Department of Examinations, Sri Lanka

EXAMINATION FOR THE AMATEUR RADIO OPERATORS' CERTIFICATE OF PROFICIENCY ISSUED BY THE DIRECTOR GENERAL OF TELECOMMUNICATIONS, SRI LANKA – 2004

(NOVICE CLASS)

Basic Electricity, Radio and Electronics Theory

Two hours

Index No: ……

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

Pick out the correct answer and **underline it.** Pass mark 50%

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1. What is the unit of electromotive force?

(a) volt (b) ampere (c) watt (d) ohm

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

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

3. The electric field of an antenna is perpendicular to the earth's surface. The antenna's polarization is

(a) horizontal (b) circular (c) vertical (d) none of the above

4. A half wave antenna is resonant at 30 MHz. It's approximate length will be

(a) 40 m (b) 20 m (c) 10 m (d) 5 m

5. Ohm's law is

(a) $V \alpha I$ (b) $V \alpha R$ (c) $V \alpha I^2$ (d) $V \alpha 1/I$

6. Signal in the UHT range uses

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

7. The basic concept of FM is to vary the

(a) carrier frequency (b) modulating frequency
(c) carrier amplitude (d) any of these

8. A beat frequency oscillator (BFO) is used in the demodulation of

(a) AM signal (b) SSB or CW signal (c) FM signal (d) PM signal

9. The characteristic impedance of a lossless transmission line is given by

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

10. An advantage of SSB over AM and DSB is

(a) less power consumption (b) less spectrum space
(c) less cost (d) good quality

11. SWR of ideal transmission line is

(a) infinity (b) zero (c) one (d) none of the above

12. Frequency shift keying is basically a method involving

(a) AM (b) FM (c) PM (d) none of those

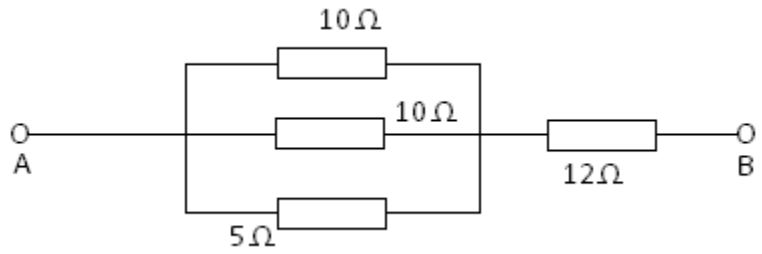
13. The ability of a receiver to pick up signals is

(a) screening (b) powerfulness (c) selectivity (d) sensitivity

14. The inductance of a wire is directly proportional to

(a) the surface area of the conductor (b) the length of the conductor
(c) the resistivity of the material (d) the area of the cross section of the conductor

15. Effective resistance between A and B is



(a) 12.4 Ω
(b) 37 Ω
(c) 1/37 Ω
(d) 14.5 Ω

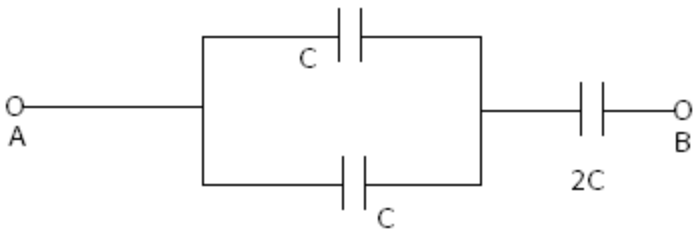
16. When the cross section of a current carrying conductor is doubled it's conductance

(a) becomes 4 times (b) becomes double
(c) becomes half (d) becomes quarter

17. What is the energy stored in 2H inductor carrying current of 2 amps ?

(a) 4W (b) 2W (c) 4 J (d) 2 J

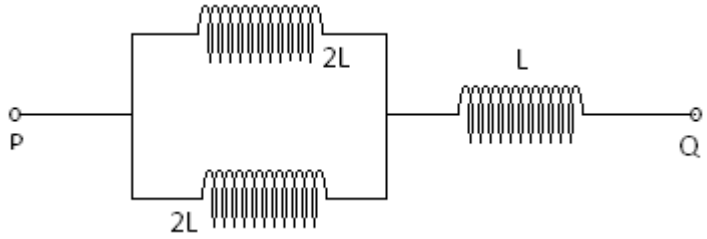
18. Capacitance between A and B in the circuit is



(a) C
(b) 2½ C
(c) 4 C
(d) ¼ C

19. Inductance between P and Q in the circuit is

(a) 2L
(b) L/2
(c) 5L
(d) ⅕L



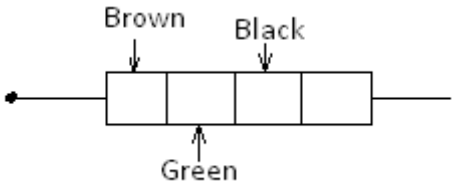
20. A transformer is terminated to reduce
    (a) eddy current loss (b) exciting current loss
    (c) hysteresis loss (d) vibration loss

21. The symbol shown indicates a
    (a) light emitting diode (b) Very cap diode
    (c) Silicon valve diode (d) Zener diode

22. The reactance of a 20H smoothing choke at a frequency of 50 Hz is
    (a) 2π kΩ (b) 2 kΩ (c) 2π Ω (d) 2 Ω

23. A varactor diode acts as a variable
    (a) resistance (b) inductance (c) capacitance (d) voltage

24. The value of the resistor shown in the figure is
    (a) 15 Ω
    (b) 16 Ω
    (c) 150 Ω
    (d) 160 Ω



25. Moving iron instruments are used for
    (a) only a.c. measurements (b) both a.c and d.c. measurements
    (c) only d.c. measurements (d) none of the above

26. A 12 Ω resistor consumes a current of 1 A. The power dissipated in the resistor is
    (a) 12 W (b) 24 W (c) 120 W (d) 144 W

27. The ability of a receiver to separate signals on different frequencies is
    (a) stability (b) filterability (c) sensitivity (d) selectivity

28. A coil has a resistance of 12 Ω and reactance of 5 Ω. The impedance is
    (a) 5 Ω (b) 12 Ω (c) 13 Ω (d) 17 Ω

29. Which amplifiers are used to increase the RF power level in AM transmitters?
    (a) Class A (b) Class B (c) Class C (d) Class AB

30. A 50 Ω resistor dissipates 2 watts of power. The voltage across the resistor is
(a) 10 V (b) 12.5 V (c) 25 V (d) 100 V

31. Power factor of a pure inductor is
(a)zero (b) 1/√2 (c) √($^3/_2$) (d) 1

32. The peak value of the 230 V, 50 Hz mains supply is
(a) 230 V (b) 230√2 V (c) 2x230√2 V (d) 230/√2 V

33. To measure the voltage of a circuit, a voltmeter must be connected in
(a) parallel with the circuit (b) series with the circuit
(c) either series or parallel with the circuit (d) none of the above

34. The megger is used for
(a) testing time (b) testing insulation
(c) measuring ground resistance (d) testing coupling

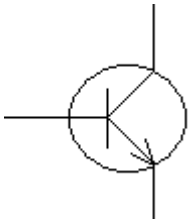
35. Energy stored in a capacitor is
(a) $\frac{1}{2}CV^2$ (b) $\frac{1}{2}CV$ (c) $\frac{1}{2}C^2V$ (d) none of the above

36. The radiation resistance of a folded dipole antenna is
(a) 300 Ω (b) 75Ω (c) 50 Ω (d) 25Ω

37. For biasing a silicon transistor the base-emitter voltage must be about
(a) 1.0 V (2) 0.7 V (c) 0.65 V (d) 0.3 V

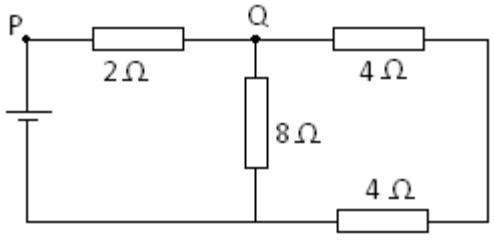
38. 35.1 MHz is the third harmonic of
(a) 175.5 MHz (b) 105.3 MHz (c) 70.2 MHz (d) 11.7 MHz

39. The symbol shown indicates a
(a) pnp bipolar transistor
(b) uni-junction transistor
(c) P-channel FET
(d) npn bipolar transistor



40. Farad is unit of
(a) inductance (b) capacitance
(c) LRC circuit resonance frequency (d) RC circuit resonance frequency

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



42. 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

43. In the ionosphere, the lowest level is known as
(a) D layer (b) E layer (c) F_1 layer (d) F_2 layer

44. Over modulation occurs when the modulation index (m) is such that
(a) $m = 0$ (b) $m = 1$ (c) $m < 0$ (d) $m > 1$

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

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

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

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

49. 0.1 microhenry inductance is equivalent to
(a) $1x10^{-5}$ H (b) $1x10^{-6}$ H (c) $1x\ 10^{-7}$ H (d) $1x10^{-8}$ H

50. The unit of electric charge is
(a) volt (b) volt/meter (c) coulomb (d) coulomb/sq. meter

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Answers

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

Q-6 question is wrong (no meaning of “UHT”)
Q-8 typing error in the original Q-paper ((b) SSB or **S**W signal)
Q-16 question is not clear (cross sectional area or diameter???)
Q-21 no symbol available
Q-41 Can’t solve. Necessary data has not given. (EMF and the internal resistance of the cell or the voltage across the terminals of the cell)
Q-50 typing error in the original Q-paper. (electric typed as electronic)