

An Examination for Radio Servicemen



RADIO servicemen are at present delving into textbooks, brushing up their long-forgotten maths., and poring over diagrams and equations that somehow do not just look right. The reason is the Radio Serviceman's examination, to be held in New Zealand within a month.

The position regarding radio servicing has been a doubtful one for some time. Just what was the dividing line between wireman's work and a radio dealer's was not at all clear, and upon investigation it was apparent that most dealers were regularly infringing regulations, though perhaps unwittingly. It became apparent, too, that it was high time inexperienced people be prevented from interfering with an electric set, which, being "mains apparatus," is liable to cause damage to the source of a.c. supply if wrongly handled.

Hence the serviceman's examination, which not only demands that servicemen of the future know applicable wiring regulations but also that they are well versed in both the theory and practice of radio.

It is understood that entries which closed last week numbered some 150. The date of the examination is not yet fixed, but it is understood that it will take place within the next month.

Following is the syllabus:—

Section I.

Candidates will be expected to have a thorough knowledge of—

(1) The Public Works Department's rules and regulations relating to the installation of radio receiving apparatus.

(2) The New Zealand Post and Telegraph Department's radio regulations insofar as they apply to receiving apparatus.

(3) The general scheme of d.c. and a.c. electric lighting and power distribution as applied to residential and commercial buildings.

Radio Serviceman's Examination

What do you know about resonance, inductance, oscillatory circuits?

Do you fully understand the operation of a superheterodyne set? Could you service one that tuned exceptionally broadly?

There is just time to brush up your knowledge of radio . . . but NO TIME TO WASTE.

Write to us re our Special Brushing-Up Course prepared to conform to the syllabus set down by the Electrical Federation.

JOHNSON'S WIRELESS AND
RADIO SCHOOL,

St. George Buildings, 8-10 Brandon St.,
Wellington.

To take place Within a Month

Section II.

(4) Direct current principles up to and including conductors and insulators, resistance in series and parallel, application of Ohm's law, such as currents, voltages, and power in simple and divided circuits, voltage drops and heating effects of electric currents.

(5) The installation, servicing and care of both wet and dry types of batteries, including connecting up and servicing of battery charging apparatus.

(6) The essentials of alternating current principles, including Ohm's law for alternating current and a knowledge of capacity, inductance and impedance, up to an understanding of peak and R.M.S. values.

(7) The working principles of power transformers, filter condensers and chokes, and different types of high and low voltage rectifiers.

Method of testing above, and a clear conception of the electrical hazards involved.

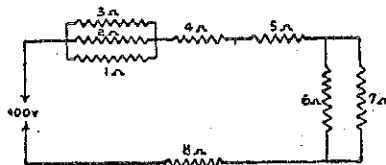
(8) The use of general testing equipment and meters used in diagnosing troubles in radio receivers, and their associated apparatus.

(9) Modern battery operated and a.c. mains operated receivers, their circuits, principles, construction and adjustment as far as necessary for the intelligent servicing and rectifying of faults.

(10) General radio principles—frequency, wavelength, tuning and resonance, the elements, impedance matching, bias arrangements, wavetraps.

THE following questions, which constitute the Wireless Institute (of Australia) trade certificate examination, should be studied by candidates. While there is no indication of the standard to be set in the forthcoming examination, it is improbable that it will be higher than that set for the institute.

Theory—Second Class



1. In the above circuit determine (a) the total current; (b) the total watts dissipated; (c) watts across each resistor.

2. (a) Upon what does the inductance of an iron core filter choke depend?

(b) What is the influence of an air gap in this choke?

(c) Define inductance, reactance, impedance, and resistance.

3. If you had 2 condensers of 4 mfd. at 1000 volt test, 4 condensers of 4 mfd. of 250 volt test, and 2 condensers of 0.5 mfd. at 1000 volt test, show how you would connect them up to obtain a total capacity of (a) 10 mfd. of 1000 volt test; (b) 7 mfd. of 500 volt test; (c) if on connecting up you found one 4 mfd. condenser of 250 volt test open circuit, what would then be the value of capacity and voltage in (a) and (b).

4. (a) Describe the production of an E.M.F. by electro magnetic induction as applied to a generator.

(b) What is Fleming's Right Hand rule?

(c) What is the difference between a dynamo and an alternator.

5. (a) Explain how a set of characteristic curves of a valve can be obtained.

(b) Illustrate by means of circuit diagrams, draw curves and from the curves drawn determine: (1) Amplification factor; (2) Impedance; (3) mutual conductance.

(c) What is the maximum allowable peak grid swing of an amplifier valve?

6. (a) Explain the theory of operation of a pick-up.

(b) Show and explain how a pick-up may be connected to an amplifier and include volume control.

7. Show by diagram a 2-valve A.C. receiver employing any make of valve (specify make) detector and penthode.

8. (a) Illustrate the chain of events that occur between the microphone at the transmitting station and the loud-speaker of the receiving set.

(b) Explain simply the difference between electro magnetic waves and sound waves.

9. Given a radio frequency transformer tuned by a given condenser to cover the broadcast band, at what part of the band does the greatest transfer of energy from plate to grid circuit take place?

10. What effect has extreme selectivity upon tone quality and how can this effect be noted in the output of the speaker?

Practical—Second Class

1. Show by sketch a suitable volume control on one or more R.F. stages.

2. If a valve tests O.K., but on placing it in the socket it becomes abnormally hot and blue glows, what fault in the receiver could this indicate?

3. Assuming you had spare fixed condensers in your kit, how would you test a suspected faulty condenser in a power unit?

4. Describe briefly a dynamic speaker of the D.C. type and state how the field supply is obtained.

5. Assuming all O.K. to input transformer, what would be the fault in a dynamic speaker—(a) weak signal, (b) no signal?

6. Show by simple diagram how you would charge a 6-volt radio accumulator from a 32-volt country lighting plant consisting of 16 accumulators? If the B battery on a battery receiver consists of small B accumulators of 120 volts, describe briefly and by diagram how you would charge from the 32 D.C. country plant?

7. What would be the apparent effect of a shorted filter choke?

8. Which of the following combinations will give the greatest resultant capacity when connected in series? First, two condensers, each having .0005 of capacity; second, two condensers, one having .0006 and one having .0004 capacity. Also the combinations in parallel. Show figures.

9. How would you determine whether any interference was coming in over an aerial or not?

10. What is the best test to indicate the condition of a storage battery for radio use?

11. What resistor in ohms would be necessary to drop the voltages from 140 to 90 volts on the plate of some tubes pulling 10 mls at 90 volts?

12. Draw the diagram of a push-pull amplifier.

13. What are the principal things to look for when the phonograph end of a combination is dead, but the radio end O.K.?

14. In substituting a condenser in the filter system of a power supply, what are the principal conditions that must be fulfilled?

15. What is the principal function of by-pass condensers?

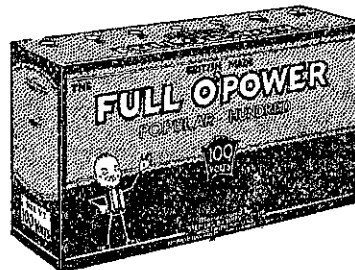
16. Explain by sketch how you would bias the 2 R.F. stages utilising A.C. screen grid valves 224 type?

17. Show by diagram a 2-valve A.C. receiver employing any make of valves (candidate to specify the make)—detector and penthode.

18. Indicate the makers' names of valves in common use and specify not more than three types of each.

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60-volt Popular	11/-
60-volt Special	10/6
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9-volt "C"	2/6
18-volt "C"	4/6
1 1/2-volt "A" Cells	2/6
50-volt Heavy Duty	30/-

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