1987
- Common law duties (negligence) apply

### 3.1 Scope Management (WBS)

- Next stage from project life cycle
- Divides the project into manageable packages
- Can be product-based or work based
- Shows hierarchy of work packages
- Leads to assignment of work packages and resources
- A task-oriented family tree
- Leads to PBS, CBS, OBS and RBS
- Helps in creating a responsibility matrix
Foundation for planning and critical path (CP) network
WBS called PBS in PRINCE methodology
Gives better definition of work
Acts as checklist to find missing stages and areas of work
Good basis for risk identification process
Does not show interdependencies
Team members have good picture of main stages
Top–down and bottom–up estimating
Leads to network, bar chart, histogram, S curve

3.2 Time Management (Scheduling) (cpa)
AoA or AoN (precedence) networks, estimating durations
Lester diagram
CP has zero float
Total and free float
Leading to bar (Gantt) chart
Resource histogram, resource smoothing, peak reduction, and ‘S’ curve
PERT
3-point estimates for durations
Maximizing parallel activities

3.2a Milestones
Important stages
Payment points (expenditures or receipts)
Achievement points
High-level programme
Milestone slip charts show record and predictions
Milestone schedule
Marked on Gantt charts
Target on networks
Often written into a contract
Approval for change and date

3.3 Resource Management
Resource allocation
Resource histogram
Resource scheduling
Resource levelling due to constraints
Resource smoothing uses up float
Replenishable resources and renewable resources

3.4 **Budgeting and Cost Management**

- Costing and monitoring methods
- Cash flow forecast (Outflow and inflow)
- Cash flow curves
- Cost breakdown structure
- See ‘4.3’
- Budget preparation
- Commitments
- Accruals

3.5 **Change Control**

- Customer responsibility: impact assessment, evaluation, agreement
- Sponsor responsibility: authorization, review, benefit assessment
- Project manager responsibility: control procedure, monitoring, evaluation, implementation
- Difference between external and internal change, effect on budget
- Change control process, stakeholder input
- All departments must assess time and cost effect of change on them

**Key Documents**

- Change request form
- Change record. This records the effects of the change on the project
- Change control register
- Change authorization. This gives the effect of the change on cost, time, and performance
- Feedback to customer (who has right to cancel) after examining the consequences

3.5a **Change Register (Change Log)**

- Essential headings on change register
- Project title
- Date of request to change
- Name of instigator
- Description of change
- Reason for change
- Time and cost estimates from each department
- PM's summary of effects
- Approval of change and date
3.6 *Earned Value Management (EVA)*

Reasons for EVA:
Shows difference between work planned, work booked (on time sheets), and work performed

Abbreviations: BCWS, ACWP, and BCWP.
Note: BCWS is planned (not budget)

These abbreviations are now being phased out

\[ EV = BCWP = \text{budget} \times \% \text{ complete} \]

Control curves: budget, planned, actual, earned value, \% complete, efficiency (CPI)

Interpretation and solution if CPI and SPI are negative

Calculations: \( CPI = \frac{BCWP}{ACWP}, \) SPI (cost) = BCWP/BCWS

Cost and time variances: cost variance = BCWP − ACWP

Time variance = BCWP − BCWS; final cost = original budget/CPI;
final time = planned time/\( SPI \) (time) (or SPI (cost))

Should be geared to CP network, which can be updated from EVA feedback

If returns of \% complete are on time sheets, regular feedback is guaranteed

Computer programs have been developed to do the calculations.

Advantages:
Shows trends, shows estimating errors, predicts final cost and completion time using curves and approximate calculations

\% complete of multidiscipline, multicontractor project possible

Trend can be seen early on in project and corrective action can be taken

Shows cost and time position on one report

Shows \% complete and efficiency on one graphical report

Weakness:
Difficulty in assessing \% complete
Wrong budget estimates
Poor feedback system
Time sheets essential

3.7 *Information Management*

Collection and capturing of information
Collation and distribution
Dissemination
Storing and archiving
Procurement and maintenance equipment
Confidentiality
4.3 Estimating

- Subjective estimates: (±20–40%)
- Parametric estimates: (±10–20%)
- Comparative estimates: (±10%)
- Analytical estimates: (±5%)
- Bottom-up estimating: (Normal for accurate estimating)
- Top-down estimating: (Useful if cost cannot be exceeded)
- Schedule of rates: (Needed to price variations)
- Bills of quantities: (Starts at site clearance and ends at finishes)
- Contingencies: (Usually given as a % of total)

4.5 Value Management and Value Engineering

- Functional analysis
- Investigate alternative solutions to meet function requirements
- Verbs and nouns technique
- Evaluation
- Acceptance, implementation, and audit

4.7 Configuration Management

- Covers documents, drawings, and components
- CM planning
- Item identification
- Control of configuration items
- Status
- Verification
- Audit

5.1 Business Case

- Defines ‘why’ and ‘what’ the requirements are
- Outlines objectives
- Outlines cost, time, and performance/quality criteria
- Might include success/failure criteria
- Should include major risks
- Can have other names such as brief, scheme, statement of work, statement of requirements
- Owned by sponsor or client
- Could include investment appraisal and possibly DCF/NPV, etc.
- Should have assessed other options
Should have identified and considered all other stakeholders
Submitted to board for approval

5.1 **Investment Appraisal DFC, NPV**

Advantages: time value of money, compares competing projects
Disadvantages: complex, wrong estimates, relies on accurate discount rate

**Payback:**

Advantages: simple, can be discounted
Disadvantages: time value ignored, cash flow after payback period ignored.
IRR, graphical solution, average return per annum, return on investment %
Intangible benefits: marketing, impact on business, prestige, social benefits, environmental benefits
Consider other options, risks, accounting practices, stakeholder views

5.4 **Procurement Strategy**

Based on value for money
Includes all feasible options
Single source supply or competition
Partnering or not
Types of contract: lump sum, remeasured, reimbursable, target, design, build, and operate
Is construction included?
Is delivery to site included?
Standard or special contract conditions
Types of pricing, firm, fixed, target, cost plus, reimbursable, schedule of rates
Contractor selection criteria
Contractor bid meetings, and attendees by contractors
Minimum and maximum number of bidders
Tender opening policy
Letter of intent possibilities
Expediting and inspection requirements
Procurement and delivery schedule
Liquidated damages
Incentives
Discounts required
Cash flow and payment terms
Shipping restrictions INCO terms
Guarantees and liabilities
Packaging and storage requirements
Spares lists
Operating and maintenance manuals
After-sales service
Limitations of procurement areas—UK, EC, Western countries, country of final user
Long lead items
Signatures for different levels of contracts

6.1 **Project Life Cycle**

No. of phases
Standard life cycles, BS 6079: conception, feasibility, implementation, operation, termination
Common phases:
Initiation, conception, feasibility, definition, design, development, production, manufacture, installation, implementation, commissioning, operation, disposal
Extended life cycle includes disposal.
Different industries have different life cycles
Advantages:
Ensures no unnecessary expenditure
Review possible after each phase. Go or nogo gates
Triggers for further funding
Each phase has a control stage with checkpoints
Basis for WBS
Phases can be split again into stages
Phases called stages in PRINCE used in IT
Different phases can have different project managers
Gives top management an overall picture of project
Gives a rough progress position (crude bar chart)
Phases can be costed for control purposes
Can show up resource and continuity problems
Shows milestones
Developed by sponsor and project manager

6.1a **Project Life Cycle**

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<thead>
<tr>
<th>Phase</th>
<th>Document</th>
<th>Issue Document</th>
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<tr>
<td>Conception</td>
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<td>Stock records</td>
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### 6.5 Handover and Close-out

- Acceptance by client
- Acceptance certificate
- Transfer of responsibility to sponsor or operator
Transmission of ownership to client
Deliverables completed and handed over
Acceptance certificate received
Operating instruction handed over
Spare lists handed over
Transfer responsibility to user/client
Material disposal arranged. This covers: sell surplus material to client if possible
Return surplus to contractor's stores
Return redundant office equipment and materials
Sell unusable materials as scrap
Clear site, remove huts and temporary fences
Make good roads and other areas (stockyards)
Complete all contract documentation
Complete all audit trails and file documents
File closeout report and index for easy access
Arrange closeout party with client and other stakeholders
(Party could be funded from scrap disposal income?)

6.6 Post Project Review and Evaluation
Reviews should be held throughout the project
Closeout meeting with project team
Evaluation against success criteria
Prepare postproject appraisal and write closeout report
Include abstracts from project diary and site diary where necessary
Highlight problems encountered, cost and time overruns, special delays
Report on project team performance
Recommendations for future projects, learning from experience
Evaluate project management process
Evaluate techniques employed

6.7 Organizations
a. Functional
b. Project (task force)
c. Matrix (combination of (a) and (b))

6.7a Matrix Project Management
Advantages:
Fast response to resource change, flexible
More economical than task force
Stronger specialist base, knowledge not lost
Existing resources use state of art technology
Common facilities (computer programs) shared
Career prospects unchanged
Contract labor more easily taught and absorbed
Disadvantages:
More executive input required, possible conflict between PM and functional manager
Possible resource priority disputes between projects and between projects and function
Not as integrated as a task force
Less commitment to project than department
Personnel have two bosses, conflicting priorities
Requires more interdepartmental co-ordination which could be complex
PM has not the same authority to commit resources
PM not responsible for pay and rations

6.7b Project Management vs Functional Line Management

Advantages:
Greater efficiency and effectiveness in employing tools and techniques used in project management
One person, the project manager, is responsible
Sponsor knows at start what the deliverables will be
Sponsor can see the PMP and be assured the correct procedures are being used
Dedicated manager in charge of cost, expenditure and programme, strong commitment
More line organizations are moving towards project management for change
Monitoring and control through life of project
Single line of communication with all parties, especially external parties
Single line of reporting
Project manager is trained to handle the stresses of change
Learning from experience through post-project reviews
Project management good training for top management due to wider vision
Line managers may be distracted by having to deal with line management functions
Spirit of dedicated project team not present in functional organization, high motivation
No competition for resources from other departments
Disadvantages:
Less job security than in functional organization
At times could be inefficient due to delays in information
Could develop parochialism and arrogance
Project objectives could eclipse company objectives
Not as strong specialist skills as functional department
Not as efficient in resources as functional department
Reporting line not as clear as in functional department
6.8 **Organizational Roles**
- Steering group or steering committee
- Function of project office (if established)
- Role of client and end user
- Role of sponsor
- Role of project manager
- Project manager's charter
- Stakeholders
- Contractors and suppliers responsibilities

7.1 **Communication**
- Barriers to communication:
  - Cultural
  - Geographical, location
  - Language, pronunciation
  - Bad translation
  - Jargon
  - Perception, attitude, lack of trust
  - Poor leadership, unclear objectives
  - Misunderstanding
  - Personality clash
  - Dislike of sender, selective listening
  - Group think
  - Bad equipment or equipment failure
  - Poor working environment, noisy office
  - Poor document distribution system, lost files
  - Unnecessarily long messages
  - Withholding information
  - Assumptions
  - Hidden agenda
  - Poor knowledge retention

7.1a **Overcoming Barriers in Communication**
- Simple messages,
- Follow-up by testing
- Confirm in writing
- Improve office facilities
- Bring team together
- Improve motivation
- Maintain equipment
7.2  **Team Building and Teamwork**

Advantages of project team:
- Complementary skills
- Increased productivity
- Project manager support
- Informal communications
- Strong identity with project
- Common objectives
- Motivation for project
- Will to succeed
- Focus
- Team spirit

Other methods used to build teams:
- Organized start, events, training, away days, discussions

7.2a  **Barriers to Team Building**

- High staff turnover
- Poor leadership
- Geographical separation
- Internal conflict and unresolved conflict
- Low morale
- Lack of motivation
- Ill-defined objectives
- Poor environment
- Lack of trust
- Too many changes
- Poorly defined roles and responsibilities
- Poor communications

7.2b  **Team Features**

- Cohesion
- Loyalty
- Motivation
- Team spirit
- Focus
- Leadership
- Informal communication
- Complementary skills
- Technical competence
Advantages:
Common objectives
Project management support
Will to succeed
Increased productivity

7.2c **Belbin Team Roles**
Balanced team, individuals in the correct slot. The roles are:
Plant
Shaper
Resource investigator
Co-ordinator
Monitor evaluator
Implementer
Teamworker
Completer, finisher
Specialist
Not always possible to find the correct type.
Project manager must use resources available

7.2d **Tuckman Team Phases**
   a. Forming
   b. Storming
   c. Norming
   d. Performing
   e. Mourning

7.2e **Motivation**
Recognition
Achievement
Advancement
Promotion
Increased responsibility
Personal growth
Perks
Share in profit
Work satisfaction
Maslow's hierarchy of needs
Herzberg's motivation theory
7.3 **Leadership and Leadership Qualities**

- Ability to influence rather than direct
- Negotiation skill
- Motivation
- Initiative
- Communication skills
- Ability to listen
- Fairness
- Wider perspective
- Decision making
- Keeps cool head
- Does not panic
- Ability to adapt to change
- Integrity
- Situational leadership
- Hersey & Blanchard

7.4 **Conflict Management**

- Withdrawing
- Smoothing
- Confronting
- Forcing
- Compromising
- Thomas & Kilman
- Mediation
- Conciliation
- Adjudication
- Arbitration
- Mitigation

7.5 **Negotiation**

- Planning and case preparation
- Set minimum acceptances
- Build up relationship
- Exchange information
- Bargaining
- Concessions
- Agreement
- Documentation of settlement
Answer to Question 7