The AhaBulb Party Game

STUFF EVERY EXTRA CLASS HAM SHOULD KNOW

How to play (30 seconds)

1. The reader reads a card and its three answers out loud.
2. Everyone says "One, two, three, Goldilocks!" and holds up 1, 2, or 3 fingers.
3. The reader flips the card and reads the answer and the Why.
4. Everyone who was right takes a point.
5. The reader reads the joke with a straight face. Anyone laughs or groans? The reader takes a point. Nobody got it right? The reader takes a point.
6. Pass the deck left. Most points when the points run out wins.

What you need

These cards and the point tokens on the last two pages. No tokens? Use coins, buttons, pebbles, or marshmallows. 3 to 10 players, ages 8 and up.

Expert rule: Bet It

Before the reader flips the card, you may put one of your points on your answer. Right: take your normal point plus one extra. Wrong: your bet goes back to the pile. That's it.

Printing

Print single-sided, on cardstock if you have it. Cut on the dashed lines. Each card is a 3.5 x 5 inch index card. The answer half is upside down on purpose, so the table can't peek.

Cards 1 to 50 of 92. More cards and the free daily online game at sesk.info. Built 2026-10-14.

HAM RADIO

How tall may an antenna used on the 2200 m and 630 m bands be above ground?

- **A** No more than 100 meters
- **B** No more than 60 meters
- **C** No more than 30 meters

FLIP FOR THE ANSWER

B **No more than 60 meters**

WHY Rule 97.15(c) says antennas used to transmit on the 2200 m and 630 m bands must not exceed 60 meters above ground level. That is about 197 feet.

STRAIGHT FACE
If your antenna didn't fall down last winter then it's too small.

SESK.INFO #4534

HAM RADIO

Outside parts of Alaska, what is the maximum radiated power allowed on the 630 m amateur band?

- **A** 5 W EIRP
- **B** 1 W EIRP
- **C** 500 W EIRP

FLIP FOR THE ANSWER

A **5 W EIRP**

WHY Rule 97.313(l) caps 630 m at 500 W PEP from the transmitter and 5 W EIRP radiated. Stations in Alaska within 800 km of Russia are held to 1 W EIRP.

STRAIGHT FACE
You have more wire run than the Power Company does.

SESK.INFO #4533

HAM RADIO

A remotely controlled station loses its control link. How long may it keep transmitting?

- **A** No more than 3 minutes
- **B** No more than 30 seconds
- **C** No more than 10 minutes

FLIP FOR THE ANSWER

A **No more than 3 minutes**

WHY Rule 97.213(b) requires provisions built into the station that limit transmission to no more than 3 minutes if the control link malfunctions. That keeps an unattended station from staying on the air with nobody in charge.

STRAIGHT FACE
My wife said that if I transmit one more time, she's going to leave me... Over.

SESK.INFO #4536

HAM RADIO

What is the maximum bandwidth an emission may occupy on the 60 m band?

- **A** 500 Hz
- **B** 6 kHz
- **C** 2.8 kHz

FLIP FOR THE ANSWER

C **2.8 kHz**

WHY Rule 97.303(h) says amateur emissions on 60 m may not occupy more than 2.8 kHz. That is about the width of one SSB voice signal or a typical digital mode.

STRAIGHT FACE
Your parrot squawks, "CQ, CQ, DE Polly!"

SESK.INFO #4535

HAM RADIO

What is the maximum transmitter power for amateur telecommand of a model craft?

- **A** 5 W
- **B** 1 W
- **C** 10 W

FLIP FOR THE ANSWER

B 1 W

WHY Rule 97.215(c) limits a model craft telecommand transmitter to 1 W. It must also carry a label with your call sign, name and address.

STRAIGHT FACE
You use your fishing rods for 20 Meter verticals on camping and fishing trips.

SESK.INFO #4537

HAM RADIO

Who must approve an amateur station operating aboard a ship or aircraft?

- **A** The nearest FCC field office
- **B** The harbor or airport authority
- **C** The ship's master or the aircraft's pilot in command

FLIP FOR THE ANSWER

C The ship's master or the aircraft's pilot in command

WHY Rule 97.11(a) says a station aboard a ship or aircraft must be approved by the master of the ship or the pilot in command. The captain is responsible for the vessel and its safety.

STRAIGHT FACE
Your battery goes dead because you forgot to start the car before the long QSO.

SESK.INFO #4538

HAM RADIO

For a transmitter installed after January 1, 2003, below 30 MHz, how far below the fundamental must spurious emissions be?

- **A** At least 43 dB below
- **B** At least 20 dB below
- **C** At least 60 dB below

FLIP FOR THE ANSWER

A At least 43 dB below

WHY Rule 97.307(d) requires spurious emissions from newer HF transmitters to be at least 43 dB below the mean power of the fundamental. The 60 dB figure belongs to 30 to 225 MHz.

STRAIGHT FACE
What did Johnny's mother do when she caught him zapping the other children with static electricity? She grounded him.

SESK.INFO #4539

HAM RADIO

Antenna structures taller than what height above ground trigger FAA notification and FCC registration rules?

- **A** 100 feet (30.5 meters)
- **B** 200 feet (60.96 meters)
- **C** 500 feet (152 meters)

FLIP FOR THE ANSWER

B 200 feet (60.96 meters)

WHY Rule 97.15(a) points owners of certain antenna structures to Part 17 when the structure is more than 60.96 meters (200 feet) above ground, or is near or at a public use airport.

STRAIGHT FACE
Your spouse wants to know why you are putting the clothes lines up so high.

SESK.INFO #4540

HAM RADIO

How many volunteer examiners must administer an amateur radio exam session?

- **A** A team of at least 2
- **B** A team of at least 5
- **C** A team of at least 3

FLIP FOR THE ANSWER

C A team of at least 3

WHY Rule 97.509(a) says each exam must be administered by a team of at least 3 VEs at a session coordinated by a VEC. Each administering VE must be accredited by the coordinating VEC.

STRAIGHT FACE
A town with two hams has one radio club. A town with three hams has two radio clubs.

SESK.INFO #4544

HAM RADIO

Besides an amateur license, what must a RACES control operator have?

- **A** A separate RACES license from the FCC
- **B** Enrollment in a civil defense organization
- **C** ARRL membership

FLIP FOR THE ANSWER

B Enrollment in a civil defense organization

WHY Rule 97.407(a) says a RACES control operator must hold an FCC amateur license and be certified by a civil defense organization as enrolled in it. No separate RACES license exists.

STRAIGHT FACE
There's a blackout and the Power Company calls YOU to complain.

SESK.INFO #4543

HAM RADIO

Amateurs may not transmit north of Line A in which UHF segment?

- **A** 420 to 430 MHz
- **B** 430 to 440 MHz
- **C** 440 to 450 MHz

FLIP FOR THE ANSWER

A 420 to 430 MHz

WHY Rule 97.303(m)(1) says no amateur station shall transmit from north of Line A in the 420-430 MHz segment. Line A is defined in 97.3(a).

STRAIGHT FACE
You say, "QRZ" when you answer the telephone.

SESK.INFO #4542

HAM RADIO

After notifying the UTC, how long before you may begin operating on 630 m or 2200 m?

- **A** After 24 hours
- **B** After 90 days
- **C** After 30 days, unless UTC flags a nearby PLC system

FLIP FOR THE ANSWER

C After 30 days, unless UTC flags a nearby PLC system

WHY Rule 97.303(g) requires notifying the Utilities Telecom Council (now the Utilities Technology Council). You may start after 30 days unless UTC says you are within 1 km of a power line carrier system.

STRAIGHT FACE
What do you call London without electricity? Londoff.

SESK.INFO #4541

HAM RADIO

How long is one WSPR transmitting period?

A 2 minutes

B 15 seconds

C 10 minutes

FLIP FOR THE ANSWER

A 2 minutes

WHY WSPR transmitting periods are 2 minutes long and occur randomly in time. It is a weak-signal beacon mode for checking propagation with very low power.

STRAIGHT FACE
Which is closer, Florida or the moon? The moon. You can't see Florida from here.

SESK.INFO #4548

HAM RADIO

How long is one FT8 transmit/receive sequence?

A 7.5 seconds

B 2 minutes

C 15 seconds

FLIP FOR THE ANSWER

C 15 seconds

WHY FT8 uses 15-second transmit/receive sequences, which keeps contacts fast. The trade is a few dB less sensitivity than slower WSJT modes.

STRAIGHT FACE
Some people can tell what time it is by looking at the sun. But I have never been able to make out the numbers.

SESK.INFO #4547

HAM RADIO

Outside the listed segments, an automatically controlled data station answering interrogation may use at most what bandwidth?

A 2.8 kHz

B 500 Hz

C 6 kHz

FLIP FOR THE ANSWER

B 500 Hz

WHY Rule 97.221(c) allows automatic control outside the listed segments only when answering an interrogation from a station under local or remote control. Its transmissions must not occupy more than 500 Hz.

STRAIGHT FACE
Your electric bill exceeds your house payment.

SESK.INFO #4546

HAM RADIO

May an amateur telecommand station use special codes to obscure its commands to a space station?

A Yes, for telecommand messages to the space station

B No, all amateur messages must be in plain language

C Only during a declared emergency

FLIP FOR THE ANSWER

A Yes, for telecommand messages to the space station

WHY Rule 97.211(b) allows special codes intended to obscure the meaning of telecommand messages to the station in space operation. That protects a satellite from being commanded by anyone who copies the signal.

STRAIGHT FACE
You start talking to yourself in code.

SESK.INFO #4545

HAM RADIO

Using MSK144 meteor scatter on VHF, about how far can contacts reach?

- **A** Up to about 300 km (190 miles)
- **B** Up to about 2100 km (1300 miles)
- **C** Up to about 12,000 km (7,500 miles)

FLIP FOR THE ANSWER

B Up to about 2100 km (1300 miles)

WHY The WSJT-X guide says meteor scatter QSOs can be made on the VHF bands at distances up to about 2100 km (1300 miles). Signals bounce off ionized meteor trails.

STRAIGHT FACE
What did the asteroid say to the meteor? Nice to meteor you!

SESK.INFO #4549

HAM RADIO

What was the JT65 digital mode originally designed for?

- **A** Contesting on HF
- **B** Sending SSTV pictures on 20 m
- **C** EME (moonbounce) on VHF and higher bands

FLIP FOR THE ANSWER

C EME (moonbounce) on VHF and higher bands

WHY The WSJT-X guide says JT65 was designed for EME, meaning earth-moon-earth or moonbounce, on VHF and higher bands. Signals travel to the moon and reflect back.

STRAIGHT FACE
How do you know when the moon has enough to eat? When it's full.

SESK.INFO #4550

HAM RADIO

The Q65 mode is designed for which kind of signal conditions?

- **A** Fast-fading paths such as tropospheric, rain and ionospheric scatter
- **B** Strong, steady local ground-wave signals
- **C** Satellite downlinks with no fading at all

FLIP FOR THE ANSWER

A Fast-fading paths such as tropospheric, rain and ionospheric scatter

WHY The WSJT-X guide says Q65 is designed for fast-fading signals such as tropospheric, rain and ionospheric scatter. It also works well for EME and trans-equatorial paths.

STRAIGHT FACE
A vibration is a motion that cannot make up its mind which way it wants to go.

SESK.INFO #4551

HAM RADIO

In the ARRL 20 m band plan, which segment is assigned to RTTY?

- **A** 14.150 to 14.175 MHz
- **B** 14.070 to 14.095 MHz
- **C** 14.225 to 14.235 MHz

FLIP FOR THE ANSWER

B 14.070 to 14.095 MHz

WHY The ARRL band plan table for 20 m lists RTTY at 14.070 to 14.095 MHz. A band plan is a voluntary division that keeps incompatible modes apart.

STRAIGHT FACE
Two antennas met on a roof, fell in love and got married. The ceremony wasn't much, but the reception was excellent.

SESK.INFO #4552

HAM RADIO

What does the ARRL 2 m band plan list as the National Simplex Calling Frequency?

- **A** 146.52 MHz
- **B** 146.94 MHz
- **C** 146.55 MHz

FLIP FOR THE ANSWER

A 146.52 MHz

WHY The ARRL 2 m band plan lists 146.52 MHz as the national simplex calling frequency. Hams monitor it and then move to another simplex frequency to talk.

STRAIGHT FACE
What did Mars say to Saturn? Give me a ring sometime.

SESK.INFO #4554

HAM RADIO

Which frequency does the ARRL 20 m band plan list for the NCDXF beacons?

- **A** 14.070 MHz
- **B** 14.200 MHz
- **C** 14.100 MHz

FLIP FOR THE ANSWER

C 14.100 MHz

WHY The ARRL band plan lists 14.100 MHz for NCDXF beacons on 20 m. Hams listen there to gauge how well the band is open without calling anyone.

STRAIGHT FACE
What keeps the sun held up in the sky? Sunbeams.

SESK.INFO #4553

HAM RADIO

What is sporadic E?

- **A** A steady daily layer above the F layer
- **B** A sudden radio blackout on the sunlit side
- **C** Transient, localized patches of high electron density in the E region

FLIP FOR THE ANSWER

C Transient, localized patches of high electron density in the E region

WHY NOAA's glossary describes sporadic E as transient, localized patches of relatively high electron density in the E region of the ionosphere. The patches come and go with little warning.

STRAIGHT FACE
Been there, sun that.

SESK.INFO #4556

HAM RADIO

What does the maximum usable frequency (MUF) describe?

- **A** The lowest frequency that avoids D layer absorption
- **B** The highest frequency that works reliably over a path
- **C** The frequency where an antenna is resonant

FLIP FOR THE ANSWER

B The highest frequency that works reliably over a path

WHY NOAA's glossary defines MUF as the highest frequency that allows reliable HF communication over a given ground range by ionospheric refraction. Go above it and your signal passes through into space.

STRAIGHT FACE
What is the sun's favourite ride at the theme park? The solar coasters.

SESK.INFO #4555

HAM RADIO

Which ionospheric region exists in daytime, from about 40 to 90 km altitude?

- **A** The F2 region
- **B** The D region
- **C** The exosphere

FLIP FOR THE ANSWER

B The D region

WHY NOAA's glossary defines the D region as a daytime region of the ionosphere from about 40 km to 90 km altitude. Solar flare X-rays enhance it, which can block HF on the sunlit side.

STRAIGHT FACE
Son: Dad can you tell me what a solar eclipse is?
Dad: No sun.

SESK.INFO #4558

HAM RADIO

What happens during a polar cap absorption event?

- **A** HF and VHF waves are absorbed over the polar ionosphere
- **B** Polar paths become the best routes for HF
- **C** The E layer disappears worldwide

FLIP FOR THE ANSWER

A HF and VHF waves are absorbed over the polar ionosphere

WHY NOAA's glossary describes polar cap absorption as an anomalous condition of the polar ionosphere where HF and VHF radio waves are absorbed. Polar paths can go dead for HF.

STRAIGHT FACE
What do you call a bad electrician? A shock absorber.

SESK.INFO #4557

HAM RADIO

A solar flare of what class produces an R3 (Strong) radio blackout?

- **A** X1
- **B** M5
- **C** X10

FLIP FOR THE ANSWER

A X1

WHY NOAA's R scale ties R3 (Strong) to an X1 flare. It describes a wide-area HF blackout with loss of radio contact for about an hour on the sunlit side of Earth.

STRAIGHT FACE
Why did the electricity documentary get such mixed reviews? People weren't sure how to feel after its shocking ending.

SESK.INFO #4560

HAM RADIO

Each solar flare X-ray class (A, B, C, M, X) is how many times stronger than the one before?

- **A** 2 times
- **B** 100 times
- **C** 10 times

FLIP FOR THE ANSWER

C 10 times

WHY NOAA lists the flare classes as A, B, C, M and X, each ten times higher than the last. X flares reach 10 to the minus 4 watts per square meter.

STRAIGHT FACE
Why does Mercury always need burn ointment? Because he is always getting sunburnt.

SESK.INFO #4559

HAM RADIO

The aurora is best seen under an oval between about which latitudes?

A 20 and 35 degrees

B 85 and 90 degrees

C 60 and 75 degrees

FLIP FOR THE ANSWER

C 60 and 75 degrees

WHY NOAA says the best aurora viewing is under an oval-shaped region between about 60 and 75 degrees latitude. In major storms the ovals expand away from the poles.

STRAIGHT FACE
Which stars wear glasses? Movie stars.

HAM RADIO

On NOAA's scale, a G1 geomagnetic storm begins at what Kp value?

A Kp 3

B Kp 5

C Kp 7

FLIP FOR THE ANSWER

B Kp 5

WHY NOAA's K-index runs from 0 to 9, and a value of 5 or higher indicates a geomagnetic storm. G1 (Minor) is Kp 5 and G5 (Extreme) is Kp 9.

STRAIGHT FACE
I finally managed to get rid of that nasty electrical charge I've been carrying... I'm ex-static!

HAM RADIO

How soon can the fastest Earth-directed coronal mass ejections reach Earth?

A In about 8 minutes

B In as little as 15 to 18 hours

C In about 3 weeks

FLIP FOR THE ANSWER

B In as little as 15 to 18 hours

WHY NOAA says the fastest Earth-directed CMEs can reach Earth in as little as 15 to 18 hours. Slower ones can take several days to arrive.

STRAIGHT FACE
What did the CME say to Earth? "I'm on my way, give or take a day."

HAM RADIO

About how long is the sunspot (solar) cycle?

A About 11 years

B About 3 years

C About 50 years

FLIP FOR THE ANSWER

A About 11 years

WHY NOAA says the number of sunspots varies with an approximately 11-year repetition known as the solar cycle. HF band conditions improve and fade along with it.

STRAIGHT FACE
Why is the sun so popular at parties? Because he is the sunniest.

HAM RADIO

After one time constant, a charging capacitor holds about what fraction of its full charge?

- **A** About 37 percent
- **B** About 63 percent
- **C** About 50 percent

FLIP FOR THE ANSWER

B About 63 percent

WHY The time constant of an RC circuit is R times C. After one time constant, a charging capacitor reaches about 0.632 of its maximum charge.

STRAIGHT FACE
Why did the robot go on summer vacation? He needed to recharge his batteries.

SESK.INFO #4573

HAM RADIO

In a resonant circuit, what does a higher Q do to the bandwidth?

- **A** Makes it wider
- **B** Nothing, they are unrelated
- **C** Makes it narrower

FLIP FOR THE ANSWER

C Makes it narrower

WHY The relationship is bandwidth equals center frequency divided by Q. A higher Q therefore means a narrower bandwidth and a more selective circuit.

STRAIGHT FACE
Resistance is futile (if less than one ohm).

SESK.INFO #4574

HAM RADIO

At resonance, what is the impedance of a series RLC circuit?

- **A** Minimum, equal to the resistance
- **B** Maximum, equal to the reactance
- **C** Zero, no matter what the resistance is

FLIP FOR THE ANSWER

A Minimum, equal to the resistance

WHY At series resonance the inductive and capacitive reactances cancel, leaving the impedance as just R. Current is therefore at its maximum at that frequency.

STRAIGHT FACE
Where do electricians go to get their supplies? The Ohm Depot.

SESK.INFO #4575

HAM RADIO

At resonance, what impedance does a parallel LC circuit present?

- **A** Minimum
- **B** Maximum
- **C** Exactly zero

FLIP FOR THE ANSWER

B Maximum

WHY A parallel resonant circuit has maximum impedance at resonance, the opposite of a series circuit. The inductor and capacitor effectively cancel each other, so almost no current is drawn from the source.

STRAIGHT FACE
What is a light bulb's favorite kind of news? Current events.

SESK.INFO #4576

HAM RADIO

At the half-power points of a resonant circuit, the current is what fraction of its maximum?

- **A** 0.5
- **B** 0.25
- **C** About 0.707

FLIP FOR THE ANSWER

C About 0.707

WHY The 0.707 current points correspond to the half-power points. Power scales with the square of the current, so 0.707 squared gives one half.

STRAIGHT FACE
What do electricians chant when they meditate?
Ohm.

SESK.INFO #4577

HAM RADIO

In an ideal inductor, what is the phase relation between voltage and current?

- **A** Voltage leads current by 90 degrees
- **B** Voltage lags current by 90 degrees
- **C** They are in phase

FLIP FOR THE ANSWER

A Voltage leads current by 90 degrees

WHY OpenStax College Physics says that in an inductor the voltage leads the current by one-fourth of a cycle, or 90 degrees. Inductive reactance is 2 pi f L, so it rises with frequency.

STRAIGHT FACE
What did the baby lightbulb say to the mommy lightbulb? I love you watts!

SESK.INFO #4578

HAM RADIO

What happens to a capacitor's reactance as frequency rises?

- **A** It rises
- **B** It falls
- **C** It stays the same

FLIP FOR THE ANSWER

B It falls

WHY Capacitive reactance is 1 divided by 2 pi f C, so it drops as frequency goes up. At higher frequency there is less time to fully charge the capacitor.

STRAIGHT FACE
He's a chip off the old shock!

SESK.INFO #4579

HAM RADIO

For maximum power transfer from a source, the load resistance should equal what?

- **A** Zero ohms
- **B** Ten times the source resistance
- **C** The source's internal resistance

FLIP FOR THE ANSWER

C The source's internal resistance

WHY Maximum load power occurs when the load resistance equals the internal resistance of the driving source. The catch is that efficiency at that point is only 50 percent.

STRAIGHT FACE
Why did Mr. Ohm marry Mrs. Ohm? He couldn't resistor!

SESK.INFO #4580

HAM RADIO

How much power do ideal inductors and capacitors dissipate?

- **A** All of the power they receive, as heat
- **B** None, they store energy and return it
- **C** Half of the power, at resonance

FLIP FOR THE ANSWER

B None, they store energy and return it

WHY Reactive loads such as inductors and capacitors dissipate zero power. They store energy and send it back to the circuit, so only the resistance does real work.

STRAIGHT FACE
Why are ideal inductors terrible at heating homes?
They give back everything they take.

SESK.INFO #4582

HAM RADIO

In what unit is reactive power measured?

- **A** Volt-amps reactive (VAR)
- **B** Watts
- **C** Volt-amps (VA)

FLIP FOR THE ANSWER

A Volt-amps reactive (VAR)

WHY Reactive power is measured in volt-amps reactive (VAR) instead of watts. True power is in watts and apparent power is in volt-amps.

STRAIGHT FACE
Hagrid: 'Yer a unit of electrical energy, Harry.' Harry Potter: 'I'm a watt?'

SESK.INFO #4581

HAM RADIO

How does the DC input impedance at a field-effect transistor gate compare with a bipolar transistor?

- **A** The FET has lower input impedance
- **B** The FET has higher input impedance
- **C** Both have low input impedance

FLIP FOR THE ANSWER

B The FET has higher input impedance

WHY A FET gate is insulated or reverse biased, so it draws almost no current. A bipolar transistor needs base current to work, so its input looks much lower.

STRAIGHT FACE
A MOSFET said BJTs are a bad choice because they need current to work. The BJT replied, that accusation is baseless, it's just MOSFET gatekeeping.

SESK.INFO #4584

HAM RADIO

Gallium arsenide is a semiconductor material used mainly in what kind of circuits?

- **A** Microwave circuits
- **B** High-current rectifier circuits
- **C** Very low-frequency RF circuits

FLIP FOR THE ANSWER

A Microwave circuits

WHY Gallium arsenide moves electrons faster than silicon does. That speed pays off at UHF, microwave and higher frequencies.

STRAIGHT FACE
Why are charge carriers never out of date? They're always current.

SESK.INFO #4583

HAM RADIO

What is the most useful characteristic of a Zener diode?

- **A** A constant voltage drop with varying current
- **B** A constant current drop with varying voltage
- **C** A negative resistance region

FLIP FOR THE ANSWER

A **A constant voltage drop with varying current**

WHY In reverse breakdown a Zener holds its voltage nearly steady while the current swings. That makes it handy for voltage references and simple regulators.

STRAIGHT FACE
Why does an analog design engineer open the databook of Zener diodes? To find a reference.

SESK.INFO #4586

HAM RADIO

Why are Zener diodes sometimes connected between a MOSFET gate and its source or drain?

- **A** To protect the substrate from excessive voltages
- **B** To provide a reverse-bias voltage reference
- **C** To protect the gate from static damage

FLIP FOR THE ANSWER

C **To protect the gate from static damage**

WHY A MOSFET gate is separated by a very thin insulating layer. A small static charge can punch through it. A Zener clamps the voltage before that happens.

STRAIGHT FACE
What did Johnny's mother do when she caught him zapping other kids with static electricity? She grounded him.

SESK.INFO #4585

HAM RADIO

What characteristic of a PIN diode makes it useful as an RF switch?

- **A** Extremely high reverse breakdown voltage
- **B** Ability to dissipate large amounts of power
- **C** Low junction capacitance

FLIP FOR THE ANSWER

C **Low junction capacitance**

WHY When reverse biased, a PIN diode has so little capacitance that RF barely passes. Forward bias lets RF pass, so it works as an RF switch.

STRAIGHT FACE
What do you say when a broken PIN diode switch takes down the RF amplifier? No PIN, no gain.

SESK.INFO #4588

HAM RADIO

Which semiconductor device is designed to act as a voltage-controlled capacitor?

- **A** Tunnel diode
- **B** Varactor diode
- **C** Silicon-controlled rectifier

FLIP FOR THE ANSWER

B **Varactor diode**

WHY A reverse-biased varactor changes its junction capacitance as the voltage changes. Radios use that to tune oscillators and filters without moving parts.

STRAIGHT FACE
If you patch a broken model train bridge with spare diodes, what do you call it? A bridge rectifier.

SESK.INFO #4587

HAM RADIO

Why are the cores of inductors and transformers sometimes built from thin layers?

- **A** To simplify assembly
- **B** To reduce power loss from eddy currents
- **C** To save cost on magnetic material

FLIP FOR THE ANSWER

B To reduce power loss from eddy currents

WHY Eddy currents swirl through a solid core and waste power as heat. Thin insulated layers break up those loops, so the core stays cooler and more efficient.

STRAIGHT FACE
Why did a mathematician buy a bunch of coils and transformers before writing his paper? Proof by induction.

HAM RADIO

What is tri-state logic?

- **A** Output states of 0, 1 and high impedance
- **B** Logic that uses ternary math
- **C** A counter with eight states

FLIP FOR THE ANSWER

A Output states of 0, 1 and high impedance

WHY The third state is a disconnected, high-impedance output. That lets many devices share one bus without fighting over it.

STRAIGHT FACE
Why do digital design engineers always have such busy jobs? They have to work around the clock.

1
AhaBulb POINT

1
AhaBulb POINT