

## Mock Examination Paper

### Full Mock Paper 2

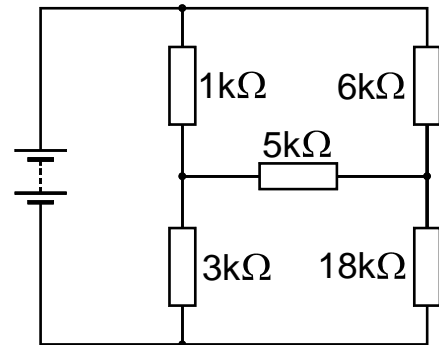
- 1 When operating by voice in a network, 'net', on 5.363MHz the station must be identified  
1A2, 1A5
- A as frequently as practicable.
  - B from time to time.
  - C at least every 15 minutes.
  - D on joining and when leaving it.
- 2 The requirement for a Foundation training course to be formally recognised is that the  
1B1, 1B2
- A successful completion will lead to an Examination Pass Certificate.
  - B course has been registered with the RSGB examination department.
  - C examination has been conducted by a named and Approved Invigilator.
  - D practical assessments have been signed off by a Registered Assessor.
- 3 What precautions must you take in re-transmitting a message which you have received  
1C1, 1C2 via amateur radio and recorded?
- A You must re-transmit the entire incoming transmission exactly as received.
  - B You must contact the intended recipient and agree the message can be sent.
  - C You must remove the callsign of the original sender and replace with your own.
  - D You must ensure that it is clear it is your station that is re-transmitting the message.
- 4 The Amateur Radio Licence requires the holder to ensure that his Radio Equipment does  
1D1 not cause undue interference to any
- A other electronic device.
  - B domestic appliance.
  - C wireless telegraphy.
  - D audio or music equipment.
- 5 When operating a remote station by means of a radio link in an amateur band the link  
1E2 must be
- A suitably encrypted to prevent others accessing the remote transmitter.
  - B on a frequency in an amateur band which is above 30MHz.
  - C limited to a maximum transmit power of 500mW pep e.r.p.
  - D compliant with the licence schedule for the band concerned.

- 6** If you are operating in another CEPT country, which of the following Licence conditions apply?  
**1F1, 1F2**
- A Those of the host country.
  - B Those of the relevant IARU Region.
  - C Those in the UK Full Licence Schedule.
  - D Those in the CEPT Licence Schedule.

- 7** A particular requirement in the 472kHz band is to avoid interference to  
**1G1, 1G2**
- A the national broadcasting service.
  - B the land mobile radio communication service.
  - C the aeronautical radio navigation service.
  - D industrial, scientific and medical equipment.

- 8** The battery in the circuit diagram is 10V but drops by 1% during use. Which statement about the circuit is correct.  
**2B1**

- A The power in the 5k $\Omega$  resistor is unchanged.
- B The power in the 3k $\Omega$  resistor decreases by 1%.
- C The voltage across the 6k $\Omega$  resistor is unchanged.
- D The current through the 18k $\Omega$  resistor decreases by 2%.

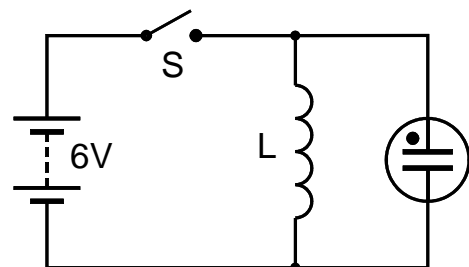


- 9** Two capacitors have identical construction except that one capacitor has an air dielectric and the other a polythene dielectric with a relative permittivity of two. They are connected in series to a voltage source so both capacitors are charged. Which statement about the capacitors is correct?  
**2D1, 2D2, 2D3**

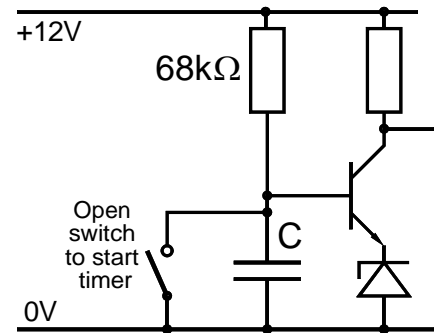
- A The voltage across the two capacitors will be the same.
- B The air spaced capacitor will have the higher voltage.
- C The air spaced capacitor will have the lower voltage.
- D The voltage depends on the distribution of the charge.

- 10** The circuit shows a battery, switch, large inductor and a neon bulb as shown by the circle symbol. Neon bulbs strike at about 70V but will extinguish if the voltage then drops below about 50V. The neon will  
**2D4**

- A flash when the switch S is opened.
- B flash when the switch S is closed.
- C flash when the switch S is opened or closed.
- D not illuminate at all whether switch S is opened or closed.



- 11**  
2D7
- The transistor shown is designed to turn on when its base reaches about 8V. Approximately what value of capacitor will be suitable for a 10 second delay?
- A 150 $\mu$ F  
B 15 $\mu$ F  
C 6.8 $\mu$ F  
D 68 $\mu$ F



- 12**  
2E3, 2E4,  
2E5, 2E6
- An audio signal generator has an output of 3V and is feeding a capacitor. The frequency is doubled. What happens to the current in the capacitor?
- A The current halves.  
B The current reduces by a factor of  $\sqrt{2}$ .  
C The current doubles.  
D The current increases by a factor of  $\sqrt{2}$ .

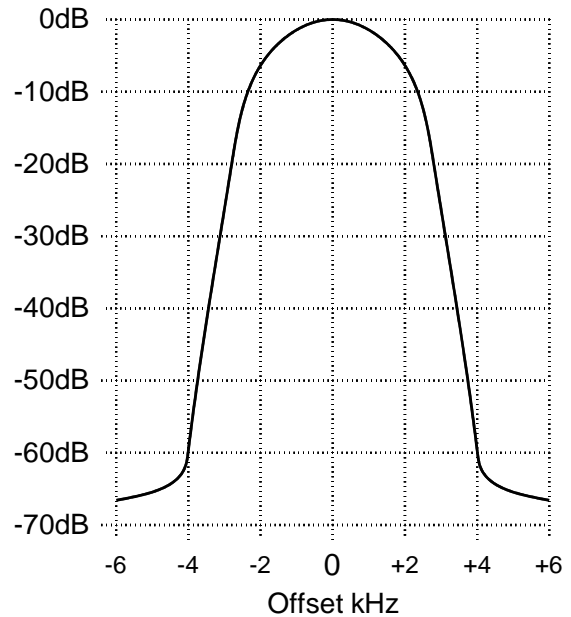
- 13**  
2F1, 2F2
- An audio signal is sampled 9000 times per second. Which signal will result in a 3000Hz alias?
- A 3000Hz  
B 4000Hz  
C 6000Hz  
D 9000Hz

- 14**  
2G1
- The primary winding of a transformer has 80 turns and the secondary has 40 turns. If the input impedance is 250 $\Omega$ , what is the impedance across the secondary terminals?
- A 62.5 $\Omega$   
B 125 $\Omega$   
C 176 $\Omega$   
D 500 $\Omega$

**15** The graph shows the frequency response of a filter. If the centre frequency is 10.7MHz, what is the approximate Q-factor of the filter?

2H1, 2H2,  
2H4, 2H5

- A 3.5
- B 1300
- C 3700
- D 6000



**16** An n-channel depletion mode FET has its source at about 2V (with respect to the 0V common rail) and its drain at about 8V in an amplifier circuit with a 12V supply. What voltage might be expected at the gate?

2I1, 2I3

- A 0.5 V.
- B 2 V.
- C 2.7 V.
- D 7.4 V.

**17** The input resistance of a common-emitter amplifier stage is about

2I4

- A 5Ω.
- B 50Ω.
- C 1kΩ.
- D 200kΩ.

**18** Which one of the following would be most likely be used to maintain a steady output voltage in a mains to 12V DC power supply suitable for an amateur transceiver?

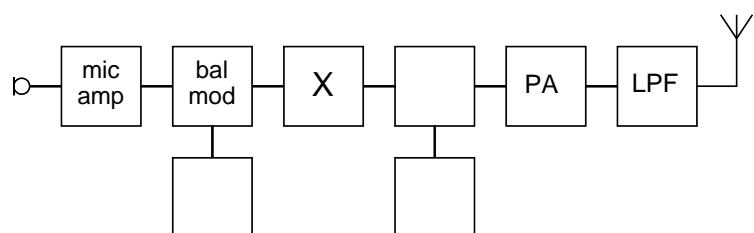
2J2, 2J3,  
2J4

- A a pass transistor and a Zener diode.
- B a step down transformer and a bridge rectifier.
- C a large value reservoir capacitor and a rectifier diode.
- D a bridge rectifier and a large value reservoir capacitor.

**19** In the block diagram of an HF transmitter, what is the box marked X?

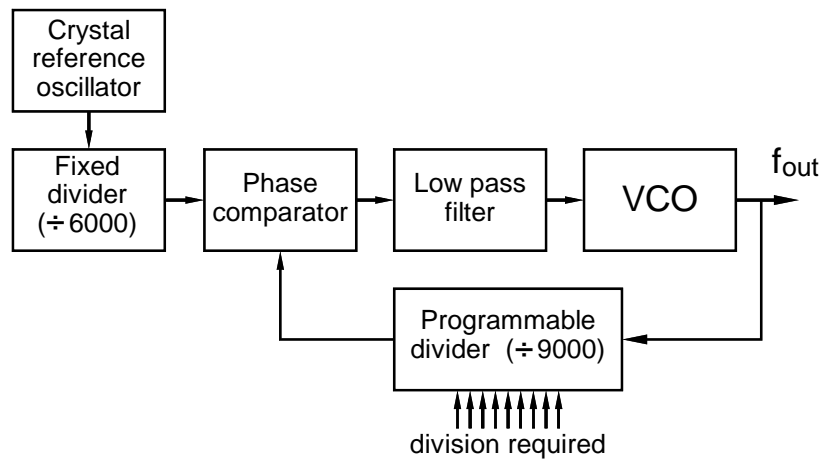
3A1, 3B1

- A the main mixer.
- B a sideband filter.
- C a crystal oscillator.
- D the variable frequency oscillator.



- 20**  
3C1
- A good way of preventing thermal drift in a VFO is to
- A allow the radio to warm up before use.
  - B keep the shack heated at all times.
  - C ensure all oscillator components have a positive temperature coefficient.
  - D design circuits with a balance of components with positive and negative temperature coefficients.

- 21**  
3C3
- In the block diagram shown the crystal oscillator is operating at 6.80MHz. What is the output frequency?
- A 10.2MHz.
  - B 4.53MHz.
  - C 1.13MHz.
  - D 1.13kHz.



- 22**  
3D1,  
3E1, 3E2
- A 13cm transmitter is operating at 2320.974 MHz and uses three stages of multiplication from a crystal oscillator. A likely frequency for the crystal is
- A 89.268 MHz.
  - B 85.962 MHz.
  - C 82.894.MHz.
  - D 92.839 MHz.

- 23**  
3F2, 3F3,  
3F4, 3F5
- Two audio tones of 800Hz and 1350Hz are fed to a well designed SSB modulator with a good sideband filter selecting the upper sideband of a 144.600 MHz suppressed carrier. If the power amplifier is non-linear what unwanted frequency might also be present at the output of the transmitter?
- A 144.60190MHz.
  - B 144.60020MHz.
  - C 144.58650MHz.
  - D 144.60210MHz.

- 24**  
3G1,  
3G2,  
3G3,  
3G4, 3G5
- What type of filters should be used at the output of an HF transmitter which covers all bands from 1.8 MHz to 30 MHz where modulation is achieved on a 6MHz carrier subsequently mixed to the final frequency?
- A A selection of band pass filters.
  - B A 30 MHz low pass filter.
  - C A 30 MHz high pass filter.
  - D A 6 MHz band stop or notch filter.

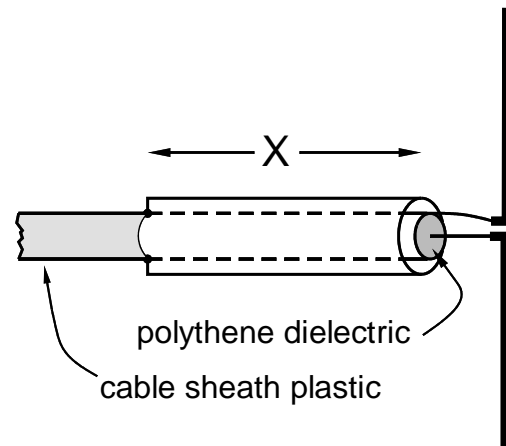


- 25** Which of the following terms describes the ratio of the minimum discernible signal a receiver can detect and the maximum signal that will not be distorted?  
3H3, 3I1
- A sensitivity.
  - B selectivity.
  - C dynamic range.
  - D signal to noise performance.
- 26** In a double conversion superheterodyne receiver the frequency difference between the wanted radio frequency signal and the image frequency is  
3I2, 3I3, 3I4, 3I5
- A twice the wanted radio frequency.
  - B twice the first intermediate frequency
  - C twice the second intermediate frequency.
  - D the sum of the first and second intermediate frequencies.
- 27** It is decided to try moving a 23cm pre-amplifier from the input to the receiver and connect it between the antenna and the feeder to the shack. Doing this  
3J1
- A will have little or no effect.
  - B increase the sensitivity by the gain of the pre-amp.
  - C increase the sensitivity by the loss in the feeder.
  - D reduce the level at which the receiver is overloaded.
- 28** Which of the following modes of transmission requires a carrier insertion oscillator for demodulation?  
3K1, 3L1
- A AM.
  - B FM.
  - C CW.
  - D SSB.
- 29** An SDR receiver has two outputs derived from mixing the incoming signal with two separate local oscillator signals which are ninety degrees offset in phase. The key merit of this approach is that  
3M1, 3M2
- A it allows polarisation diversity to better combat HF fading.
  - B each sideband can be independently demodulated for better signal to noise performance.
  - C the need for automatic level control (ALC) is eliminated.
  - D any type of modulation can be subsequently demodulated by the same processing.

- 30** In order to receive amateur signals on 433MHz using a 28MHz receiver a down-converter must be used. The frequency of the oscillator in the converter will need to be set to
- 3N1, 3N2
- A 28MHz.
  - B 433MHz.
  - C 461MHz.
  - D 489MHz.

- 31** The drawing shows a metal sleeve balun suitable to connect a coaxial cable to a centred half-wave dipole. The distance marked 'X' should be
- 4A3, 4B1

- A  $\lambda/2$  allowing for the permittivity of polythene.
- B  $\lambda/2$  allowing for the permittivity of plastic.
- C  $\lambda/4$  allowing for the permittivity of polythene.
- D  $\lambda/4$  allowing for the permittivity of plastic.



- 32** The length of a half-wave dipole for 7.10MHz in a normal domestic setting is about
- 4D1, 4D2
- A 42.25m.
  - B 21.13m.
  - C 20.07m.
  - D 19.01m.

- 33** If an antenna/feeder system has a return loss of 25dB and the feeder has a loss of 2.5dB, what is the return loss of the antenna itself?
- 4E1, 4E2, 4E3
- A 20dB.
  - B 22.5dB.
  - C 27.5dB.
  - D 30dB.

- 34** A device used to tune out reactance at the feed-point of the antenna systems is known as
- 4F1, 4F2
- A an antenna reactance analyser.
  - B an antenna matching unit.
  - C a return loss bridge.
  - D an SWR meter.



- 35** Which of the following reduces by the inverse square of the distance from the antenna?  
5A1, 5A4
- A SWR.
  - B Field Strength.
  - C Power Flux Density.
  - D Angle of radiation.
- 36** A likely effect of a solar flare is  
5B1, 5B2, 5B3, 5B4
- A an increased probability of sporadic-E.
  - B increased absorption in the D-layer.
  - C enhanced propagation in the F-layer.
  - D a reduction in the critical frequency.
- 37** Auroral flutter is a phenomenon normally  
5C3, 5D1, 5D2
- A experienced in equatorial regions.
  - B seen with particularly quiet solar activity.
  - C associated with vertical curtains in the ionosphere.
  - D indicating propagation along the day/night terminator or 'grey line'.
- 38** Which feature is most likely to affect the immunity of a well-made television receiver?  
6A2
- A use of  $50\Omega$  rather than  $75\Omega$  coax between the antenna and the TV.
  - B a break in the coax screen continuity close to the TV.
  - C reversing the connections of the dipole element to the built in balun.
  - D using a higher gain antenna than the signal strength would indicate.
- 39** A home made transceiver should be made so it complies with  
6A4
- A Interface Requirement IR2027.
  - B the European EMC Directive.
  - C the conditions of the Amateur Licence.
  - D the British Standard for domestic white goods.
- 40** Which sort of modulation is most likely to be associated with blocking in a victim receiver?  
6B1, 6B2,
- A FM.
  - B AM.
  - C SSB.
  - D CW.



- 41** A combined television and sound radio entertainment system has RF breakthrough. It is known that  
**6C1, 6C2**
- there is a single common aerial input fed from a combiner and two antennas
  - removing the antenna plug from the unit has no effect.
  - there is a second set of speakers in another room
- The first step in diagnosing the cause of the problem is to
- A power the system from a different mains socket.
  - B swap the connections of the main speakers and second set on the back of the unit.
  - C transmit on a known problem frequency directly into a dummy load.
  - D replace the second set of speakers with a pair of a higher impedance.
- 42** Which harmonic of a 28MHz signal falls in the Digital Audio Broadcast (DAB) band?  
**6C3**
- A 2<sup>nd</sup>.
  - B 3<sup>rd</sup>.
  - C 5<sup>th</sup>.
  - D 7<sup>th</sup>.
- 43** Which one of the following filters should be fitted into a TV downlead in order to attenuate 145MHz signals?  
**6D1, 6D2**
- A low-pass filter.
  - B high-pass filter.
  - C band-stop filter at 470MHz.
  - D band-pass filter at 145MHz.
- 44** What is the field strength 20m away from an antenna radiating 400W ERP?  
**6E1**
- A 2.6V/m.
  - B 7V/m.
  - C 12V/m.
  - D 140V/m.
- 45** Which of the following dipole antenna feed arrangements is likely to produce least EMC problems when the transmitter is located under one end of the antenna?  
**6E2, 6E3**
- A The shortest length of coaxial feed possible.
  - B The shortest length of balanced feeder possible.
  - C Balanced feeder falling away at right angles from the antenna and buried in the ground leading back to the shack.
  - D Balun with coaxial feeder falling away at right angles from the antenna and buried in the ground leading back to the shack.
- 46** Guidance on installing a transceiver in a vehicle is available from the  
**6F1, 6F2**
- A Code of Practice 1362 from the Federation of Communication Services.
  - B Code of Practice 1362 from the RSGB.
  - C Automobile Association (AA) or Royal Automobile Club (RAC)
  - D Vehicle Certification Agency.

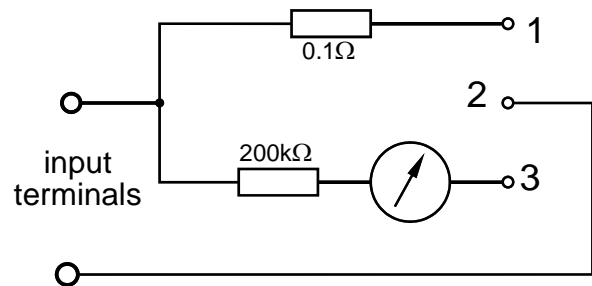


- 47**  
6G1 If you receive a complaint of causing interference, your first action should be to
- A close your station down.
  - B send a report to Ofcom.
  - C seek confirmation of the problem in writing.
  - D seek confirmation of dates and times of the problem.
- 48**  
7A1 What is the purpose of listening a few kHz away from the frequency you are transmitting on?
- A To allow a full duplex contact where you have simultaneous two-way communication.
  - B To avoid listening to local noise, normally from non-radio sources but maintain communication.
  - C To spread out the large number of callers if you are in a sought after location.
  - D To allow full break-in on CW contacts so you are aware of a reply between the very short gaps in sending.
- 49**  
7B1, 7B2, 7H1 Which part of the 5362kHz band is recommended for contacts between two UK amateurs?
- A 5362.0 – 5374.5kHz.
  - B 5351.5 – 5366.5kHz.
  - C 5362.0 – 5366.5kHz.
  - D 5366.5 – 5374.5kHz.
- 50**  
8A1, 8A2, 8A6 A specific point about a Protective Multiple Earth (PME) supply is that
- A each premises must provide its own earth rod.
  - B the house Earth wire is connected to the company Neutral.
  - C the house earth is carefully isolated from the company Earth.
  - D the company Earth wire is earthed at many points along the street.
- 51**  
8D1, 8E1 Advice of the safe RF field strength levels for human exposure can be found from the
- A RoSPA.
  - B NHS.
  - C ICNIRP.
  - D RSGB.
- 52**  
8F4, 8F5 You intend to set up a temporary HF station at your local Scout campsite. Before doing so it is important to check
- A there is no risk of thunderstorms during the event.
  - B there is a clear take off from the roof to ensure good line of sight contacts.
  - C the mains supply will deliver sufficient current for the equipment involved.
  - D the RSGB propagation forecast to ensure good international contacts.

- 53** The factors that must be covered in a risk assessment are  
**8F6, 8F7** A nature of risk, probability of occurrence, severity of outcome, mitigating and remedial measures.  
 B nature of risk, people at risk, insurance cover, reporting chain.  
 C number of safety staff, location of safety staff, public to staff ratio.  
 D training requirements, first aid facilities, casualty transport, location of accident and emergency centres.

- 54** In the circuit shown, which connections should be made to allow the meter to act as a voltmeter?  
**9A1, 9A3**

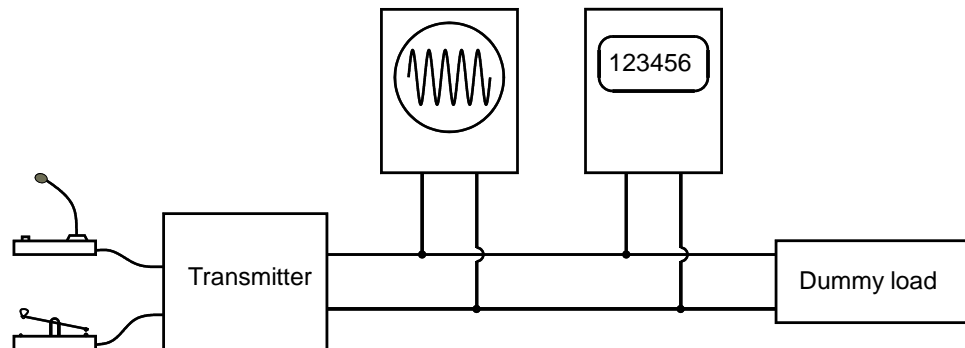
- A 1 to 2.  
 B 1 to 3.  
 C 2 to 3.  
 D 1 to 2 to 3.



- 55** A transmitter is being set up to give 10W pep on SSB. A good RF rms voltmeter is used to measure a steady CW signal into a matched dummy load and the signal viewed on an uncalibrated oscilloscope.  
**9A4, 9A5**

The transmitter is then set to SSB and adjusted so the peaks are the same level as previously displayed by the CW signal. For 10W pep, what reading should be set on the RF voltmeter during the CW phase?

- A 11V.  
 B 16V.  
 C 22V.  
 D 32V.



- 56** To increase the height of a small AC waveform viewed on an oscilloscope display you would need to adjust the setting of the  
**9A6, 9A7, 9A8, 9A9**

- A X axis to give less time per division.  
 B X axis to give more time per division.  
 C Y axis to give less volts per division.  
 D Y axis to give more volts per division.



- 57**  
9B1 A signal generator has a calibrated  $50\Omega$  source impedance and is delivering  $10\mu\text{V}$  to a high impedance microvolt meter. It is then connected to a calibrated  $50\Omega$  dummy load. What power will be dissipated in the dummy load?
- A -100dBW.
  - B -93dBm.
  - C -57dBm.
  - D -87dBm.
- 58**  
2A1, 9C1 A 6MHz crystal oscillator is used to drive a multiplier chain to produce a 144MHz carrier which will be used for a beacon transmitter. The crystal is specified as 0.5ppm (parts per million) when supplied, aging at a rate of 0.3ppm per year. The project is completed exactly one year later. How far out might the 144MHz transmission be?
- A 3.0Hz.
  - B 4.8Hz.
  - C 72Hz.
  - D 115Hz.



### Answer keys

1	2	3	4	5	6	7	8	9
D	A	D	C	D	A	C	A	B
10	11	12	13	14	15	16	17	18
A	A	C	C	A	C	A	C	A
19	20	21	22	23	24	25	26	27
B	D	A	B	A	B	C	B	C
28	29	30	31	32	33	34	35	36
D	D	C	D	C	A	B	C	B
37	38	39	40	41	42	43	44	45
C	B	C	A	C	D	B	B	D
46	47	48	49	50	51	52	53	54
A	D	C	D	B	C	C	A	C
55	56	57	58					
C	C	B	D					