

Department of examination Sri Lanka  
 EXAMINATION FOR THE AMATEUR RADIO OPERATORS' CERTIFICATE OF PROFICIENCY  
 ISSUED BY THE DIRECTOR GENERAL OF TELECOMMUNICATIONS, SRI LANKA – July 1997  
 (NOVICE CLASS)

**BASIC ELECTRICITY, RADIO & ELECTRONICS THEORY**

*Two hours*

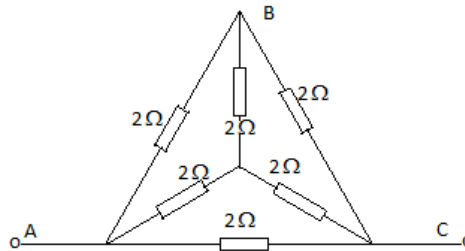
**Index No.** .....

*Answer all questions on this paper itself.  
 A minimum of 50 marks is required for a pass.  
 Pick out the correct answer and underline it.*

1. henry is a unit of  
 (a) Resistance                      (b) Inductance                      (c) Capacitance                      (d) Frequency
  
2. The rms value of the 230V, 50Hz main supply is  
 (a) 230 V                              (b)  $230\sqrt{2}$  V                      (c)  $230/\sqrt{2}$  V                      (d)  $2 \times 230\sqrt{2}$  V
  
3. 0.1mF capacitance is equivalent to  
 (a)  $1 \times 10^{-5}$  F                      (b)  $1 \times 10^{-6}$  F                      (c)  $1 \times 10^{-7}$  F                      (d)  $1 \times 10^{-8}$  F

4. The value of the effective resistance between A and C in the circuit shown is

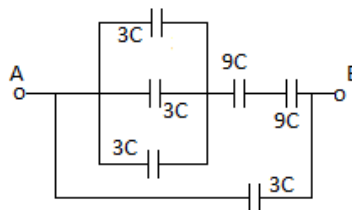
- (a)  $\frac{1}{2} \Omega$
- (b)  $1 \Omega$
- (c)  $\frac{3}{2} \Omega$
- (d)  $2 \Omega$



5. The length of a current carrying conductor is doubled. The resistance will be  
 (a) half                      (b) one fourth                      (c) twice                      (d) same

6. What is the total capacitance between the points A and B in the given circuit?

- (a) C
- (b) 3C
- (c) 6C
- (d) 9C



7. The reactance of a 4mH smoothing choke at a frequency of 50Hz is  
 (a)  $4 \times 10^{-1} \pi \Omega$                       (b)  $4 \times 10^{-2} \pi \Omega$                       (c)  $2 \times 10^{-1} \pi \Omega$                       (d)  $2 \times 10^{-2} \pi \Omega$

8. The prefix “mega” is equivalent to

- (a)  $10^3$       (b)  $10^{-3}$       (c)  $10^6$       (d)  $10^{-6}$

9. The resonant frequency of a tuned (LRC) circuit is given by

- (a)  $\frac{1}{2\pi\sqrt{LC}}$       (b)  $\frac{1}{2\pi}\sqrt{\frac{L}{C}}$       (c)  $\frac{1}{2\pi}\sqrt{LC}$       (d)  $\frac{2\pi}{\sqrt{LC}}$

10. The output signal of a balanced modulator is

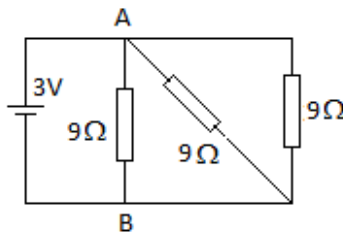
- (a) DSB      (b) AM      (c) FM      (d) SSB

11. The wavelength of a signal at 60MHz in free space is

- (a) 1m      (b) 5m      (c) 10m      (d) 50m

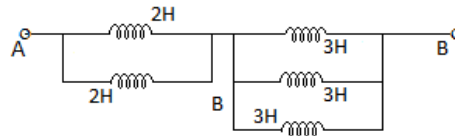
12. What is the value of the current flowing in branch AB in the given circuit?

- (a)  $1/3$  A  
 (b)  $2/3$  A  
 (c) 1 A  
 (d)  $3/2$  A



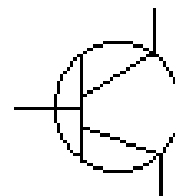
13. The total value of inductance between A and B in the circuit shown is

- (a)  $1/2$  H  
 (b) 1 H  
 (c)  $3/2$  H  
 (d) 2 H



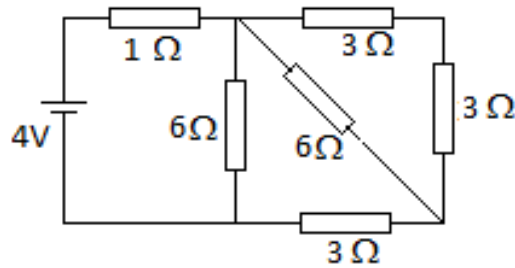
14. The symbol shown indicates a

- (a) npn transistor      (b) pnp transistor  
 (c) field effect transistor      (d) diode



15. The power dissipation of the  $1\Omega$  resistor in the circuit shown is

- (a) 250 mW
- (b) 500 mW
- (c) 1W
- (d) 2W



16. The input power of a transmitter running at 24V, 0.5A is

- (a) 6W
- (b) 12W
- (c) 18W
- (d) 24W

17. 0.01 microhenry inductance is equivalent to

- (a)  $1 \times 10^{-5}$  H
- (b)  $1 \times 10^{-6}$  H
- (c)  $1 \times 10^{-7}$  H
- (d)  $1 \times 10^{-8}$  H

18. When 1V emf is applied across 1 F capacitor, the energy stored in the capacitor is

- (a)  $\frac{1}{2}$  J
- (b) 1 J
- (c) 2J
- (d) 4 J

19. As the frequency decreases the reactance of an inductor is

- (a) decreases
- (b) stay constant
- (c) increases
- (d) none of the above

20. The wavelength of a signal in the free space is 100m. What is its frequency?

- (a) 1MHz
- (b) 10MHz
- (c) 100MHz
- (d) 3MHz

21. The frequency range from 30MHz to 300 MHz is generally referred to as

- (a) Low Frequency
- (b) High Frequency
- (c) Very High Frequency
- (d) Ultra High Frequency.

22. A half wave antenna is resonant at 30MHz. Its approximate length will be

- (a) 2.5m
- (b) 5m
- (c) 7.5m
- (d) 10m

23. In the ionosphere, the lowest layer is known as

- (a) D layer
- (b) E layer
- (c) F<sub>1</sub> layer
- (d) F<sub>2</sub> layer

24. In a series RLC circuit, at resonance the impedance is

- (a) zero
- (b) minimum
- (c) maximum
- (d) infinity

25. A transformer is used to change the value of

- (a) voltage
- (b) frequency
- (c) power
- (d) none of the above

26. To measure the voltage of a circuit a voltmeter must be connected in  
 (a) series with the circuit (b) parallel with the circuit  
 (c) either series or parallel with the circuit (d) none of the above
27. The equation which does not give the power dissipated in a resistor R is  
 (a)  $P = I^2/R$  (b)  $P = I^2 R$  (c)  $P = V^2/R$  (d)  $P = VI$
28. The magnification factor of a series (LRC) circuit is given by  
 (a)  $Q = \frac{\omega L}{R}$  (b)  $Q = \omega L R$  (c)  $Q = \frac{\omega C}{L}$  (d)  $Q = \frac{\omega L}{C}$
29. The purpose of adding reflectors and director to a folded dipole antenna is to  
 (a) increase its impedance (b) decrease its impedance  
 (c) make it unbalance (d) none of the above
30. The moving coil instrument can be used to measure  
 (a) dc values only (b) ac values only  
 (c) both dc and ac values (d) none of the above
31. A transformer is laminated to  
 (a) reduce hysteresis loss (b) increase exciting current  
 (c) reduce eddy current losses (d) increase magnetic flux
32. The megger is used for  
 (a) measuring current (b) measuring voltage  
 (c) measuring power (d) testing insulation
33. A varactor diode acts as a variable  
 (a) resistance (b) capacitance (c) inductance (d) voltage regulator
34. The electric field of an antenna is perpendicular to the earth's surface. The polarization of the antenna is  
 (a) horizontal (b) vertical (c) circular (d) none of the above.
35. The ability of a receiver to separate signals on different frequencies is defined as  
 (a) stability (b) screening (c) selectivity (d) sensitivity

36. The total power content of an AM signal is 200W and the percent modulation is 100%. The power transmitted by the carrier is

- (a) 66.66W                      (b) 133.32 W                      (c) 33.32 W                      (d) 200W

37. Over modulation occurs when the modulation index (m) is such that

- (a)  $m = 0$                       (b)  $m = 1$                       (c)  $m < 1$                       (d)  $m > 1$

38. The ionosphere layer which has the greatest effect on radio signals is the

- (a) D layer                      (b) E layer                      (c) F layer                      (d) none of the above

39. An antenna whose input impedance is  $75\Omega$  should have a feeder link with an impedance of

- (a)  $50\Omega$                       (b)  $75\Omega$                       (c)  $150\Omega$                       (d)  $300\Omega$

40. Shunt should have

- (a) zero resistance                      (b) very low resistance                      (c) high resistance                      (d) infinity resistance

41. The energy stored in an inductor L is given by

- (a)  $LI/2$                       (b)  $LI^2/2$                       (c)  $LV/2$                       (d)  $LV^2/2$

42. 35.1MHz is the third harmonic of

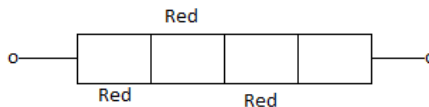
- (a) 11.7MHz                      (b) 70.2MHz                      (c) 105.3MHz                      (d) 175.5MHz

43. What is the characteristic impedance of a transmission line which has a capacitance of  $50\text{pF/m}$  and an inductance of  $0.5\ \mu\text{H/m}$ .

- (a)  $10\Omega$                       (b)  $100\Omega$                       (c)  $500\Omega$                       (d)  $50\Omega$

44. The value of the resistor shown in the figure is

- (a)  $22\Omega$   
(b)  $220\Omega$   
(c)  $2200\Omega$   
(d)  $22\text{k}\Omega$



45. For better signal reception, S/N ratio should be

- (a) low                      (b) medium                      (c) high                      (d) zero

46. Signals in the VHF range uses

- (a) sky wave propagation                      (b) space wave propagation  
(c) ground wave propagation                      (d) any one of these

47. The automatic gain control (AGC) circuit is usually used to control the gain of the  
 (a) mixer      (b) detector      (c) IF amplifier      (d) audio amplifier
48. A 75MHz carrier signal having an amplitude of 50V is modulated by a 3kHz audio signal having an amplitude of 20V. The modulation factor of the amplitude modulated wave is  
 (a) 0.4      (b) 0.6      (c) 0.8      (d) 1.0
49. The unit of frequency is  
 (a) Ampere      (b) Volt      (c) Ampere . meter      (d) Hertz
50. 3dB power gain is equivalent to an increase of gain by  
 (a) 2 times      (b) 3 times      (c) 10 times      (d) 30 times.

**Answers for 1997-July**  
**Basic Electronic ....**

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

Q-3 No answer. Answer is  $1 \times 10^{-4} \text{ F}$

Q-20 "What is the wavelength?" should be correct as "What is the frequency?" ( I corrected)

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**LICENCING CONDITIONS, OPERATING PRACTICES AND PROCEDURES**

*One hour*

**Index No.** .....

*Answer all questions on this paper itself.*

*A minimum of 50 marks is required for a pass.*

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

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1. Q-code abbreviation "QRK" means
  - (a) What is the readability of my signal?
  - (b) What is the tone of my transmission?
  - (c) What is the strength of my signal?
  - (d) Does my frequency vary?
  
2. Q-code abbreviation "QRP" means
  - (a) Shall I send more slowly?
  - (b) Shall I send faster?
  - (c) Shall I decrease power?
  - (d) Shall I increase power?
  
3. Q-code abbreviation "QRS" means
  - (a) Shall I change to another frequency?
  - (b) Shall I stop sending?
  - (c) Shall send faster?
  - (d) Shall I send more slowly?
  
4. Q-code abbreviation "QSV" means
  - (a) Shall I change to another frequency?
  - (b) Shall I send a series of Vs?
  - (c) Shall I stop sending?
  - (d) Shall I send each word more than once?
  
5. "I am busy" is given by the Q-code
  - (a) QRL
  - (b) QRM
  - (c) QRN
  - (d) QRV
  
6. "Increase power" is given by the Q-code
  - (a) QRP
  - (b) QSY
  - (c) QRO
  - (d) QSV
  
7. "Send each word twice" is given by the Q-code
  - (a) QSQ
  - (b) QSY
  - (c) QSV
  - (d) QRS
  
8. Using voice modulation F3E corresponds to
  - (a) PM
  - (b) FM
  - (c) DSB
  - (d) SSB
  
9. Using voice transmission A3E corresponds to
  - (a) SSB with suppressed carrier
  - (b) FM
  - (c) SSB with full carrier
  - (d) DSB

10. Amplitude modulated single side band full carrier is denoted by  
(a) A3E      (b) G3E      (c) H3E      (d) J3E
11. What emission designator describes PM (phase modulation) voice transmission ?  
(a) H3E      (b) J3E      (c) F3E      (d) G3E
12. Abbreviation "VA" means  
(a) end of message      (b) end of work      (c) starting signal      (d) stand by
13. Abbreviation "AR" means  
(a) end of message      (b) end of work      (c) starting signal      (d) stand by
14. Abbreviation for "Invitation to a particular station to transmit" is  
(a) K      (b) KA      (c) KN      (d) AR
15. Abbreviation for "starting signal" is  
(a) AR      (b) AS      (c) KN      (d) KA
16. The amateur radio equipment cannot be used for  
(a) intercommunication      (b) transmitting news  
(c) self training      (d) none of the above
17. Which of the following types of messages can be transmitted over amateur radio.  
(a) messages relating to technical investigation .  
(b) those of personal affairs.  
(c) the words of a third party publicly spoken.  
(d) all the above are correct.
18. All times entered in the station log book shall be in  
(a) BST      (b) local time      (c) UTC      (d) any of the above.
19. In the RST code, S represents  
(a) Signal strength      (b) specific station      (c) starting signal      (d) secret code
20. During transmission , amateur stations are required to transmit their call signs at intervals not exceeding  
(a) 7 minutes      (b) 5 minutes      (c) 3 minutes      (d) 2 minutes



21. In amateur transmission , it is not permissible to use  
 (a) secret code (b) plain language  
 (c) international phonetic alphabet (d) the words of third party publicly spoken
22. When transmissions are made it is always better to use  
 (a) phone patched traffic (b) Q-code  
 (c) plain language (d) secret code
23. Which of the following can be entered in the station logbook?  
 (a) transmitting power (b) test carried out  
 (c) station operated at temporary locations (d) all the above are correct
24. The correct phonetic alphabet for the word “STAR” is  
 (a) Sierra, Thomas, Alpha, Romeo. (b) Sierra, Tango, Alpha, Romeo  
 (c) Sarah, Thomas, Alpha, Robert. (d) Sarah, Tango, Alpha, Robert
25. The correct group of international phonetic alphabet is  
 (a) Oscar, Victor, Yankee, Zulu (b) Oscar, Victor, York, Zulu  
 (c) Oscar, Victor, Yankee, Zero (d) Oscar, Violet, York, Zero

**Licencing conditions.....**

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

Q-7 No answer. Answer is QSZ

Q-10 typing error. “single side band” typed as “signal – side band” (I corrected )