

Department of Examinations, Sri Lanka  
Examination for the issue of Amateur Radio Operators' License by the Telecommunications Regulatory  
Commission of Sri Lanka (Novice Class License) – 2007

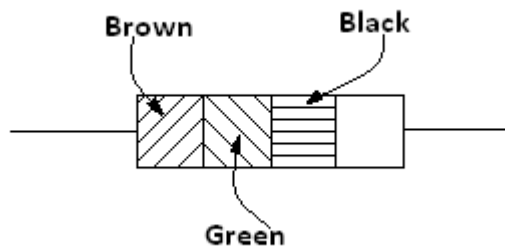
(1) Basic Electricity, Radio and Electronics Theory

Two hours

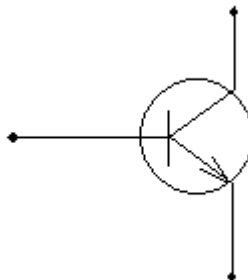
- Answer **all** questions on this paper itself.
- Pick out the correct answer and **underline it**.
- A minimum of 50% marks is required for pass

Index No : .....

1. Hertz is a measuring unit of  
(1) voltage    (2) current    (3) frequency    (4) power level
2. Ohm's Law denoted by  
(1)  $V = IR$     (2)  $R = \rho l/A$     (3)  $H = di/dt$     (4)  $p = I^2R$
3. The value of the resistor shown in the figure is



- (1)  $30 \Omega$     (2)  $15 \Omega$     (3)  $300 \Omega$     (4)  $150 \Omega$
4. A varactor diode act as a variable  
(1) resister    (2) inductance    (3) capacitance    (4) voltage regulator



5. The symbol shown indicates a  
(1) pNp bipolar transistor  
(2) NpN bipolar transistor  
(3) p-channel FET  
(4) N-channel FET

6. The equation which does not give the power dissipated in a resistor R is

- (1)  $p=i^2R$       (2)  $p=V^2/R$       (3)  $p=VI$       (4)  $p=RV^2$

7. A coil has a resistance of X  $\Omega$  and Y reactance of 6 $\Omega$ . The impedance is

- (1)  $\sqrt{XY}$       (2)  $\sqrt{X+Y}$       (3)  $\sqrt{X/Y}$       (4)  $\sqrt{X^2+Y^2}$

8. Induced emf is defined as

- (1) rate of change of charges      (2) rate of change of flux linkage  
(3) rate of change of voltage      (4) rate of change of current

9. What is the power consumed by a transmitter taking 1.5A at 12V?

- (1) 18W      (2) 13.5W      (3) 10.5W      (4) 8W

10. 20dB power gain is an increase of

- (1) 10 times      (2) 20 times      (3) 100 times      (4) 200 times

11. 0.01 microfarad is equivalent to

- (1)  $1 \times 10^{-4}$  F      (2)  $1 \times 10^{-5}$  F      (3)  $1 \times 10^{-6}$  F      (4)  $1 \times 10^{-8}$  F

12. Transformer is use to change the value of

- (1) power      (2) voltage      (3) frequency      (4) phase factor

13. The power advantage of SSB over AM is

- (1) 4:3      (2) 3:2      (3) 3:1      (4) 2:1

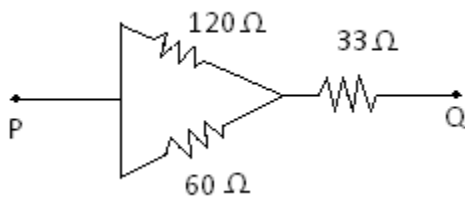
14. The reactance of a 20H smoothing choke at a frequency of 50Hz is

- (1)  $2\pi$  k $\Omega$       (2) 2 k $\Omega$       (3)  $2\pi$   $\Omega$       (4) 2  $\Omega$

15. In the ionosphere the highest layer is

- (1) D      (2) E      (3) F<sub>1</sub>      (4) F<sub>2</sub>

16. The effective resistance between P and Q in the circuit shown is



- (1) 33  $\Omega$   
(2) 73  $\Omega$   
(3) 60  $\Omega$   
(4) 120  $\Omega$

17. A transformer is laminated to

- (1) reduce eddy current      (2) reduce vibration  
(3) increase stiffness      (4) increase eddy current

18. The peak to peak value of 220V, 50Hz, main supply is  
 (1)  $220\sqrt{2}$  V    (2)  $2 \times 220\sqrt{2}$  V    (3) 440 V    (4)  $200\sqrt{2}$  V
19. The internal resistance of an ideal current source is  
 (1) finite    (2) infinite    (3) unknown    (4) zero
20. One Volt equal one  
 (1) Newton/Coulomb    (2) Joule/Coulomb  
 (3) Newton . meter    (4) Joule . Second
21. When 4 V emf is applied across a 2 F capacitor, the energy stored in the capacitor is  
 (1) 4 J    (2) 8 J    (3) 16 J    (4) 32 J
22. Power factor of pure inductor is  
 (1) zero    (2)  $1/\sqrt{2}$     (3)  $\sqrt{3}/2$     (4) 1
23. At what frequency is the reactance of a  $0.1 \mu\text{F}$  capacitor is  $1\text{k}\Omega$   
 (1) 10MHz    (2) 1 MHz    (3) 1.6 kHz    (4) 100MHz
24. Which of the following is not true about AM?  
 (1) The information signal amplitude changes.  
 (2) The carrier amplitude varies.  
 (3) The carrier frequency remains constant.  
 (4) The frequency changes.
25. A  $50\Omega$  resistor dissipates 2 watts of power. The voltage across the resistor is  
 (1) 10 V    (2) 12.5 V    (3) 25 V    (4) 100 V
26. A coil has a resistance of  $12\Omega$  and a reactance of  $5\Omega$ . The impedance is  
 (1)  $5\Omega$     (2)  $12\Omega$     (3)  $13\Omega$     (4)  $17\Omega$
27. Which amplifiers are used to increase the RF power level in AM transmitter?  
 (1) class A    (2) class B    (3) class C    (4) class AB
28. The most commonly used amplitude de-modulator is  
 (1) The envelop detector    (2) The diode mixer  
 (3) The balanced diode detector    (4) The crystal detector
29. Another name for signals in the HF range is  
 (1) short wave    (2) RF wave    (3) micro wave    (4) space wave
30. Moving iron instruments are used for  
 (1) Only ac measurements    (2) Only dc measurements  
 (3) Both ac and dc measurements    (4) None of the above
31. The magnification factor of a parallel tuned (LRC) circuit depends on  
 (1) R    (2) R and C    (3) R and L    (4) L and C

32. Shunt should have

- (1) zero resistance      (2) very low resistance  
(3) high resistance      (4) infinite resistance

33. The resonant frequency of a tuned (LRC) circuit depends on

- (1) R                      (2) L                      (3) C                      (4) L and C

34. For constant D.C. voltage an inductor act as

- (1) an open circuit      (2) a short circuit      (3) a finite resistance      (4) voltage source

35. The ability of a receiver to pick up weak signals is

- (1) screening      (2) stability      (3) selectivity      (4) sensitivity

36. The following stage of a radio receiver provides the maximum adjacent channel selectivity

- (1) frequency mixer      (2) audio amplifier      (3) RF amplifier      (4) IF amplifier

37. Over modulation occurs when the modulating index

- (1)  $m < 1$       (2)  $m = 1$       (3)  $m > 1$       (4)  $m = 0$

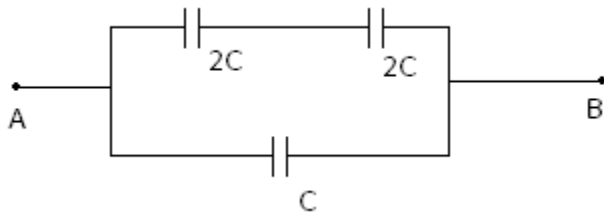
38. Frequency shift keying is basically a method involving

- (1) AM      (2) FM      (3) PM      (4) none of these

39. The wave length of a signal of 100 MHz in free space

- (1) 30m      (2) 3m      (3) 30 cm      (4) 3 cm

40. The total capacitance between A and B in the circuit shown is



- (1) 0.5 C      (2) 2C      (3) C      (4) 0.8C

41. Signals in UHF range use

- (1) space wave propagation      (2) sky wave propagation  
(3) surface wave propagation      (4) Any one of these

42. Ground wave communication is most effective in the frequency of

- (1) 300 kHz to 3 MHz      (2) 3 MHz to 30 MHz  
(3) 30MHz to 300 MHz      (4) above 300 MHz

43. The desirable standing wave ratio (SWR) on a transmission line is

- (1) infinity      (2) two      (3) one      (4) zero

44. A quarter wave antenna is resonant at 10 MHz. It's approximate length is about  
 (1) 3.75 m      (2) 7.5 m      (3) 15m      (4) 30 m
45. The characteristic impedance of a lossless transmission line is given by  
 (1)  $z = \sqrt{L/C}$     (2)  $z = \sqrt{C/L}$     (3)  $z = \sqrt{LC}$     (4)  $z = L/C$
46. The magnetic field of an antenna is perpendicular to the Earth. The antenna polarization is  
 (1) Vertical      (2) Horizontal    (3) Circular      (4) None of the above
47. The impedance of a half wave dipole is about  
 (1) 50  $\Omega$       (2) 75  $\Omega$       (3) 100  $\Omega$       (4) 300  $\Omega$
48. A beat frequency oscillator (BFO) is used in the demodulation of  
 (1) AM signal    (2) SSB or CW signal    (3) FM signal    (4) PM signal
49. The automatic gain control (AGC) circuits usually controls the gain of the  
 (1) mixer      (2) detector      (3) audio amplifier      (4) IF amplifier
50. The out put signal of a balanced modulator is  
 (1) AM      (2) DSB      (3) SSB      (4) FM

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Answers

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

Q-2    3<sup>rd</sup> answer is out of syllabus

Q-7    meaningless question

Q-8    There is no correct answer (Induced emf is proportional to the rate of change of flux linkage or Induced emf is proportional to the rate of change of current)

Q-13 There is no correct answer( answer is 4:1)

Q-20  $Q=CV$  &  $E = \frac{1}{2} C V^2$ , therefore  $E = \frac{1}{2} QV$ , therefore **Jule =choulomb x Volt**

Q-21  $E = \frac{1}{2} C V^2$

Q-23  $X = 1/(2\pi fC)$ , therefore  $f = 1/(2\pi XC)$

Q-24 there are two answers. 2 and 4

Q-25 apply  $W = V^2 / R$

Q-26  $Z^2 = X^2 + R^2$

Q-28 Diode detector

Q-31  $Q = R/X$

Q-`32 Question is incomplete .

Q-33  $f = 1/(2 \pi \sqrt{LC})$