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**COMMONWEALTH PUBLIC SERVICE.
FOURTH DIVISION.**

Examination No. 2586.—22nd September, 1945, and
subsequent dates.

**FOR PROMOTION OR TRANSFER AS SENIOR TECHNICIAN,
TELEPHONE, POSTMASTER-GENERAL'S DEPART-
MENT, ALL STATES.**

WRITTEN EXAMINATION.

(b) TELEPHONY I.

Time allowed : Three hours.

NOTE.—A candidate is required to attempt all five questions.
Only brief answers are necessary.

Maximum marks.

Telephony I.	..	100	} 200
Telephony II.	..	100	
Pass marks	..	120	

1. (a) If requested by a subscriber to erect a telephone on a glazed tile wall, how would you proceed ? 2 1/2
- (b) If the lead-in wires of an exposed line are left unconnected pending the installation of apparatus, state briefly what precautions should be taken regarding them. 2 1/2
- (c) In installing a P.B.X. in a subscriber's premises which method of cabling would you prefer—
 - (i) overhead. 2 1/2
 - (ii) under the floor or under the floor coverings, assuming that either was suitable and practicable.
- (d) How would you test the insulation resistance of a newly installed P.B.X. of the C.B. cord type? What precautions are necessary regarding the 10 u.f. condenser ? 2

[TURN OVER.]

1—continued.

- (e) What factors should be considered in determining the location of a distributing frame in a large building? 2
- (f) A subscriber having an automatic handset telephone receives a loud click in his receiver when the switch-hook is pressed or released. Assuming that the trouble is in the telephone, what is the likely cause of the fault, and how is it remedied?
- (g) Why are a 2 u.f. condenser and a non-inductive resistance of 100 ohms connected in series across a dial associated with a switchboard? 2 1/2
- (h) In cabling an exchange what precautions would you take regarding the runway when a "block" of cables is passed through to a lower level? 2

—[20 marks.]

2. (a) How would you busy a selector associated with an incoming junction if it were necessary to adjust the switch on the shelf?
- (b) How is a trunk associated with an auto-auto relay set (repeater), in a 2000 type exchange busied when the relay set is removed from the shelf? 3
- (c) List the tests you would make from a standard test desk to a new automatic subscriber's service. 2
- (d) What is the standard dial speed and impulse ratio? 3
- (e) A final selector is being replaced in service in an automatic exchange. State what tests you would apply to insure that— 2
- (i) the wiper spring tension,
- (ii) position of the wipers on the bank contacts,
- (iii) cut in,
- are correct.
- (f) List the alarms in an automatic exchange which require— 3
- (i) urgent attention,
- (ii) non-urgent attention.
- (g) What cord test facilities are provided on a standard magneto floor-pattern switchboard at a subscriber's premises? 3

—[20 marks.]

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3. (a) Why is a copper slug placed on the armature end of a line relay associated with a Keith type uniselector?
- (b) In a primary finder circuit provision is made for relay "H.B." to operate before relay "H.A." when testing corresponding bank contacts on M.1 and M.2 banks which are marked simultaneously. State briefly how this is arranged.
- (c) What is the maximum number of springs provided on a—
 (i) 3000 type relay,
 (ii) 600 type relay?
- What would be the effect of removing the residual screw from an impulsing relay associated with an auto-auto relay set (repeater)?
- (d) A 3000 type relay is required to have very fast operation. What are the necessary requirements—
 (i) in the relay design,
 (ii) in the circuit?
- (e) Show by means of a rough sketch how a 3000 type relay should be associated with a copper oxide rectifier when connected across a 230 volt A.C. supply in a "no voltage" alarm circuit.
- (f) For what purpose is an interception circuit used, and how is it associated with other circuits?
- (g) (i) What provision is made in an automatic exchange for giving temporary service on faulty subscribers' lines.
 (ii) On what class of faults can the temporary service be given?

—[20 marks.]

4. (a) In a local call the group selectors restore when the called party answers. Name the most likely point in the circuit for the fault.
- (b) The wiper assembly of a 2000 type selector associated with an incoming junction, after release from the bank level, fails to return to normal from the horizontal position. List the possible causes of the fault.
- (c) What effect will the failure of a 2000 type switch to restore from the horizontal position have on the junction with which it is associated?
- (d) What would be likely to happen to a group selector, in an automatic exchange, if the speed of impulses from a dial from which it was receiving impulses, were below standard?
- (e) How would you locate an earth fault on a selector bank multiple in an automatic exchange?

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2

3

2

2

2

3

1 1/2

2

2 1/2

2 1/2

4—continued.

(f) What method of bank marking is used for the finding action on the following:—

- (i) primary allotter,
- (ii) primary line finder during vertical search, in an automatic exchange (2000 type).

(g) When providing restricted access facilities on a P.A.B.X., what alterations are necessary to—

- (i) uniselector,
- (ii) line finder bank,

for the extension line prohibited exchange access.

(h) What is a "tie line"?

—[20 marks.]

5. (a) A row of 10 selectors is observed at regular intervals for an hour. The number of selectors engaged at successive periods is as follows:—

5.5.5.4.0.4.5.5.4.5.9.9.5.8.4.5.2.0.8.8.

Find the traffic units carried by the selectors in that hour.

(b) State when the following methods of trunk distribution are used—

- (i) interconnecting,
- (ii) grading.

(c) Explain the difference between "demand" and "delayed" trunk line working.

(d) Explain briefly why voice frequency signalling is necessary in modern trunk line operating procedure.

(e) What is meant by the following terms appearing on relay adjustment charts?

- (i) saturate current,
- (ii) hold current.

(f) List the routine tests applied to a straight line final selector using "Routine Test Set No. 1."

(g) State briefly the reason for connecting a non-inductive resistance in series with a spark quench condenser associated with a bi-motional switch.

(h) What is meant by the term "self protecting" as applied to electro-magnets associated with bimotional switches and uniselectors.

—[20 marks.]