

## **Signalling Revision Questions: Track circuits (with answers)**

1. An aster track works by what method?  
USING FREQUENCY TRANSMITTED (& RECEIVED) DOWN THE RAILS
2. What is the main cause of aster track failures?  
USUALLY HEAT (SUMMERTIME) OR SUDDEN HIGH CURRENT (BLOWS FEED FUSE)
3. A serious condition can occur if you disconnect more than one aster track in series, what can happen & where would you find this info?  
THE TC BEFORE THE AFFECTED TC CAN FALSELY FEED THE NEXT TC ALONG TOTALLY MISSING OUT THE AFFECTED TC CAUSING A TRAIN TO DISAPPEAR, (see SMTH)
4. What prevents a TR from damage when shunted by a train?  
RELAY END RESISTOR
5. What does a TPR follow & how does it work?  
IT IS FED VIA THE 'TR' USING A 50V DC SUPPLY TO FEED THE NEXT TPR (IF USED; I.E. T2PR)
6. What is meant by a dead short & a partial short?  
DEAD SHORT: RAILS SHORTED NO VOLTAGE PRESENT, WHEREAS A PARTIAL SHORT, YOU WOULD EXPECT SOME VOLTAGE TO BE PRESENT.
7. How would you find a partial short?  
WALK ALONG TRACK FROM FEED END AND APPLY METER TO RAILS AT SET INTERVALS LOOKING FOR VOLTAGE/LOSS OF VOLTAGE
8. What is residual voltage?  
VOLTAGE THAT IS PRESENT AFTER THE FEED HAS BEEN DISCONNECTED, THIS CAN SOMETIMES BE SUFFICIENT ENOUGH TO KEEP THE RELAY FALSELY ENERGISED (A WRONG SIDE FAILURE)
9. What is the working voltage of a HVI TC?  
AROUND 70V AC
10. What is a stagger & what is its purpose?  
THIS IS POLARITY CHANGE BETWEEN TWO IBJ's SEPERATING TWO TC'S, IT IS TO MAKE SURE THAT SHOULD THE IBJ's FAIL, THE DIFFERENCE WILL SHORT OUT THE VOLTAGE AND FAIL THE TC AND THUS NOT BECOME ONE LONG WHOLE TC
11. Why do we have transposition cables & what do they do?  
THESE ARE ASSOCIATED WITH TRANSPOSITION JOINTS, THIS IS TO MAKE A TC HAVE A STAGGER WHERE ONE DOESN'T EXIST DUE TO POINTWORK OR THE REMOVAL OF A TC.
12. Why are Nylons (commonly known as 'biscuits') put under pandrol clips?  
TO KEEP THE TC FROM SHORTING OUT THROUGH THE REINFORCING STEEL RODS IN THE CONCRETE SLEEPER (NOT USED ON WOODEN SLEEPERS)
13. Why do OHL areas have one rail only that has insulated block joints?  
THIS IS TO ENSURE THAT ONE RAIL IS USED FOR THE OHL RETURN CURRENT, REFERRED TO AS THE 'THE COMMON RAIL'
14. What is a jumper cable and where would you find them?  
IN POINTWORK, THESE ARE TO ENSURE THAT ALL THE RAILS ARE USED IN THE CIRCUIT AND THAT NO RAILS ARE SUBSEQUENTLY BY-PASSED.
15. Why do some rails (in sidings & stations) have weld zig-zags on the rail top?  
SIDINGS & STATIONS LINES THAT ARE RARELY USED SUFFER FROM RUSTY RAIL HEAD CONTAMINATION, THESE STRIPS WELDED ON ARE

STAINLESS AND ENSURE GOOD CONTACT FROM THE WHEELS WILL OPERATE THE TC

16. What must you never do if you find a TC which has wet ballast contamination and it is drop shunting too high?  
YOU MUST NEVER ALTER THE TC TO GET A GOOD DROP SHUNT, THE TC MAY WORK AS REQUIRED, BUT WHEN DRIED OUT, IT MAY FAIL TO DETECT A TRAIN (A WRONG SIDE FAILURE)
17. If a TC is deemed to be SCWO what is this failure, and what documentation must be followed?  
WRONG-SIDE FAILURE & WSF INVESTIGATION PACK MUST BE USED
18. What is the main cause of an unwanted slow-to-pick TC?  
WET BALLAST/BED CONTAMINATION, FLOODED TRACK OR CONTAMINATED LEVEL CROSSING
19. What is a TC-AID and why is it used?  
A TRACK SIDE DEVICE THAT DETECTS A FREQUENCY TRANSMITTED FROM TRAIN BORNE EQUIPMENT THAT WILL OCCUPY THE TC IT IS CONNECTED TO (FITTED TO TC'S THAT ARE PRONE TO RAIL HEAD CONTAMINATION)
20. What is the purpose of a TFR relay?  
SOME TC'S (USUALLY THROUGH POINTWORK) ARE FITTED WITH A TRACK FEED RELAY AS WELL AS A NORMAL TR.  
THIS IS TO ELIMINATE RESIDUAL VOLTAGE AS THE TFR WILL DISSIPATE ANY REMAINING VOLTAGE
21. At the end of a track circuit where the rails continue, the rails on the other side of the IBJ's are shorted out by permanent cables, why is this?  
IF THE LAST PAIR OF IBJ'S WERE TO FAIL, THE VOLTAGE AT THE LAST TC WILL CARRY ON, THIS COULD RESULT IN THE TC FAILING TO DETECT THE TRAIN IT COULD ALSO PICK UP STRAY VOLTAGES FROM THE UN-TRACK CIRCUITED PART
22. What special meter is used to detect faults on the frequency side of an aster TC?  
FREQUENCY SELECTIVE METER
23. What is a 'K-9' and what does it aid?  
IT IS A DEVICE DEVELOPED BY THE S&T AND IT IS USED TO AID THE FINDING OF DEFECTIVE TRACK INSULATIONS, IT IS PUSHED ALONG THE RAIL HEAD AND HAS METAL BRUSHES THAT BRUSH ALONG THE PANDROL CLIPS, THE METAL WHEEL IT RUNS ON HAS ONE POLARITY, THE UNIT WILL BLEEP IF IT PICKS UP THE OPPOSITE VOLTAGE THROUGH THE BRUSHES THUS INDICATING THAT PANDROL CLIP HAS FAULTY INSULATIONS
24. What is a 'Manchester tester'?  
A TESTER THAT IS PLACE ON THE TC WHILST IT IS DISCONNECTED IT TRANSMIT A PULSING SOUND, THE LOCATING DEVICE CARRIED DOWN THE DEFECTIVE TC WILL PICK UP THE PULSING AT THE SHORT CIRCUIT THUS FINDING THE CAUSE OF THE FAILURE
25. What device is added to a track circuit which is known to SCWO due to rusty/contaminated rails?  
EITHER A TC AID AS ABOVE, BUT THESE ARE EXPENSIVE AND NEED INTENSIVE MTCE, OR A MORE CHEAPER WAY IS TO ADD A TREADLE TO SHORT OUT THE TC AND MAKE SURE IT OCCUPIES THE TC FOR AT LEAST ONCE (THIS IS TO ENSURE THAT THE SIGNALLING IS IN SEQUENCE, IT IS NOT A PERMANENT SOLUTION TO DETECT TRAINS).
26. What is the preferred method of checking that a TR relay has dropped/picked during a TC test on maintenance?  
METER ON TPR FEED LINES
27. What is meant by track locked?  
IN ORDER FOR A SET OF POINTS TO MOVE THE TC THAT RUNS UP TO THE POINTS AND THROUGH THEM MUST BE PROVED CLEAR AMONGST OTHER THINGS, IF THE TC SHOULD FAIL THE POINTS WILL BE UNABLE TO MOVE MAKING THEM 'TRACK LOCKED'

