

EXAMINATION FOR THE AMATEUR RADIO OPERATORS' CERTIFICATE OF PROFICIENCY  
ISSUED BY THE DIRECTOR GENERAL OF TELECOMMUNICATIONS OF SRI LANKA  
MARCH 1996  
(GENERAL CLASS)

FUNDAMENTALS OF ELECTRICITY & RADIO COMMUNICATIONS

Two hours

Index No. ....

Answer **all** questions on this paper itself.

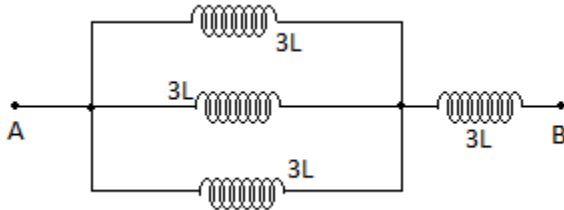
Pick out the correct answer and **underline it**.

A minimum of 50 marks is required for a pass.

1. The RMS value of the 240V, 50Hz main supply is

- (a)  $(2/\pi) \times 240$  V      (b) 240 V      (c)  $240\sqrt{2}$  V      (d)  $240/\sqrt{2}$  V

2.



The total inductance between A and B in the circuit shown is

- (a)  $9L/4$       (b)  $3L$       (c)  $4L$       (d)  $12L$

3. The ultra high frequency extends from

- (a) 3 GHz to 30 GHz      (b) 300 MHz to 3GHz  
(c) 30 MHz to 300 MHz      (d) 3 MHz to 30 MHz

4. In a class C amplifier with sinusoidal input signal, the out put current flows for

- (a) more than half a circle      (b) a full circle  
(c) less than half a circle      (d) a half circle

5. For constant d.c. voltage, an inductor acts as

- (a) a voltage source      (b) an open circuit  
(c) a finite resistance      (d) a short circuit

6. Simultaneous two-way communications is called

- (a) full duplex      (b) bicom      (c) half duplex      (d) simplex

7. The process of transmitting two or more information signals simultaneously over the same channel is called

- (a) telemetry      (b) mixing      (c) modulation      (d) multiplexing

8. The voice frequency range sensitive for human ear is

- (a) 20 Hz to 20 kHz      (b) 100 Hz to 10 kHz      (c) 300Hz to 3kHz      (d) 30Hz to 300 Hz

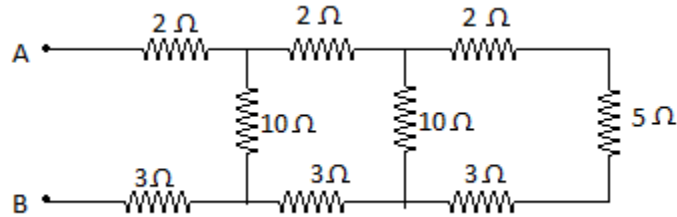
9. A major benefit of DSB and SSB is

- (a) greater power consumption      (b) higher power can be put into the sidebands  
(c) more carrier power      (d) double the sideband power

10. Most of the power in an AM signal is in the  
 (a) carrier (b) modulating signal (c) lower sideband (d) upper sideband
11. What is the minimum AM signal needed to transmit information?  
 (a) carrier plus sidebands (b) carrier only  
 (c) both sidebands (d) one sideband
12. Frequency translation is done with a circuit called a  
 (a) summer (b) filter (c) mixer (d) multiplier
13. The frequency deviation from the carrier centre frequency in a FM transmitter is proportional to  
 (a) amplitude of carrier (b) amplitude of modulating signal  
 (c) frequency of carrier (d) frequency of modulating signal
14. With the doubling of the modulation index value of a FM signal, its bandwidth will  
 (a) remain exactly the same (b) remain approximate the same  
 (c) become exactly double (d) become approximately double
15. A.C. currents can induce voltage because it has  
 (a) varying magnetic field (b) constant magnetic field  
 (c) stronger magnetic field (d) high peak value
16. The phase velocity  $v$  in a transmission line is given by  
 (a)  $v = 1/LC$  (b)  $v = \sqrt{L/C}$  (c)  $v = \sqrt{LC}$  (d)  $v = 1/\sqrt{LC}$
17. The ratio of the reflected voltage to the incident voltage on a transmission line is called the  
 (a) velocity factor (b) reflection coefficient (c) line efficiency (d) standing wave ratio
18. The most desirable reflection coefficient is  
 (a) zero (b) 0.5 (c) 1 (d) infinity
19. On doubling the number of turns of a coil, the inductance  
 (a) remains the same (b) doubles (c) becomes one fourth (d) quadruples
20. The length of a half-wave dipole, at 100 MHz is  
 (a) 6 m (b) 3 m (c) 150 cm (d) 75 cm
21. The horizontal radiation pattern of a horizontal dipole is a  
 (a) circle (b) figure eight (c) narrow beam (d) clover leaf
22. A quarter-wave vertical antenna is commonly known as a  
 (a) ground plane antenna (b) dipole antenna  
 (c) collinear antenna (d) broadside antenna
23. A radio wave that propagates near the surface of the earth is called a  
 (a) sky wave (b) direct wave (c) space wave (d) ground wave
24. The surface wave communication is most effective in the frequency range of  
 (a) 300 kHz to 3 MHz (b) 3 MHz to 30 MHz (c) 30 MHz to 300 MHz (d) above 300 MHz
25. In any transformer the voltage per turn in primary and secondary are always  
 (a) the same (b) different (c) in a fixed ratio (d) none of the above

26. Which of the following combination forms a low pass filter  
 (a) series C and shunt L (b) series L and shunt C  
 (c) both L and C in series arm (d) both L and C in shunt arm
27. A thermocouple instrument responds to  
 (a) temperature difference (b) electrical field  
 (c) resistance (d) magnetic field
28. Microwave signal propagate by way of the  
 (a) sky wave (b) direct wave (c) ground wave (d) surface wave
29. The main benefit of using microwaves is  
 (a) lower – cost equipment (b) simpler equipment  
 (c) greater transmission distance (d) more spectrum space for signals
30. A single winding transformer is known as a  
 (a) balun transformer (b) toroid transformer  
 (c) auto transformer (d) RF transformer
31. The ability of a receiver to pickup weak signal is  
 (a) screening (b) stability (c) sensitivity (d) selectivity
32. The following stage in a radio receiver provides the maximum adjacent channel selectivity  
 (a) R.F. amplifier (b) I.F. amplifier  
 (c) audio amplifier (d) frequency mixer
33. For best selectivity and stability, the I.F. should be  
 (a) high (b) medium (c) low (d) none of the above
34. The image problem can be solved by proper choice of the  
 (a) intermediate frequency (b) gain (c) S/N ratio (d) mixer
35. The instrument used for d.c. measurement only is  
 (a) induction type (b) electromagnetic type  
 (c) moving iron type (d) permanent magnet type
36. The current is defined as the  
 (a) rate of change of flux (b) rate of change of charge  
 (c) rate of change of voltage (d) product of charge and time
37. The magnification factor of a parallel circuit is given by  
 (a)  $Q = \omega C/R$  (b)  $Q = \omega C/L$  (c)  $Q = \omega L/C$  (d)  $Q = \omega L/R$
38. The resonant frequency of a tuned (LCR) circuit depends on  
 (a) R (b) L (c) C (d) L and C
39. The unit of magnetic flux is  
 (a) Weber (b) Tesla (c) Ampere per meter (d) Coulomb
40. In which type of transmitter are class C amplifiers not used?  
 (a) AM (b) SSB (c) CW (d) FM
41. Product detector is used for the detection of  
 (a) AM signals only (b) FM signals only  
 (c) SSB and CW signals (d) all the above are correct

42. In RLC series circuit , the current at resonance is  
 (a) maximum (b) minimum (c) zero (d) infinity
43. The field effect transistor (FET) behaves as a  
 (a) current controlled voltage source (b) current controlled current source  
 (c) voltage controlled voltage source (d) voltage controlled current source
44. The gain of a transistor amplifier is  
 (a) directly proportional to frequency (b) directly proportional to collector current  
 (c) inversely proportional to frequency (d) inversely proportional to collector current
45. The addition of a reflector and directors to a folded dipole  
 (a) decreases its impedance (b) increases its impedance  
 (c) will cause unbalance (d) none of the above
46. The inductor voltage is proportional to the  
 (a) rate of change of current (b) rate of change of voltage  
 (c) rate of change of charge (d) none of the above
47. The current through a capacitor  
 (a) is never zero (b) is always infinite  
 (c) can not change suddenly (d) can change suddenly
48. Noise in a frequency modulation system may be reduced by  
 (a) widening the bandwidth (b) narrowing the bandwidth  
 (c) increasing temperature (d) decreasing deviation
49. An AFC (automatic frequency control) circuit is used to correct for  
 (a) audio distortion (b) strong input signals  
 (c) instability in the IF amplifier (d) frequency drift in the Local Oscillator (LO)
50. The equivalent resistance between A and B in the circuit shown is  
 (a)  $2\ \Omega$  (b)  $3\ \Omega$  (c)  $5\ \Omega$  (d)  $10\ \Omega$



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**RAE-1996**  
**General Class**  
**Fundamentals of Electricity and Radio Communication**  
**Answers**

1. b   2. c   3. b   4. c   5. c   6.   7. d   8. a   9. b   10. a  
11. a   12. c   13. b   14. c   15. a   16.   17. b   18. a   19. d   20. c  
21. b   22. a   23. d   24. a   25. a   26. b   27. a   28. b   29. d   30. c  
31. c   32. d   33. b   34. a   35. d   36. b   37. d   38. d   39. b   40. d  
41. c   42. a   43.   44. b   45. a   46. a   47. c   48. d   49. d   50. d

Q-37. correct answer is  $\omega CR$  or  $R/\omega L$

Q-47 no answer. Answer is "Always zero"

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LICENSING CONDITIONS, OPERATING PRACTICES AND PROCEDURES

*One hour*

Index No. ....

Answer **all** questions on this paper itself.

Pick out the correct answer and **underline it**.

A minimum of 50 marks is required for a pass.

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1. When wearing a headphone it is not advisable to
  - (a) have hands on inside live equipment
  - (b) call CQ
  - (c) do any writing
  - (d) be switching off
2. The abbreviation for using low power is
  - (a) QRO
  - (b) QRP
  - (c) QRM
  - (d) QRL
3. Using the international phonetic alphabet **RADIO** would be
  - (a) Romeo Alpha Delta India Oscar
  - (b) Romeo America Denmark Italy Oscar
  - (c) Roger Able Denver Isaac Orange
  - (d) Royal Ascot Dover Iris Omega
4. If "N" appears after the report on a CW contact it indicates
  - (a) a chirp on the signal
  - (b) a clean tone on the signal
  - (c) a rough note on the signal
  - (d) Non of the above
5. A test signal transmitted by an Amateur whose call sign is 4S7XX using the Morse code would be
  - (a) VVV de 4S7XX 4S7XX 4S7XX
  - (b) VVV VVV de 4S7XX
  - (c) V de 4S7XX 4S7XX 4S7XX
  - (d) VV de 4S7XX
6. What does QRZ stand for ?
  - (a) What is the readability of my signal
  - (b) What is the power used
  - (c) What is my signal strength
  - (d) Who is calling me
7. The abbreviation for fading is
  - (a) QSA
  - (b) QSL
  - (c) QSO
  - (d) QSB
8. When operating from an alternative location your call sign should follow with letters
  - (a) /M
  - (b) /P
  - (c) /AM
  - (d) /A
9. If your license has been extended to operate from a Yacht your call will be followed by
  - (a) /MM
  - (b) /M
  - (c) /P
  - (d) /AM
10. If you are using voice modulation the nomenclature J3E stands for
  - (a) SSB with reintroduced carrier
  - (b) SSB with no carrier
  - (c) SSB with full carrier
  - (d) SSB with full modulation
11. The transmission defined as RTTY shall encompass
  - (a) Radio Teletype and AMTOR
  - (b) AMTOR only
  - (c) ASCII Transmission
  - (d) Binary coded decimal encoding
12. For safety reasons all exposed metal work in an Amateur station should be
  - (a) left floating
  - (b) free of Earthing
  - (c) connected to the live phase
  - (d) connected to the earth

13. CQ should only be made  
 (a) after listening to a frequency which is not in use (b) On frequencies that are in use  
 (c) when contests are on (d) When band conditions are hopeless
14. When conducting a conversation on the VHF Amateur Bands, the duration of an over should be  
 (a) No longer than 2 mins.  
 (b) No longer than 15 mins.  
 (c) Any length of time without identification  
 (d) Any length of time with identification every 5 mins.
15. The speed in Morse to qualify for the General Class License is  
 (a) 5 wpm (b) 12 wpm (c) 18 wpm (d) 20 wpm
16. The classification R3E is  
 (a) SSB with full carrier (b) SSB with no carrier  
 (c) SSB with reduced carrier (d) AM using double Side Band
17. When using voice transmission, it is wise to  
 (a) speak as fast as possible to make QSO short (b) use jargon continuously  
 (c) use plane language (d) use the Q-code
18. Using the RST code a perfectly readable signal will be  
 (a) S 1 (b) T 9 (c) R 1 (d) R 5
19. When operating via a Satellite , a station should  
 (a) use the minimum power needed to maintain contact  
 (b) never call CQ  
 (c) always use voice  
 (d) be a member of AMSAT
20. Which of the following need not to be entered in the log book  
 (a) time of operation (b) date  
 (c) frequency band (d) Name of the operators worked
21. When calling CQ the transmission should be terminated by  
 (a) K (b) CT (c) AR (d) KN
22. If a readability signal is given as 2, this indicates that the signal is  
 (a) perfectly readable (b) unreadable  
 (c) readable with practically no difficulty (d) readable with considerable difficulty
23. To obtain an indication if a particular International path is open on HF  
 (a) Telephone the licensing authority (b) call CQ country on any HF band  
 (c) look at the propagation forecast (d) examine the whether forecast
24. When operating through VHF repeater  
 (a) give priority to base station nets (b) give priority to mobile stations  
 (c) use only CW (d) do not give breaks between overs
25. Which of the following bands are shared with other services  
 (a) 21.0 – 21.450 MHz (b) 14.0 – 14.350 MHz (c) 7.0 – 7.1 MHz (d) 3.5 – 3.8 MHz

**RAE-1996**  
**General Class**  
**Licensing Conditions Operating Practices and Procedures,**  
**Answers**

1. a   2. b   3. a   4. d   5. a   6. d   7. d   8. d   9. a   10. b  
11. a   12. d   13. a   14.   15. b   16. c   17. c   18. d   19. a   20. d  
21. a   22. d   23. b   24. b   25. d

Q-14 No correct answer. Correct answer is 10 min

Q-15 The answer given is for old regulations. (No Morse for current regulation.)

Q-22 actually no answer for this question.

R2 = Barely readable

R3 = readable with considerable difficulty