

EXAMINATION FOR THE AMATEUR RADIO OPERATORS' CERTIFICATES OF PROFICIENCY
ISSUED BY THE DIRECTOR GENERAL OF TELECOMMUNICATIONS, SRI LANKA - (1998)
(NOVICE CLASS)

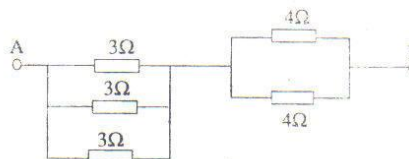
Basic Electricity, Radio and Electronics Theory Two hours

Index No. :

8. 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.

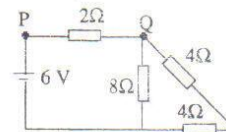
1. Farad is a unit of
(a) Resistance. (b) Inductance. (c) Capacitance. (d) Frequency.
2. The rms value of the 230 V, 50 Hz main supply is
(a) 230 V (b) $230\sqrt{2}$ V (c) 2×230 V (d) $230\sqrt{3}$ V
3. 0.1 pF capacitance is equivalent to
(a) 1×10^{-12} F (b) 1×10^{-13} F (c) 1×10^{-9} F (d) 1×10^{-10} F
4. The length of a current carrying conductor is halved, the resistance will become
(a) half. (b) double. (c) one fourth. (d) same.

5. The effective resistance between A and B in the circuit shown is
(a) 1 Ω (b) 2 Ω
(c) 3 Ω (d) 4 Ω



6. The unit of frequency is
(a) Hertz. (b) Volt.
(c) Ampere. (d) Ampere meter.

7. What is the magnitude of the current flowing through PQ in the given circuit?
(a) 1 A (b) 2 A
(c) 3 A (d) 4 A



8. The prefix "micro" is equivalent to
(a) 10^{-3} (b) 10^{-6}
(c) 10^3 (d) 10^6

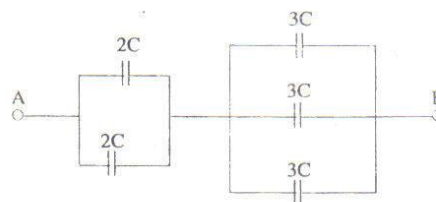
9. A 100 Ω resistor dissipates a power of 1 W. The current flowing across the resistor is
(a) 0.01 A (b) 0.1 A (c) 1 A (d) 10 A

10. The input power of a transmitter running at 48 V, 2 A is
(a) 24 W (b) 48 W (c) 96 W (d) 192 W

11. The frequency range from 3 MHz to 30 MHz is generally referred to as
(a) low frequency. (b) high frequency. (c) very high frequency. (d) ultra high frequency.

12. What is the total capacitance between the points A and B?

- (a) $C/2$ (b) C
(c) $13C/36$ (d) $36C/13$

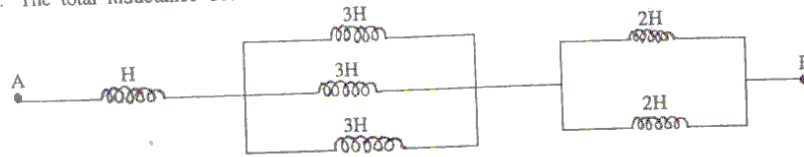


13. The reactance of a 2 mH smoothing choke at a frequency of 50 Hz is

- (a) $1 \times 10^{-4} \pi \Omega$ (b) $2 \times 10^{-2} \pi \Omega$
(c) $4 \times 10^{-4} \pi \Omega$ (d) $2 \times 10^{-1} \pi \Omega$

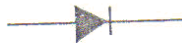
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14. A half-wave antenna is resonant at 60 MHz. Its approximate length will be
 (a) 2.5 m (b) 5 m (c) 10 m (d) 20 m
15. The output signal of a balanced modulator is
 (a) SSB (b) DSB (c) AM (d) FM
16. In the ionosphere, the lowest layer is known as
 (a) D layer. (b) E layer. (c) F_1 layer. (d) F_2 layer.
17. The energy stored in an inductor L is given by
 (a) $\frac{1}{2} LI$ (b) $\frac{1}{2} LV$ (c) $\frac{1}{2} LI^2$ (d) $\frac{1}{2} LIV$
18. The radiation resistance of a dipole antenna is
 (a) 50 Ω . (b) 75 Ω . (c) 150 Ω . (d) 300 Ω .
19. The wavelength of a signal at 100 MHz in free space is
 (a) 0.3 m (b) 3 m (c) 10 m (d) 20 m
20. Envelope or diode detector is used for the detection of
 (a) AM signals. (b) FM signals. (c) SSB signals. (d) CW signals.
21. The total inductance between A and B in the circuit shown is



- (a) H (b) 2H (c) 3H (d) 4H
22. A varactor diode acts as a variable
 (a) resistance. (b) inductance. (c) capacitance. (d) none of the above
23. overmodulation occurs when the modulation index (m) is such that
 (a) $m = 0$ (b) $m = 1$ (c) $m < 1$ (d) $m > 1$
24. The magnification factor of a parallel (LRC) circuit is given by
 (a) $Q = \frac{\omega L}{R}$ (b) $Q = \omega LR$ (c) $Q = \frac{\omega C}{L}$ (d) $Q = \frac{\omega L}{C}$
25. A transformer is laminated to
 (a) reduce hysteresis losses. (b) increase exciting current.
 (c) reduce eddy current losses. (d) increase magnetic flux.
26. The electric field of an antenna is perpendicular to the earth's surface. The polarization of the antenna
 (a) horizontal. (b) vertical. (c) circular. (d) none of the above
27. An antenna whose input impedance is 75 Ω should have a feeder link with an impedance of
 (a) 50 Ω (b) 75 Ω (c) 150 Ω (d) 300 Ω
28. The resonant frequency of a tuned (LRC) circuit is given by
 (a) $\frac{2\pi}{\sqrt{LC}}$ (b) $\frac{1}{2\pi\sqrt{LC}}$ (c) $\frac{1}{2\pi} \sqrt{\frac{L}{C}}$ (d) $\frac{1}{2\pi} \sqrt{\frac{C}{L}}$
29. The magnification factor of a series (LRC) circuit is given by
 (a) $Q = \frac{\omega L}{R}$ (b) $Q = \frac{\omega C}{L}$ (c) $Q = \frac{\omega L}{C}$ (d) $Q = \omega LR$
30. 27.3 MHz is the third harmonic of
 (a) 9.1 MHz (b) 13.65 MHz (c) 54.6 MHz (d) 81.9 MHz
31. 0.1 microhenry inductance is equivalent to
 (a) 1×10^{-5} (b) 1×10^{-6} (c) 1×10^{-7} (d) 1×10^{-8}
32. When 4 V emf is applied across 1 F capacitor, the energy stored in the capacitor is
 (a) 2 J (b) 4 J (c) 8 J (d) 16 J

31. A transformer is used to change the value of
 (a) voltage. (b) power. (c) frequency. (d) none of these.

32. The symbol shown indicates a 

- (a) diode. (b) pnp transistor. (c) npn transistor. (d) zenor diode.

33. 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.

34. The meggar is used for
 (a) measuring current. (b) measuring voltage. (c) measuring power. (d) testing insulation.

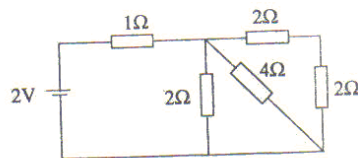
35. The automatic gain control (AGC) circuit is usually used to control the gain of the
 (a) mixer. (b) detector. (c) audio amplifier. (d) IF amplifier.

36. The purpose of adding reflectors and a director to a folded dipole antenna is to
 (a) increase its impedance. (b) decrease its impedance.
 (c) make it unbalanced. (d) none of the above.

37. 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.

38. As the frequency increases, the reactance of an inductor.
 (a) decreases. (b) increases.
 (c) stays constant. (d) none of the above.

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



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

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

- (a) 33.33 W (b) 66.67 W (c) 16.66 W (d) 100 W

41. When antenna length is halved the resonant frequency
 (a) becomes half. (b) becomes double. (c) remains constant. (d) none of the above.

42. In a series RLC circuit at resonance the impedance is
 (a) zero. (b) minimum. (c) maximum. (d) infinity.

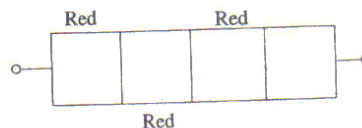
43. The ionosphere layer which has the greatest effect on a radio signal is
 (a) D layer. (b) E layer. (c) F layer. (d) none of these layers.

44. 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) $50\ \Omega$

45. A coil has a resistance of $5\ \Omega$ and a reactance of $12\ \Omega$. The impedance is
 (a) $7\ \Omega$ (b) $12\ \Omega$ (c) $13\ \Omega$ (d) $17\ \Omega$

46. The Ratio detector is used for the detection of
 (a) CW signals. (b) SSB signals. (c) AM signals. (d) FM signals.

47. The value of the resistor shown in the figure is
 (a) $22\ \Omega$ (b) $33\ \Omega$
 (c) $2200\ \Omega$ (d) $3300\ \Omega$



48. The basic concept of FM is to vary the
 (a) amplitude of the carrier signal.
 (b) amplitude of the modulating signal
 (c) frequency of the carrier signal.
 (d) frequency of the modulating signal

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EXAMINATION FOR THE AMATEUR RADIO OPERATORS' CERTIFICATES OF PROFICIENCY
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(NOVICE CLASS)

Licensing Conditions, Operating Practices and Procedures One hour

Index No. :

Answer all questions on this paper itself.

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Pick out the correct answer and underline it.

- Q - code abbreviation "QRH" means
(a) What is the readability of my signals? (b) What is the tone of my transmission?
(c) Will you tell me my exact frequency? (d) Does my frequency vary?
- Q - code abbreviation "QSB" means
(a) Is my keying defective? (b) Are my signals fading?
(c) Are you being interfered with? (d) Are you troubled by static?
- Q - code abbreviation "QSL" means
(a) Can you give me acknowledgement of receipt? (b) What is the strength of my signals?
(c) Shall I change to another frequency? (d) Shall I send each word more than once?
- Q - code abbreviation "QTR" means
(a) Shall I send more slowly? (b) Shall I stop sending?
(c) What is the correct time? (d) What is your location?
- "Decrease power" is given by Q - code
(a) QRM (b) QRN (c) QRO (d) QRP
- "Send more slowly" is given by Q - code
(a) QRQ (b) QRS (c) QRT (d) QRU
- "I am ready" is given by Q - code
(a) QSV (b) QSY (c) QRU (d) QRV
- Using voice modulation H3E corresponds to
(a) SSB with suppressed carrier (b) FM
(c) SSB with full carrier (d) DSB
- Amplitude modulated single side band with suppressed carrier is denoted by
(a) J3E (b) H3E (c) G3E (d) A3E
- Using voice transmission A3E corresponds to
(a) SSB (b) DSB (c) FM (d) PM
- Abbreviation KN means
(a) invitation to a particular station to transmit. (b) invitation to any station to transmit.
(c) starting signal. (d) end of message or communication.
- Abbreviation for "invitation to any station to transmit" is
(a) KA (b) KN (c) K (d) AS
- Abbreviation for "end of message" is
(a) VA (b) KA (c) AS (d) AR
- Which of the following types of messages can be transmitted over amateur radio?
(a) Messages for a pecuniary reward. (b) Messages of a religious nature.
(c) Messages on behalf of a third party. (d) Those of personal affairs.
- The amateur radio equipment can not be used for
(a) transmitting advertisements. (b) technical investigations.
(c) intercommunications. (d) self training.

[Turn over

16. In amateur transmission, it is not permissible to use
(a) plain languages. (b) phonetic alphabet. (c) secret code. (d) Q - code.
17. Which of the following need not to be entered in the station log book?
(a) Call sign of calling station (b) Call sign of the called station
(c) Station operated at a temporary location (d) Transmitter power
18. Which of the following represents a valid amateur station log?
(a) In an exercise book (b) On a magnetic tape or disc
(c) On any electronic storage media (d) All the above are correct
19. Before initiating a 'CQ' call
(a) keep giving your call sign. (b) listen on the frequency.
(c) send a series of VS. (d) All the above are correct.
20. Classes of emission are designated by groups of a minimum of three characters. The third character
(a) type of modulations of the main carrier.
(b) nature of signal(s) which is used to modulate the main carrier.
(c) type of information to be transmitted.
(d) none of the above.
21. In the RST code, T is for
(a) time of transmission. (b) transmitter power.
(c) temperature of PA stage. (d) tone.
22. During transmission, amateur stations are required to transmit their call signs at intervals of not
(a) 7 minutes. (b) 5 minutes. (c) 3 minutes. (d) 2 minutes.
23. Telegraphy by on-off keying of an amplitude-modulated audio frequency for automatic reception by
(a) A1B (b) A1A (c) A2B (d) A2A
24. The correct phonetic alphabet for the word "GOLD" is
(a) Groge, Oscar, Lima, Delta. (b) Golf, Oscar, Lima, David.
(c) Golf, Oscar, Lima, Delta. (d) Golf, Oliver, Lima, David
25. The correct group using the international phonetic alphabet is
(a) Alpha, Mary, Sarah, York. (b) Alpha, Mary, Sierra, York.
(c) Alpha, Mike, Sarah, Yankee. (d) Alpha, Mike, Sierra, Yankee.

Answers for 1998

Basic Electronic

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

Licencing conditions.....

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