1. The Amateur's Radio Equipment must NOT be used for

    a) beacons and packet radio
    b) business or advertising
    c) foxhunts and DF events
    d) AM operations below 30 MHz

2. The callsign M3ABC/A indicates

    a) a Foundation licensee in a premises which is not their main station address.
    b) a Foundation licensee in a temporary location such as camping in a farm field.
    c) an Intermediate licensee in a premises which is not their main station address.
    d) That is acceptable as it is a new business and it takes time to afford business radios.

3. If you have NOT changed your address or other details of you licence, you must confirm to Ofcom that the details are still correct

    a) within 3 years of the last date of notification to Ofcom
    b) within 5 years of the last date of notification to Ofcom
    c) within 2 years of the last date of notification to Ofcom
    d) every year after the last date of notification to Ofcom

4. When borrowing a digital voice handheld radio from a friend one of the things that must be checked is that

    a) the correct encryption method for the particular talk group has been set up
    b) the embedded digital callsign is changed to show and transit your callsign
    c) the relevant CTCSS tones for the area of operation are correctly selected
    d) the frequencies for the activity concerned are stored in accessible memories

5. You are arranging a Jamboree-On-The-Air to allow a local scout troop to experience amateur radio. To do this you must

    a) ensure the operation is carried out under a Club Licence.
    b) advise the scout leaders that those speaking on-air must be 14 years of age or over.
    c) ensure those who will supervise the scouts on-air all hold a Full Licence.
    d) advise Ofcom, via the RSGB, of the proposed event.

6. If your reply to a transmission is of a menacing character, then it is possible that you will have contravened the

    a) Wireless Telegraphy Act 2006.
    b) Communications Act 2003.
    c) Wireless Telegraphy (Content of Transmission) Act 1988.
    d) Wireless Telegraphy (Content of Transmission) Regulations 1988.

7. A condition of your licence is that you must not cause Undue Interference. Where will you find guidance as to what this requirement means?

    a) The Wireless Telegraphy Act 2006.
    b) The Communications Act 2003.
    c) The Office of Communications Act 2002.
    d) The European Radio Emissions Directive 2005.

8. To control your remote station from your main station your communication link within an amateur band

    a) you must use Morse code.
    b) you may encrypt the communication link.
    c) you must not encrypt the communication link.
    d) you must encrypt the communication link.

9. When you are operating in a CEPT country you must

    a) Unless otherwise instructed use the suffix of the host country.
    b) Present your license to the relevant supervisory authority upon request.
    c) Comply with the wireless telegraphy act 2006 in the host country.
    d) Obtain written permission from the host country prior to transmitting.

10. You MUST keep a Log of your transmissions when

    a) asked by the master of a vessel
    b) at sea on international waters
    c) in the territorial waters of a CEPT country
    d) at sea in a different ITU Region to that of your licence

11. What restrictions apply to unattended automatic position reporting on 144.800MHz if you are not in a geographically restricted temporary location?

a) Operation while maritime mobile is not permitted.
b) The maximum transmitted power is limited to 25W eirp.
c) It must be possible to switch off within 2 hours of a demand.
d) Operation is limited to a maximum period of 30 minutes.

12. An amateur must ensure that possible exposure to electro-magnetic fields from their station is within the ICNIRP guidelines in

a) areas accessible to the general public.
b) the amateur's own enclosed garden.
c) areas accessible to wild animals.
d) all areas near the station, accessible or not.

13. VE is the call sign prefix for an amateur in

a) USA
b) the Netherlands
c) New Zealand
d) Canada

14. Somebody keeps interrupting your transmission on 2m SSB saying Foundation licensees are not allowed on SSB and is getting quite rude. You should

a) pretend you cannot hear them and change frequency if necessary
b) rudely tell them the frequency is in use
c) pointedly suggest they go somewhere else
d) reply suggesting they go and read their licence which is the same as yours

15. The recommended maximum bandwidth on 473.5kHz is

a) 3kHz.
b) 1.5kHz.
c) 500Hz.
d) 200Hz.

16. Which of the following is a reason to have a special event callsign?

a) To make more contacts in a single operator contest
b) To explain amateur radio to one of your friends at your home
c) To mark the 100th anniversary of the opening of a public park
d) You would like to use a special event callsign to make more contacts

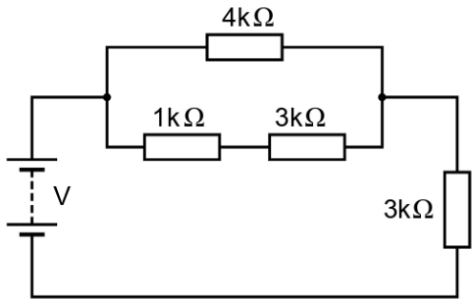
17. To transmit and receive PSK31, in addition to a transmitter, receiver, feeder and antenna you need a

a) microphone
b) camera
c) personal computer with a suitable interface
d) Morse key and oscillator

18. When operating via satellite it is found necessary to keep readjusting the received frequency. This is because the

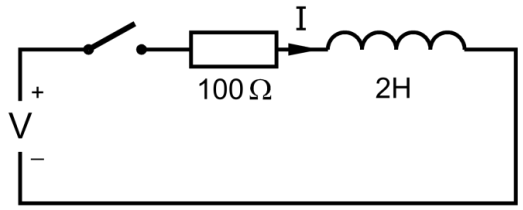
a) large temperature changes on the satellite cause frequency drift
b) movement of the satellite affects the received frequency
c) very long propagation path can cause frequency changes
d) narrow range of frequencies available must be shared between all the users

19. The 1kΩ resistor is dissipating 2W of heat. What is the dissipation in the 4kΩ resistor?



a) 6W
b) 8W
c) 12W
d) 40W

20. The switch in the diagram is closed at time t=0. After approximately how long will the current drawn from the battery be given by I = (2/3) × V/R?



a) 500ms
b) 200ms
c) 50ms
d) 20ms

21. Part of a circuit is fed from the positive power rail through a coil of about ten turns wound on a small ferrite rod. What is the function of this coil?

a) To supply DC power to the circuit but minimise unwanted RF getting in or out.
b) To avoid the possibility of a high gain amplifier from bursting into RF oscillation.
c) To improve the voltage regulation of the power supply to that part of the circuit.
d) To reduce the level of phase noise and consequent impairment of the signal to noise ratio.

22. Your receiver is picking up a frequency of 1.5MHz. What is the wavelength corresponding to this frequency?

a) 190m
b) 210m
c) 180m
d) 200m

23. In a sampled system the sampling rate is 10kHz. To avoid signal aliasing a low pass filter is placed before the ADC. The filter cut-off frequency must be between

a) 5kHz and 7.5kHz.
b) 0Hz and 5kHz.
c) 10kHz and 20kHz.
d) 7.5kHz and 10kHz.

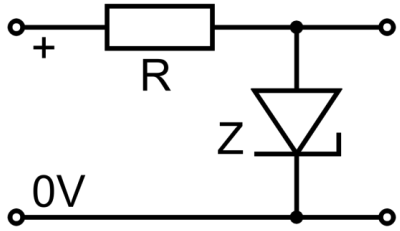
24. It is found that when adding an HF power amplifier to the existing installation the ferrite balun feeding the twin-open wire feeder is getting hot, but the matching was good previously. A good way to resolve the problem is to

a) reduce the number of primary turns.
b) increase the number of primary turns.
c) replace the balun with one having a larger ferrite core.
d) replace the balun with one having a smaller ferrite core.

25. At resonance a parallel tuned circuit can appear as a pure resistance which is often termed the

a) parallel resistance
b) resonant resistance
c) dynamic resistance
d) apparent resistance

26. The diode in this circuit is a Zener diode with a reverse breakdown voltage of 9V and the resistor is 1kΩ. The circuit is fed from a 13.8V supply. What is the actual output voltage of the circuit shown?



a) 13.8V
b) 9V
c) 4.8V
d) 0.7V

27. If the attenuation in the tuned circuit feedback of an oscillator is greater than the gain of the transistor amplifier then

a) there will be excessive noise on the output signal.
b) the amplitude of oscillation will be poorly controlled.
c) the frequency of oscillation will be unstable.
d) it is likely the circuit will fail to oscillate.

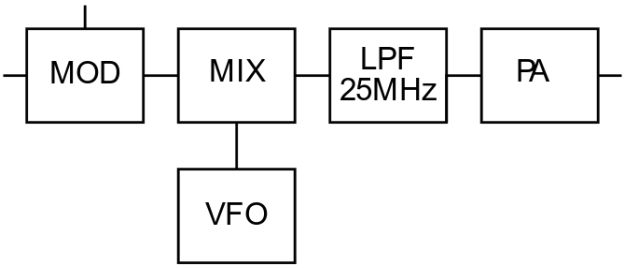
28. A key difference between a switched mode power supply and a linear one is that

a) the voltage step down transformer in a switched mode PSU operates at several tens of kilohertz.
b) the series pass transistor in a switched mode PSU is in emitter follower mode.
c) the smoothing capacitors on the output of a switched mode PSU operate at 100Hz rather than 50Hz
d) unlike a linear PSU a switched mode PSU has no need for harmonic filtering to avoid EMC problems.

29. In an SSB transmission the total radiated power is

a) contained wholly within one sideband with no power in the carrier or the other sideband.
b) split between both sidebands with minimal power contained in the carrier itself.
c) contained wholly in the carrier when there is no audio signal at that moment in time.
d) the sum of both sidebands and the carrier which contains at least 50% of the power.

30. The diagram shows part of a transmitter for the 21MHz band. The modulator is operating at 8MHz. A good choice of frequency for the VFO is

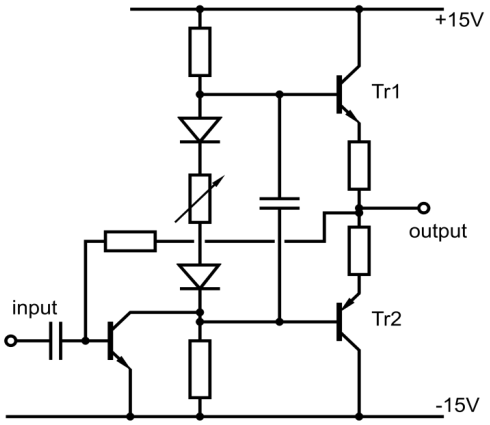


a) 29MHz
b) 21MHz
c) 13MHz
d) 5MHz

31. What is the purpose of the low pass filter in a direct digital synthesiser?

a) To remove frequencies associated with the step nature of the signal from the DAC.
b) To remove the effects of minor frequency variations associated with the phase comparator.
c) To minimise the effect of requesting a fast rate of tuning to a different output frequency.
d) To ensure the output frequency of the wanted signal remains stable and accurate.

32. The circuit diagram shows part of a push-pull amplifier. What will happen if the variable resistor is increased in value?



a) The balance of the currents through the two output transistors will change.
b) The balance of voltages across the two output transistors will change.
c) The standing or quiescent current through the output transistors will decrease.
d) The standing or quiescent current through the output transistors will increase.

33. An FET HF RF power amplifier occasionally suffers from parasitic oscillation at a frequency much higher than the designed operating frequency. Which of the four options is most likely to be successful?

a) A low value resistor in series with a capacitor of around 10nF from the drain of the FET to the 0V line.
b) A capacitor from the drain of the FET to the 0V line of a value around half of that of the capacitors used in the resonant circuits.
c) A low value capacitor in series with the FET gate mounted as close to the gate as possible.
d) An inductor with a reactance of about 50 ohms from the drain of the FET to the 0V line.

34. It is noticed that the noise floor is raised over much of an amateur band when a very strong HF broadcast signal is operating on a nearby frequency just outside the amateur band. The most probable mechanism for this effect is

a) the strong signal is affecting the AGC causing the associated s-meter to indicate an increase in the noise.
b) phase noise on the broadcast signal is extending further out from the wanted transmitted signal than normal.
c) that overloading in the receiver front end is generating lots of intermodulation products which are seen as RF noise.
d) the broadcast transmitter power amplifier is being driven slightly harder than intended causing splatter.

35. As well as quoting the noise level in dBc/Hz what other factor must be quoted for the figure to be usable?

a) The type of modulation concerned.
b) The bandwidth of the transmission.
c) The actual power level of the carrier.
d) The frequency offset from the carrier.

36. A 70cm receiver has a long feeder to an antenna at the far end of the garden. To improve reception of weak signals a good pre-amp is fitted alongside the receiver. The improvement in signal to noise ratio is noticeable but not impressive, certainly only a fraction of the expected improvement given the gain of the pre-amp. To try to further improve matters it is worth

a) swapping the pre-amp for one of a higher gain.
b) moving the pre-amp to the antenna end of the main feeder.
c) fitting a high-pass filter to remove signals at 2m and below.
d) running the feeder at least 20cm deep in the soil.

37. What does the term 'decay' refer to in the operation of the AGC of a receiver?

a) The loss of sensitivity of a receiver when subject to repetitive noise spikes.
b) The 'max hold' time of the signal level indicator to allow pep measurement.
c) The time taken for the IF amplifiers to achieve maximum gain.
d) The way in which the audio is muted following a large RF noise spike.

38. Which type of filter offers the sharpest response so that the signal is rapidly attenuated outside the wanted pass-band?

a) a digital filter.
b) a parallel tuned circuit.
c) an LC notch filter.
d) a series tuned circuit.

39. In a transceiver the IF stage of the receiver

a) is often powered down when on transmit especially if it is normally run from batteries.
b) is often used to limit the bandwidth and spurious modulation products on transmit.
c) can utilise the AGC system to control the transmitter output power.
d) can double as the driver stage to the transmitter power amplifier.

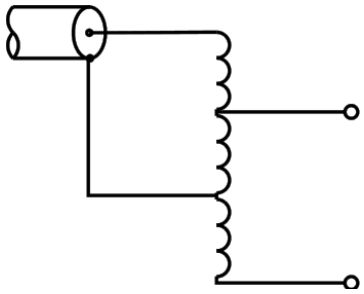
40. A transmitter is supplying 100W of power to a feeder of loss 6dB. The power lost in the feeder is

a) 25W
b) 100W
c) 50W
d) 75W

41. A VHF FM broadcast programme on 100MHz is suffering interference from a 2m transmission nearby. A stub filter is proposed, a length of solid polythene dielectric coaxial cable to be connected in parallel with the existing feeder from the aerial in the roof. The coax stub should be about

a) 52cm long and open circuit at the free end.
b) 52cm long and short circuit at the free end.
c) 34cm long and open circuit at the free end.
d) 34cm long and short circuit at the free end.

42.The circuit is a



a) 4:1 balun
b) low-pass filter
c) braid-breaker filter
d) 1:1 balun

43.When fed with the same RF power, an isotropic antenna radiates

a) more power than a Yagi in the forward direction
b) the same power as a Yagi in the forward direction
c) the same power in all directions
d) less power towards the rear

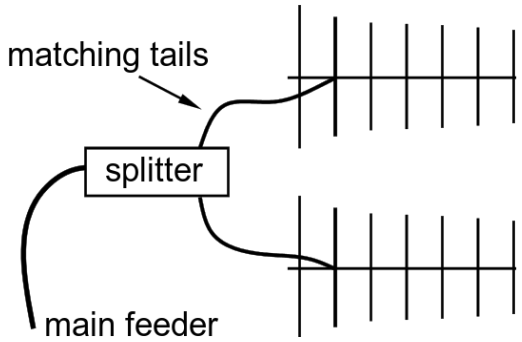
44.Typically reducing the height of an HF horizontal dipole will

a) reduce the angle of radiation resulting in an increased range
b) increase the angle of radiation resulting in an increased range
c) increase the angle of radiation resulting in a reduced range
d) reduce the angle of radiation resulting in a reduced range

45.A directional power meter shows 400W from the transmitter and 25W reflected from the antenna. An SWR meter is then substituted for the power meter. What approximate reading is expected?

a) 4 : 1
b) 16 : 1
c) 1.1 : 1
d) 1.7 : 1

46. Two 50Ω Yagi antennas are connected by a λ/4 splitter to match 50Ω feeder. The characteristic impedance of the two λ/4 sections should be about



a) 50Ω
b) 35Ω
c) 70Ω
d) 100Ω

47. Which one of the following is used to connect RF coaxial cable to an antenna socket?

a) PL259 plug
b) 3.5mm jack plug
c) Banana plug
d) Phono plug

48. Why is circular polarisation advantageous when communicating through or with a satellites

a) Circular polarisation needs less power
b) The orientation of the satellite antenna is changing
c) The satellite is in a circular orbit
d) Circularly polarised signals will not bounce off the atmosphere

49.Why does an increase in sunspots tend to increase the MUF?

a) Ultra-violet radiation from sunspots is much higher than from the normal sun surface so the level of ionisation increases leading to an increase in the MUF.
b) Sunspots emit vast levels of charged particles which, after a two day journey, reach the earth decreasing ionisation and causing an increase in the MUF.
c) Sunspots are much cooler than the rest of the sun's surface so reduce the overall amount of ultra-violet radiation which disturbs the ionosphere, allowing the MUF to increase normally.
d) Sunspots have an intense magnetic field which interacts with the earth's magnetic field enhancing the susceptibility of the ionosphere to ultra-violet radiation and increasing the MUF.

50.NVIS contacts are usually possible

a) on bands above 30MHz.
b) on the lower HF bands.
c) only well after sunset.
d) only during the day.

51.If an RF link between the distant transmitter and local receiver suffers from multipath propagation then

a) it is likely that the signal has been reflected off the troposphere.
b) the receiver will get a direct signal and a number of reflected signals.
c) there is an increased risk of adjacent channel interference.
d) another transmitter may be operating on the same frequency.

52.Which one of the items below SHOULD NOT be included when calculating a link budget?

a) RF power amplifier gain.
b) Spreading loss.
c) Antenna gain.
d) Feeder loss.

53. An alarm system claims to meet the various standards including EMC and there is no reason to doubt that. However it is found to react to a neighbour's radio transmissions on several HF bands. Why might that be?

a) The alarm is good but it has been installed poorly with many unscreened wires.
b) It is more than 12 months old and the guarantee has expired.
c) The transmissions happen to be on the image frequency of the alarm.
d) The pickup on the alarm wires is differential mode interference.

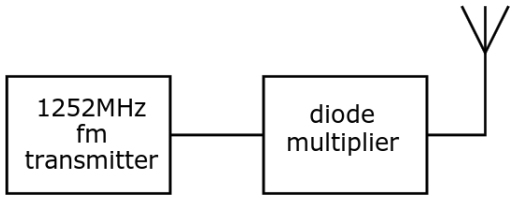
54. Which one of the following is most likely to be the source of interference to other domestic appliances?

a) A television
b) A cassette recorder
c) An electric drill
d) A DVD player

55. A neighbour says that when they put their mobile phone down next to the radio in the kitchen that they get occasional buzzing sounds from the radio. You should advise them that

a) the phone might be faulty and return it to the dealer they got it from.
b) this is normal and is simply the mobile phone maintaining contact with the cellular network.
c) they should get in touch with their mobile phone company to get the problem fixed.
d) there could be a fault with their radio receiver because it operates on different frequencies and should not be affected.

56. The diagram shows a transmitter operating at 1252MHz, feeding a diode multiplier circuit with an output in the 10GHz amateur band. The actual output will be on a frequency of



a) 10.000GHz
b) 12.520GHz
c) 10.125GHz
d) 10.016GHz

57. A domestic VHF FM radio receiver is noticeably more sensitive to interference from a neighbour's HF transmitter when on the 3.5MHz band than on other HF bands. This is likely to be due to

a) the polar diagram of the amateur antenna having a lobe in the direction of the VHF radio
b) a harmonic of the transmission getting into receiver IF stages
c) the dimensions of the receiver being such that direct pick-up is more efficient
d) the house mains wiring being resonant at that frequency

58. Tests on a domestic medium wave radio using an external aerial show it is picking up interference from HF transmissions from a nearby amateur. A suitable filter would be

a) a high pass filter in the domestic radio aerial lead
b) an HF band pass filter in the amateur transmitter feeder
c) a low pass filter in the domestic radio aerial lead
d) an MF band stop filter in the amateur transmitter feeder

59. One of the best methods of checking an amateur transmission for harmonics is to tune over the RF spectrum with

a) an RF signal generator
b) an absorption wavemeter
c) a general coverage receiver
d) a small neon lamp connected to a loop of wire

60. A UHF transmitter on a hilltop has a clear view. A measuring receiver with an antenna mounted clear of ground effects 1km away records a signal strength of 300mV/m. What will the signal strength be at 2km?

a) 75mV/m
b) 106mV/m
c) 150mV/m
d) 212V/m

61. The Code of Practice for installing radio transmitting equipment in a vehicle recommends (in negative chassis vehicles) that the negative lead from the transmitter is connected to the chassis close to where the battery negative connects to the chassis. Why might that be so?

a) The chassis may contain parts bolted together which are exposed to dirt and wet potentially setting up 'rusty bolt' non-linear conduction and consequent risk of intermodulation products on transmit.
b) If the negative lead went elsewhere there is a common return path for the transmitter current and other vehicle electronics and thus a fluctuating voltage drop and possibility of RF ingress to other devices.
c) Not all vehicles have a metal chassis so the continuity of a return path for chassis currents can be guaranteed, particularly for higher currents drawn by the more powerful transmitters.
d) High currents in the chassis can give rise to galvanic corrosion, which, in time, could either weaken the mechanical integrity of the vehicle or result in heating in higher resistance paths.

62. If you keep a log of all transmissions and you receive a complaint of interference you can

a) see if only certain modes of transmission are causing an EMC problem
b) compare the times of your transmissions to those of the alleged interference
c) see if only certain bands are causing an EMC problem
d) check all of these possibilities

63. When might it be appropriate to disconnect the mains earth wire inside a 3-pin mains plug?

a) If RF is getting back into the mains from a transmitter.
b) When connecting it to a local RF earth.
c) When the power is supplied by overhead cables.
d) Never under any circumstances.

64. Most amateur satellites

a) orbit the Earth and are only in view at certain times
b) remain in view of their coverage at all times
c) appear to be fixed above a particular point on the Earth
d) are at heights of at least 500km

65. Charging or over-charging a 12V vehicle battery can result in it giving off

a) ammonia
b) carbon dioxide
c) hydrogen
d) oxygen

66. The most serious consequence of the careless use of screwdrivers, saws and files is

a) the job being ruined
b) an injury to the user
c) the tool being damaged
d) poor workmanship

67. When erecting antennas

a) guy ropes are rarely necessary
b) they should always be sited close to a building
c) safety is the most important concern
d) a good earth is always required

68. It is unwise, when transmitting, to touch the

a) coaxial feeder.
b) transmitter.
c) PTT.
d) antenna.

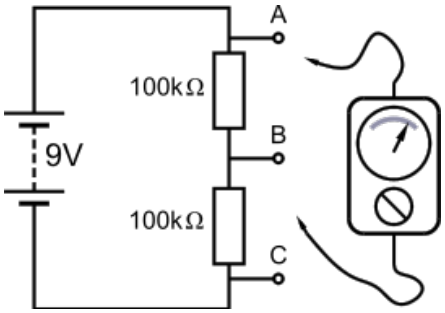
69. Which of the following statements concerning the protection of an amateur radio station from a direct lightning strike is true?

a) You should switch off the mains where it enters the property where the station is located.
b) You should make sure your antenna is lower than your TV aerial.
c) You cannot take any precautions even with regards to distant lightning strikes.
d) You cannot protect against a direct strike.

70.A risk assessment should be carried out

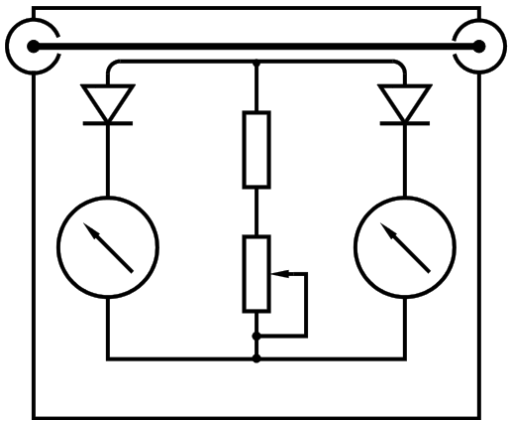
a) as part of the normal planning for any event.
b) immediately after an accident when all the details are fresh.
c) when requested by an appropriate authority.
d) in response to a third party claim following an incident.

71.A voltmeter comprises a microammeter and a series 'multiplier' resistor. The reading between points A and C is 9V. Between A and B it is 3V and between B and C it is 3V. What is the value of the multiplier resistor?



a) 50kΩ
b) 100kΩ
c) 200kΩ
d) over 1MΩ

72.What device is shown in the circuit diagram?



a) Deviation monitor
b) Heterodyne wave-meter
c) Absorption wave-meter
d) SWR meter

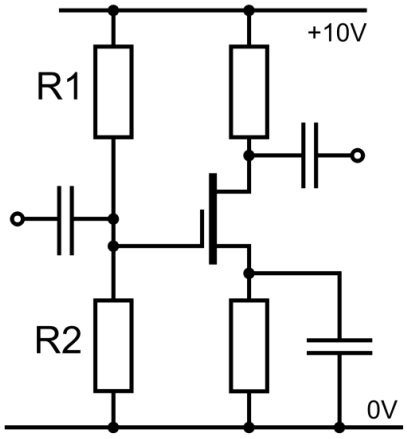
73. An oscilloscope is displaying an AC signal showing 5 cycles across 5 divisions on the x-axis of the screen. The time base is set to 50μs per division. What is the frequency of the AC signal?

a) 100Hz
b) 250kHz
c) 20kHz
d) 200kHz

74. An RF preamplifier is required to bring the 0.2μV signal from the antenna to the 8μV required by the main receiver for best noise performance. What is the preamplifier gain?

a) 16dB
b) 19dB
c) 29dB
d) 32dB

75. The drawing shows an FET circuit biased by R1 and R2. R1 is 80kΩ and R2 is 20kΩ. Both resistors are 10% tolerance. The bias voltage might be lower than its design value by a maximum of



a) 100 mV
b) 180 mV
c) 200 mV
d) 300 mV