This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners’ meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.
1 (a) (i) Four descriptions of benefits from:
- Any designer can access the design from anywhere/other offices so designs can be created more quickly/reviewed
- Designs are easily edited/altered so no need to redraw
- Designs are accurate/precise with no human errors
- Use of libraries of shapes/items so no need to redraw
- Accurate measurements on drawings for use in e.g. cost analysis
- Assist in calculating costs for production runs
- Can be used to output to 3D printers to print models/prototypes

(ii) One Input device from e.g.:
- Scanner to input/capture images of drawings
- Light pen to draw shapes on screen
- Tracker ball to move pointer
- Graphics tablet to draw shapes/designs

One output device from e.g.:
- Graph plotter to produce hard copy of designs
- High resolution screen (e.g. LCD) to display drawings/designs
- 3D printer to produce model/scale model of design

(b) Six from:
- Uses critical path method/Gantt/PERT charts finding optimum time to be spent on individual stages/find end date
- Critical path specifies the order in which tasks must be completed
- PERT charts specifies the order in which tasks are completed
- Gantt charts help to show progress of individual tasks
- Event chain diagrams for visualising multiple events
- Software helps identify progress made in each task
- Software helps with daily and weekly planning
- Identifying progress/lack of progress helps with planning future tasks/Milestones identified such as module completion
- Some tasks can be done in parallel such as work on different modules
- Other tasks must be done in sequence such as linking modules
- Number of workers/cost of each stage identified - to monitor cost/organise work force
- Use of alarms if stage is late and warning director/project manager report progress at suitable intervals
- Use of calendar software plus appropriate use

2 (a) (i) Two from:
- Voice over Internet Protocol
- Use of computer networks
- Other Internet services are compatible e.g. file exchange and audio conferencing to carry voice/audio conversations
- Can be computer-based or connected to ordinary telephones
- Allows automatic routing of calls/answering services
(ii) Four from:
Can originate from computers/PC/laptops
Telephone number stays with computer/laptop so same number wherever user is in world
Telephone numbers are independent of location so no need to store/use different numbers
Internet phones are portable and can be used anywhere there is broadband connection
Calls can effectively be free
Call forwarding/call waiting/voicemail/caller ID and three-way calling are available
Can have multiple users/two or more participants/ conference calls
Can use existing PCs/network instead of dedicated telephone system
Use of computer networks/internet so cost can be/is free [4]

(b) Four from:
Compresses audio and video from microphone/webcam
Noise cancellation prevents unwanted audio elements
Uses a codec for compression
Compression ratio can be very high/100s to 1
Codec converts audio/video into digital bit stream
Audio and video but stream converted into data packets for transmission over internet
Keeps audio and video synchronised
Use of large screen divided into sections [4]

(c) Four from:
Introduction of high speed communication systems
Introduction of high bandwidth communication systems
Introduction of high performance computer technology
Increased costs of flying/fuel/taxes on flying
Increased awareness of environmental issues so less willing to travel
Increased costs of venues
Increased fear of terrorism so less travel
Company has gone global/globalisation of company so workers all over world [4]
3  (a)  Two from:
   All items/goods/tools bar coded  
   Use of RFID tags
   Bar code/RFID scanners at point of sale as items/goods sold
   [2]

   (b)  Eight from:
   Bar code/RFID scanners at goods-out/sales area read barcode/tag
   Database with items/goods details referenced by bar code/RFID and stock levels and pre-set re-order level
   As bar code/RFID scanned data sent to computer with database
   Item/goods looked up
   If sold number deducted from relevant field/stock level field
   If goods arriving, number added to relevant field/stock level field
   If number in stock reaches/less than pre-set re-order level alert/message/automatic re-order sent
   Re-order level changes when goods sold in great quantities
   Fields include e.g.:
   Bar code
   Number in stock
   Item name
   Location in warehouse
   Re-order level
   Supplier ID
   Supplier name

4  (a)  Two from:
   Storage of company files/data/web site
   Allow access/login by staff using remote devices on network/from internet
   [2]

   (b)  Two from:
   Connect networks into company LAN and to WAN
   Using IP packets to direct computer data to required destination computer of employee
   Provide low level addressing via MAC address
   [2]

   (c)  Two from:
   Interface between network cable and computer
   Prepare and send network traffic
   Receive network traffic and pass it to computer
   [2]

   (d)  Two from:
   provide Wifi
   allow staff use of portable devices/laptops/mobile or cell phones to connect to network
   [2]

   (e)  Two from:
   Provide secure/private transmission of company data between remote locations
   Provide tunnelling using routing protocols to connect company sites together
   [2]
5 Four from, e.g.:
- FTP/ file transfer protocol
to upload data to website
- HTTP/ hypertext transfer protocol
for viewing/displaying content of webpages
- HTTPS/ hypertext transfer protocol secure
for secure transactions/data transfer between web pages
- SSH/ secure shell
to log into remote computers and manage them/execute commands
- Telnet to allow remote access for maintenance/configuration of servers
- TCP/IP Transfer Control Protocol/Internet Protocol
provides end-to-end connectivity specifying how data should be formatted for
transmission/addressed/transmitted/routed/received at destination
- POP3/ Post Office Protocol ver.3
used by email clients to transfer email using TCP/IP
- IMAP/ Internet Message Access Protocol
transfer of email over SSL

Accept other valid protocols [8]

6 (a) Four from:
Use of sensors, two example sensors such as infra-red (sensors) to detect warmer
areas/clouds/fires used for height determination/movements/visible light (sensors) to detect
cloud formations/pollution, to collect data/take measurements
Data sent to computer system
Data converted from analogue to digital with appropriate reason e.g. computers cannot read
analogue data
Computer reads/data into memory/onto storage device
Use of weather balloons
Use of weather satellites [4]

(b) Three from:
Analysis of data using formulas/functions/statistical functions
Data transferred into appropriate software/example software
Graphs/charts drawn to show trends
Tables to show data
Moving/animated presentation for use on TV [3]
7 (a) Four from:
   TV signal from studio sent to uplink dish station by high capacity circuit/microwave/fibre-optic cable
   Signal uplinked to geostationary satellite
   Change of frequency from uplink to downlink
   Signal sent from satellite transponder to viewer’s dish
   Line of sight
   LNB on dish collects signals from satellite
   Cable downlink to receiver box
   Satellite decoder/set top box processes signals for use by TV

(b) Three from:
   May be wrong TV system e.g. analogue v. digital/PAL v. NTSC/SECAM or high definition v. standard definition
   TV channel is scrambled/encrypted and needs a viewing card to decode/decrypt it for viewing
   Channel is not subscribed to by viewer
   Viewing card has not been authorised by provider for use in that particular receiver
   TV not switched on/not connected

8 (a) Max three marks with:

Max two from:
   Computer program/code/application/script/software
      Can replicate itself
      Can send itself/copies to other computer systems/devices

Max two from:
   Can delete files
   Can edit/amend files
   Can replace system files to slow computer/alter behaviour of computer

   Must answer both parts of the question to score full marks

(b) Four from:
   Scan computer’s disks/memory
   Monitor computer ports
     for filenames that match those is a database of viruses
     for suspicious activity by software/applications
   scan files for suspicious code

(c) Three from e.g.:
   Receive/play FM/AM/DAB radio stations that play music
   Play digital/MP3 files using a media player
   Play CDs/DVDs using a media player
   Receive/play streaming audio from a media server
   Receive/play streaming audio from the internet

   Allow other suitable media sources

[Total: 80]