

ORDINARY MS.

G.O., No. 637

DATED 22-9-99 ✓

INDEXED.



[Despatch Abstract.]

Approving the revised syllabuses in
Practical Telegraphy for the Elementary
& the Intermediate Technical Exams

see then
to be

12/5

26/10
BACK PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

FURTHER PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

OFFICE OF THE DIRECTOR OF

CURRENT No. 1454
Educational (1899) Department.

CURRENT No. 1454

✓ 297/295199
✓ 565/291800
From The Director of Public Instruction, Madras.

resp
Order no 637 dated 22/9/99.

The revised Syllabuses in Practical Telegraphy, elementary and intermediate grades, submitted by the D.P.I are approved.

No 10516

Dated 14th September 1899.

Received 15 SEP 1899

Registered

Enclosures 2

Spare copies

SUBJECT.

Submitting for sanction revised Syllabuses in Practical Telegraphy for the Elementary and the Intermediate Technical Examinations.

DEPATCHED

14 SEP 1899

at 21/9/99

21/9/99

2
in D.P.I. of 26/9
- C. S. S. at 28/9

Defunct 20/10

BACK PAPERS.

BACK PAPERS.

G.O.	No.	Department.	Date.
	297825-58		

FURTHER PAPERS.

G.O.	No.	Department.	Date.

CURRENT NO. 134

OFFICE OF THE DIRECTOR OF
PUBLIC INSTRUCTION,

1899.

From
C. J. Williams, Esq., M. A. & C.
Chairman of the
Board of Examiners in
Electrical Engineering
To
E. H. Elliott, Esq., B. A.,
Secretary to the Commission
for Govt. Examinations,
Madras.

Sir,
I would suggest that 15 words
per minute be specified as the
qualifying speed and this should
include figures. This fact would
have to be notified to the several
Technical Schools. In connection
with these institutions, it is ne-
cessary that they have not a
sufficient number of instru-
ments for teaching and the
technical instruction is almost
confined to that which can be
given by the aid of a black board.
Many of the men, who can draw
correct diagrams of instrument
connections and explain the
principles of their action, (or
actually do not know the names
of the instruments) when
seen then

26/10
 These, as a rule, are the men who
 do not qualify. To them, a
 Scientific instrument consists
 of a diagram and nothing more.
 It has no real existence out-
 side of a text book. I shall be
 pleased to furnish a list of the
 instruments required, if the
 Commissioner would care
 for one, avoiding unnecessary
 or expensive ones.

Another branch of telegraph
 signalling which I should I think
 be taught and candidates
 examined in, is the closed
circuit system of signalling.
 This is largely used in India
 both by the Government Tele-
 graph Department and by
 Railways. It is possible for
 a man who only knows the
 pen circuit system to work
 on the closed system, but it
 entails a special adjustment
 of the receiving instrument.
 I think that if agreeable to
 the Commissioner, I should
 like to prepare a revised draft
 syllabus, a few alterations
 by would be made, but
 it would, in my opinion
 be a good idea.

has pointed out certain things
 requiring revision. The Com-
 missioner would of course
 decide as to the adoption, or
 otherwise, of our views and
 his decision would settle the
 matter. I shall be glad to know
 what you think of the proposal.

I have &c
 (Signed) C. J. Willains
 Chairman of the Board
 of Examiners

No. 377
 4/5 A True Extract
 Communicated to the Director
 of Public Instruction.
 2. Mr. Willains's offer has
 been accepted and the draft
 syllabus and the list of
 instruments will be for-
 warded as soon as they are
 received.

E. H. Stuart
 Secretary
 Office of the Commissioner
 for Govt. Examinations
 Madras, 5th July 1899



No. 10516

From

THE HONOURABLE MR. D. DUNCAN, M.A., D.SC., LL.D.,

DIRECTOR OF PUBLIC INSTRUCTION,

Madras,

To

THE SECRETARY TO GOVERNMENT,

Educational DEPARTMENT,

Fort St. George.

Sir,

I have the honour to submit for favour of sanction, revised syllabuses in Practical Telegraphy for the Elementary and the Intermediate Technical Examinations. In the syllabuses enclosed, the modifications sanctioned in G.O. No 297, Educational, dated 25th May last, have been noted in black ink and those now recommended in red ink. The enclosed extract from a letter from the Chairman of the Board of Examiners in Electrical Engineering for the Government Technical Examinations to the Commissioner for Government Examinations explains the necessity for the alterations now proposed. The revised syllabuses were prepared by Mr. Williams.

I have the honour to be,

Sir,

Your most obedient servant,

D. Duncan

Director of Public Instruction.

When given for copying _____
When copied _____ } 189
When examined _____
When signed _____

READ AGAIN G.O., No. _____, DATED
189 .

CURRENT No.

ENCLOSURES TO O. No.

ORDER OF GOVERNMENT

A A A A A A A

LETTER OF GOVERNMENT.

STATEMENT WITH DITTO.

PAPERS NOT FILED UP, BEING MEANT FOR DESPATCH
IN ORIGINAL.

N.B.—

A = Copy in full.
B = Not to be copied.
P = Copy abstract only
Q = Copy heading only.

Encl. to CPD 3 no 1516
14.9.97

[Revised up to 31st January 1893.]

*Government of Madras Technical
Examinations.*

PRACTICAL TELEGRAPHY.

ELEMENTARY EXAMINATION.

1. *Batteries.*—Description and use of different kinds.
2. *Signalling keys.*—Single and double current.
3. *Receivers.*—Morse sounders. Recorders. Relays. Needle instruments.
4. *Methods of working.*—Single and double current, open and closed circuit. Translation. (To be illustrated by diagrams.)
5. *Electric bells.*—Chattering and single stroke.
6. *Lightning dischargers.*—Principle of action. Various kinds.
7. *Earths.*—Object, and method of installation.
8. *Fitting up a Telegraph office.*—Kind of wire suitable for connections. Methods of bringing in leading wires, and attaching them to walls.
9. *Faults.*—How to detect and trace a fault in an office.
10. *Signalling.*—Sending and receiving Morse signals. Reading by sound and from tape. Sending and receiving on the single needle instrument.

The examination shall comprise—

(1) A written examination.

One paper of three hours' duration.

(2) An oral and practical examination of three hours' duration.

Candidates will be examined practically in signalling and will be required to prepare batteries and put up the connections of the instruments described. They must be able to signal and receive 20 words a minute, *including figures as used in Morse signalling.*

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The distribution of marks and the minima required for passing shall be as follows:—

	Max.	Min. for passing.	
		1st class.	2nd class.
Written examination	50	...	...
Oral and practical examination	50	35	25
Total	100	60	40

Note Candidates who may not be prepared to be examined in signalling on the single needle instrument will be allowed to pass provided that they are thoroughly proficient in 'Morse' signalling.
(G.O. no. 297 Edl. 26.5.99)

INTERMEDIATE EXAMINATION.

1. The principal phenomena of electricity in their application to the electrical industries.
2. Practical units of electrical measurement, ~~and their relation to the fundamental units of mass, time, and length, and to the units of the absolute centimetre—gramme—second system.~~
3. *Batteries.*—Different kinds in practical use with their chemical action, E.M.F., and resistance. Storage batteries. 'Universal battery' system. Determination of battery power required for a given circuit. Method of joining up cells for maximum effect. Testing batteries for E.M.F. and resistance.
4. *Switches.*—Commutators. Current reversers or pole changers.
5. *Receivers.*—Siemens', Post office, and other relays. Embossers and ink recorders. Chemical recorders. Sounders for direct working, and for local circuits.
6. *Multiple and fast speed transmission.*—The general principles of duplex, quadruplex, multiplex, and automatic telegraphy.
7. *Induction.*—Effect of induction on long land lines. Static discharge and how to counteract its effect. Condensers.
8. *Testing.*—Wheatstone's bridge. Differential and tangent galvanometers. Testing of land lines, regular and fault. Measurement of received currents. Testing the resistance of 'earths.' Determination of the working range of instruments.
9. *Calling up closed stations.*—Different methods, with and without clock work.

SUBMARINE TELEGRAPHY.

10. *Receivers.*—~~The principles of~~ Thomson's syphon recorder. Reflecting galvanometer.
11. *Signalling.*—Sending with double current key. Reading from the reflecting galvanometer, and from the tape of the syphon recorder.

MILITARY TELEGRAPHY.

12. *Equipment.*—Portable instruments and batteries. System of working. Camp offices.

TELEPHONY.

11 13. *Telephones*.—Description of different forms of transmitters and receivers in use. Modes of connecting transmitters and receivers with automatic switches and call-bells both with and without induction coils. Principles involved in telephone transmission.

12 14. *Induction*.—How to obviate the effect of induction between telephone wires.

TELEGRAPH CONSTRUCTION.

13 15. *Materials*.—Different kinds of supports, wire, brackets, and insulators generally used, and advantages of each.

14 16. *Tools*.—For jointing and binding. Block and tackle. Rope stops. Wire reels.

15 17. *Aerial lines*.—Surveying and marking out route. Distribution of material. Paying out wire. Fitting stays and struts. Measurement of angles. Calculation of strain at angles. Formula for calculating the dip to be allowed.

16 18. *Jointing and binding*.—Britannia and twisted joints. Joints in stranded wire. Soldering. Fluxes. Methods of fastening the wire to the insulators.

19 19. *Hill lines*.—Calculation of dip and strain in long spans, and with supports at different levels.

17 20. *Underground lines*.—Systems of placing wires underground, pipe lines, Brookes' method.

21. *Masts*.—Construction of masts for long spans. Erecting masts.

22. *Military lines*.—Flying lines; semi-permanent lines; material used; transport; protection.

18. 23. *Cables*.—Relative advantages of indiarubber and gutta-percha dielectrics. Methods of protection from mechanical injury. Deep-sea and shore-end types. Fittings of a cable ship. Jointing gutta-percha and indiarubber core. Laying cables across rivers and creeks.

19. 24. Application of electricity to such purposes as controlling clocks, fire alarms, house bells, &c.

The examination shall comprise—

(1) A written examination.

Two papers each of three hours' duration.

(2) An oral and practical examination of three hours' duration.

The distribution of marks and the minima required for passing shall be as follows:—

	Max.	Min. for passing.	
		1st class.	2nd class.
Written examination	60	...	...
Oral and practical examination ...	40	25	20
Total	100	60	40

Note Candidates who may not be prepared to be examined in signalling on the typewriter or mirror instruments will be allowed to pass provided that they are thoroughly proficient in 'Morse' signalling.

ADVANCED EXAMINATION.

The subjects in the Intermediate Examination, and, in addition, such subjects as the following :—

1. The materials used in telegraph and telephone lines, overhead, underground, and submarine; and the testing of their quality.
2. The speed of signalling and the conditions necessary for rapid transmission. Appliances used for the increase of speed and the principles involved in their operation.
3. Electrical measurement as applied to the testing of apparatus, the regular testing of the condition of overhead and underground lines, and to the localization of faults.
4. The application of electricity to railway working, excluding the use of electricity as a motive power.
5. The telephone and its accessories, telephone installations, and the construction of switchboards.
6. The conditions necessary for good articulation on long lines. Simultaneous telegraph and telephone transmission.
7. Different methods of constructing underground lines.
8. The construction of submarine cables, their laying and repair.
9. The working of submarine cables. Principle and construction of condensers and inductive resistance for duplex working, and the adjustments required.
10. Electrical measurement as applied to submarine cables, including the tests made during manufacture and laying; periodical testing, and the various methods of localizing faults.

The examination shall comprise—

- (1) A written examination.

Two papers each of three hours' duration.

- (2) An oral and practical examination of three hours' duration, in which special attention will be paid to the measurements of electrical quantities.

The distribution of marks and the minima required for passing shall be as follows :—

	Max.	Min. for passing.	
		1st class.	2nd class.
Written examination	60	...	...
Oral and practical examination ...	40	25	20
Total	100	60	40