

Department of Examination, Sri Lanka

EXAMINATION FOR THE AMATEUR RADIO OPERATORS CERTIFICATE OF PROFICIENCY ISSUED  
BY THE DIRECTOR GENERAL OF TELECOMMUNICATION OF SRI LANKA – OCTOBER 1994

**FUNDAMENTALS OF ELECTRICITY AND RADIO COMMUNICATIONS**  
(GENERAL CLASS)

2 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*

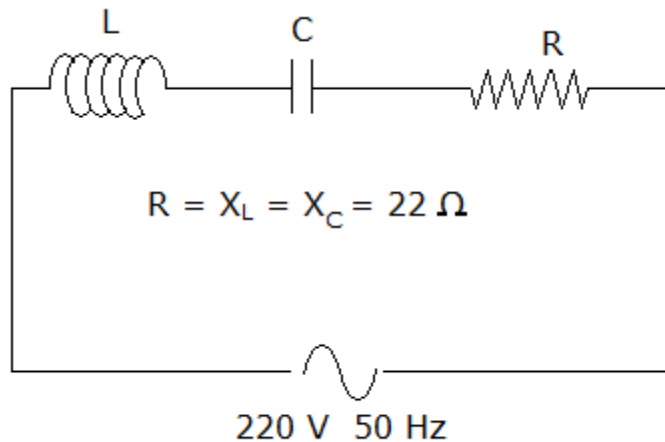
1. The energy stored in any two charges in an electric field as a result of electrostatic force is termed
  - (a) Inductance
  - (b) Capacitance
  - (c) Potential difference
  - (d) None of these
  
2. The energy stored in a capacitor as a function of voltage is given by
  - (a)  $CV^2$
  - (b)  $\frac{1}{2}(V^2/C)$
  - (c)  $\frac{1}{2}CV^2$
  - (d) None of these
  
3. A  $100\ \Omega$ , 1 Watt resistor can sustain a maximum current of
  - (a) 100mA
  - (b) 10A
  - (c) 0.1 A
  - (d) None of these
  
4. Resistor used in the high voltage circuits have
  - (a) Generally a low voltage rating
  - (b) Generally a higher wattage rating
  - (c) Generally a special characteristics to sustain higher voltages
  - (d) None of these
  
5. In a  $5.6\ \Omega$  resistor, color of third strip from left is
  - (a) blue
  - (b) golden
  - (c) silver
  - (d) brown
  
6. Inductive reactance
  - (a) increases with decrease in frequency
  - (b) decreases with decrease in frequency
  - (c) is independent of frequency
  - (d) none of these
  
7. If an EMF of 5 mV is induced by change in current of 2 A, the inductance is
  - (a) 2.5 mH
  - (b) 0.4 mH
  - (c) indeterminate from given data
  - (d) none of these
  
8. The secondary of a 220 V, 12 V transformer drives a load of 100 mA. Primary current is
  - (a) 9.54 A
  - (b) 4.54 mA
  - (c) 2.54 A
  - (d) none of these

9. An ideal coil should have  
 (a) a large bandwidth (b) a small bandwidth  
 (c) a peaked response (d) none of these
10. A resistor connected across a coil  
 (a) peaks its response (b) flattens its response  
 (c) does not have any effect on its bandwidth (d) none of these
11. Total capacitive reactance  $X_r$  of a number of series connected capacitive reactances  $X_{C1}$ ,  $X_{C2}$ ,  $X_{C3}$  is given by  
 (a)  $X_r = X_{C1} + X_{C2} + X_{C3} + \dots$   
 (b)  $X_r = (X_{C1} * X_{C2} * X_{C3} * \dots) / (X_{C1} + X_{C2} + X_{C3} + \dots)$   
 (c)  $1 / X_r = 1 / X_{C1} + 1 / X_{C2} + 1 / X_{C3} + \dots$   
 (d) none of these
12. Quality factor  $Q$  of a coil is given by  
 (a)  $Q = \omega L / R$  (b)  $Q = \omega L R$   
 (c)  $Q = R / \omega L$  (d)  $Q = 1 / \omega L R$
13. Two perfect capacitors  $C_1 = 10 \mu\text{F}$  and  $C_2 = 1000 \mu\text{F}$  are connected in parallel and are fed from a source of  $V = 250 \text{ V}$ ,  $50 \text{ Hz}$ . They draw currents  $I_{C1}$  &  $I_{C2}$  respectively. Then  
 (a)  $I_{C1} > I_{C2}$  (b)  $I_{C1} = I_{C2}$   
 (c)  $I_{C1} < I_{C2}$  (d) none of these
14. Frequency of parallel resonance is given by  
 (a)  $f = 1 / 2\sqrt{LC}$  (b)  $f = \sqrt{LC} / 2\pi$   
 (c)  $f = \sqrt{L / C} / 2\pi$  (d) none of these
15. 220 V, 50 Hz main supply has an RMS voltage of  
 (a)  $220 \sqrt{2}$  Volts (b)  $220 / \sqrt{2}$  Volts  
 (c) 220 Volts (d) none of these
16. If you touch the +ve terminal of 220 V d.c. generator with your feet naked, you are going to  
 (a) get a severe shock; may even prove fatal  
 (b) get a very mild shock throwing you away  
 (c) be unaffected by it  
 (d) none of these
17. "High frequency electromagnetic waves have very short wavelengths" This is a  
 (a) true statement (b) false statement  
 (c) neither of the two (d) partially true statement

18. Gain in an amplifier has dimensions of  
(a) voltage (b) current  
(c) voltage in case of voltage amplifiers and current in case of current amplifiers  
(d) none of these
19. Frequency response of an amplifier gives variation of  
(a) voltage gain Vs frequency (b) current gain Vs frequency  
(c) gain Vs frequency (d) none of these
20. The effect of decreasing the work function of an emitting surface by an electric field applied near the surface is known by the name  
(a) faraday effect (b) hall effect  
(c) schottky effect (d) none of these
21. The process of emission electrons by heating a filament is called.  
(a) thermionic emission (b) high-field emission  
(c) photo emission (d) none of these
22. Intelligence in a "Telegraph signal" is  
(a) In the form of a train of pulses  
(b) A continuous A.C. wave of varied frequencies  
(c) Interrupted A.C. wave  
(d) None of these
23. Signal wave shape of a voice signal  
(a) a square one  
(b) a sinusoidal one  
(c) a trapezoidal one  
(d) a complex wave form consisting of various sinusoidal
24. A complex waveform is composed of frequency components 1 Hz, 3 Hz, 5 Hz, 7Hz & 9 Hz . Its fundamental frequency is  
(a) 9 Hz (b) 12.5 Hz (c) 1 Hz (d) Indeterminate
25. An antenna is 60 cm long. The smallest frequency to which this antenna can be resonant when placed in a horizontal plane is  
(a) 250 MHz (b) 500 MHz (c) indeterminate (d) none of these
26. Give the frequency , a quarter wave dipole has a length of  
(a)  $1.5 \times 10^8 / 2f$  (b)  $1.5 \times 10^8 / f$   
(c)  $1.5 \times 10^8 / 4f$  (d) none of these
27. SWR should be  
(a) as large as possible (b) as small as possible  
(c) as close to unity as possible (d) none of these

28. Day time ionosphere comprises of following layers  
(a) D,E & F<sub>2</sub>                      (b) D,E,F<sub>1</sub> & F<sub>2</sub>                      (c) E, F<sub>1</sub> & F<sub>2</sub>                      (d) D & E
29. Microwaves travel as  
(a) space waves                      (b) sky waves  
(c) ground waves                      (d) surface waves
30. Hartley oscillators is  
(a) an inductively coupled oscillator                      (b) a capacitively coupled oscillator  
(c) suitable for low frequencies                      (d) none of these
31. Balanced modulators are used  
(a) to produce suppressed carrier signals                      (b) to produced SSB signals  
(c) to produce FM signals                      (d) none of these
32. A parallel tuned circuit initially tuned to 1000 kHz was found after some time to be resonant at 800 kHz. A possible methode to restore its resont frequency to the originnal value is to  
(a) put some more turns on the coil  
(b) put another capacitor of appropriate value across the tuned circuit  
(c) take off a few turns from the coil  
(d) none ofthese
33. Sensitivity in a broadcast receiver is provided by  
(a) RF section                      (b) RF and IF sections  
(c) RF, IF and AF sections                      (d) none of these
34. A “push-pull” amplifier gets rid of  
(a) odd harmonics                      (b) even harmonics  
(c) both odd and even harmonics                      (d) none of these
35. The configuration that has the highest input impedance could be  
(a) common base                      (b) common collector  
(c) common emitter                      (d) none of these
36. Increase in collector current due to some reason or other may cause  
(a) Clipping and distortion of applied signals  
(b) Excessive heat generation in load resistor  
(c) Shift of operating point in upword direction  
(d) None of these
37. High frequency response of a transformer coupled amplifier is generally limited by  
(a) transformer’s leakage inductance & distributed capacitance  
(b) transformer’s primary inductance  
(c) transformer’s leakage inductance only  
(d) transformer’s winding capacitance only

38. Doping of semiconductors is
- (a) The process of purifying semiconductor materials
  - (b) The process of adding certain impurities to the semiconductor materials in controlled amounts.
  - (c) The process of converting semiconductor materials into some form of active Device like BJT, FET, UJT etc.
  - (d) One of the steps used in fabrication IC's.
39. The important specification of the zener diode are
- (a) its breakdown voltage and power dissipation.
  - (b) breakdown voltage, dynamic impedance and power dissipation.
  - (c) breakdown voltage and dynamic impedance.
  - (d) none of these.
40. A tunnel rectifier is
- (a) always operated in the negative resistance region.
  - (b) always operated in the forward region.
  - (c) always operated in the reverse region.
  - (d) None of these.
41. In moving coil meters damping is provided by
- (a) A separate pair of magnets called damping magnets.
  - (b) A coil wound on a frame.
  - (c) The aluminium frame on which main coil is wound.
  - (d) none of these
42. A meter that is capable of measuring DC only is
- (a) moving coil meter
  - (b) moving iron meter.
  - (c) thermocouple meter
  - (d) none of these.
43. It is desired to increase the range of a milliammeter of internal resistance  $35 \Omega$  from 2 to 10 mA. It could be achieved with a shunt of
- (a)  $36 \Omega$
  - (b)  $6.75 \Omega$
  - (c)  $42 \Omega$
  - (d)  $8.75 \Omega$
44. In an RC low pass circuit C appears
- (a) In the shunt arm on the input side.
  - (b) In the series arm on the input side.
  - (c) In the shunt arm on the output side.
  - (d) In the series arm on the input side.
45. One of the following circuit types can be used to generate a pulse whenever triggered
- (a) astable multivibrator
  - (b) flip-flop
  - (c) monostable multivibrator
  - (d) none of these



46.

Current (I) in the circuit shown is

- (a) 10 A      (b) 3.33 A      (c) zero      (d) none of these.

47. In a parallel LC circuit at resonance

- (a) impedance is negligible      (b) current is infinite  
 (c) impedance is infinite      (d) impedance is finite and current is zero

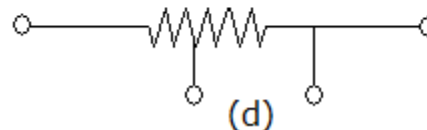
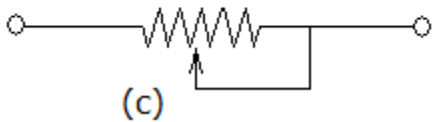
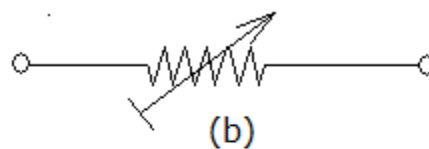
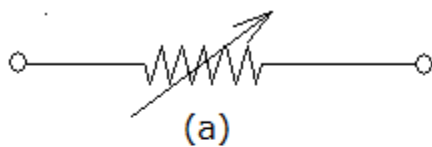
48. Loudness of a signal depends upon its

- (a) phase      (b) frequency      (c) amplitude      (d) quality

49. In metals the electrical conductivity

- (a) increase with temperature      (b) decrease with the temperature  
 (c) is proportional to  $T^5$       (d) is proportional to  $T^5$  at low temperatures

50. A variable resistor is represented by



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**Answers:-**

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

Q48 no meaning for “loudness of a signal” it should be “strength of a signal”

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**LICENSING CONDITIONS, OPERATING PRACTICES AND PROCEDURES.**  
(GENERAL CLASS)

*One hour*

**Index No:-.....**

*Answer all questions on this paper itself..*

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

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1. Unwanted emissions include
  - (a) Any emission, radiation or induction which endangers the functioning of a radio navigation service.
  - (b) Harmonic emission, parasitic emissions, intermodulation products and frequency conversion products.
  - (c) Any emission, radiation or induction which seriously degrades, obstructs or repeatedly interrupts a radio communication services.
  - (d) Any emission of unmodulated carrier.
  
2. An operating method in which transmission is possible in both direction is termed.
 

(a) Simplex operation	(b) Double Side Band Operation
(c) Duplex operation	(d) Multiplex operation
  
3. A station in the mobile service the emission of which are intended to facilitate search and rescue operation is termed correctly
  - (a) Emergency Position – Indicating Radio beacon Station
  - (b) A coast Station
  - (c) A mobile Rescue and Search Station
  - (d) A Radio beacon station
  
4. An emission classified and symbolised by F3E is designated by
  - (a) Frequency Modulation, Telephony, by direct frequency modulation of carrier
  - (b) Frequency Modulation, Telephony by frequency shift keying
  - (c) Facsimile, by direct frequency modulation of carrier
  - (d) Frequency Modulation, Telegraphy for automatic reception
  
5. Amplitude modulation DOUBLE Sideband – Telephony is designated by
 

(a) A3C	(b) A3F	(c) A3E	(d) A2A
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6. If the tape recording of an amateur transmission from another station is to be transmitted
- (a) Call sign of the transmitting station and the call sign of the recorded station must be included
  - (b) All call sign must be omitted.
  - (c) Such transmission is prohibited
  - (d) Call sign of the originated station must be omitted.
7. After having established contact on calling frequency it is always good practice to
- (a) To move to another frequency
  - (b) Proceed to maintain communication on the same frequency
  - (c) Shift to a higher frequency amateur band
  - (d) Shift to a low frequency amateur band
8. Data transmission can be made on the VHF band provided
- (a) the call sign is sent in Morse or Telephony
  - (b) the call sign is sent encoded in ASCII
  - (c) the bandwidth dose not exceed 10 kHz
  - (d) the baud rate is below 300
9. The code to be used when transmitting on HF band on RTTY, is
- (a) Binary Coded Decimal
  - (b) International No.2
  - (c) ASCII
  - (d) Baudot Code
10. When calling a station you should
- (a) put the call sign of the station being called first
  - (b) put the call sign of your station first
  - (c) use your call sign only
  - (d) use the call sign of the called station only
11. When working through a satellite it is best to use
- (a) English or French
  - (b) As much power as possible
  - (c) FM only
  - (d) Sufficient power to maintain reliable communication
12. Which uses the correct phonetic alphabet for the word BYTE
- (a) BRAVO YANKEE TANGO ECHO
  - (b) BERTY YORK THOMAS EDWARD
  - (c) BRAVO YORK THOMAS ECHO
  - (d) BRAVO YANKEE TANGO EDWARD
13. Which uses the correct phonetic alphabet for the word JOHN
- (a) JULIET OLIVER HARRY NELLIE
  - (b) JULIET OSCAR HOSPITAL MOVEMBER
  - (c) JULIET OSCAR HOTEL NOVEMBER

- (d) JULIET OLIVER HOTEL NOVEMBER
14. Which of the following groups use the correct phonetic alphabet
- DELTA GOLF LIONEL PETER
  - DELTA GEORGE LIONAL PETER
  - DAVID GEORGE LIONAL PETER
  - DELTA GOLF LIMA PAPA
15. Meaning of the abbreviation  $\overline{AR}$  is
- End of work
  - End of transmission
  - All received
  - Waiting period
16. Meaning of the abbreviation  $\overline{KA}$  is
- Go ahead-specific station
  - Starting signal
  - Go ahead-any station
  - End of QSO
17. Meaning of the abbreviation BK is
- All between
  - Reply to a request
  - Signal used to interrupt a transmission in progress
  - Signal to mark the separation between different parts of the same transmission
18. Meaning of the Q code QRS? is
- Shall I stop sending?
  - Shall I send more slowly?
  - Are you busy?
  - Are my signal fading?
19. Q Code abbreviation for 'shall I send faster?' is
- QRQ ?
  - QRT ?
  - QRM ?
  - QRZ ?
20. Q Code abbreviation for 'stop sending' is
- QRL
  - QRN
  - QRT
  - QRU
21. In RST code, unreadable, weak signal of rough low pitched A.C. note is denoted by
- 222
  - 234
  - 134
  - 133
22. In RST code signal denoted by 454 is
- Readable with considerable difficulty, fair signal, rough low-pitched note
  - Barely readable, fairly good signal, musically modulated note
  - Readable with practically no difficulty, fairly good signal, rough A.C. note
  - Readable with practically no difficulty, fairly good signal, rough low pitched A.C. note
23. When a station is being used from a temporary premises, the address must be transmitted
- At least every 15 minutes
  - Only at end of QSO
  - At least every 5 minutes
  - Not required at all

24. If a station is operated by visiting amateur other than the licence of the station, following must be entered in the log book.
- (a) Call sign of the operator
  - (b) Full name of the operator
  - (c) Full name and call sign of the operator
  - (d) Call sign of the licence of the amateur station
25. A visiting amateur with a foreign licence call sign, UK7AB will have the call sign
- (a) 4S7/UK7AB
  - (b) UK7AB/4S7
  - (c) UK7AB/G
  - (d) UK7AB/P

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**Answers :-**

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