

EXAMINATION FOR THE AMATEUR RADIO OPERATORS' CERTIFICATE OF PROFICIENCY
ISSUED BY THE DIRECTOR GENERAL OF TELECOMMUNICATIONS, SRI LANKA – (1999)
(NOVICE CLASS)

Basic Electricity, Radio & Electronic Theory

Two hours

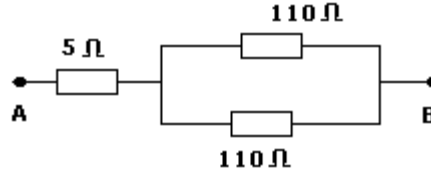
Index No.

Answer all questions on this paper itself.

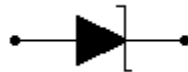
A minimum of 50 marks is required for a pass.

Pick out the correct answer and underline it.

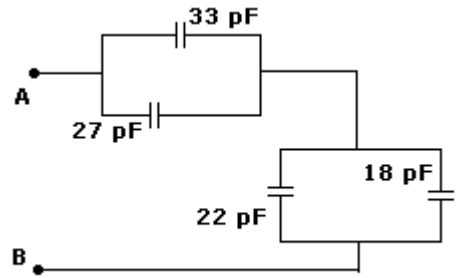
1. Volt is a measuring unit of
(a) Power (b) electrical potential. (c) current (d) resistance.
2. The unit of resistance is
(a) Ampere (b) Farad (c) Watt (d) Ohm
3. A transmitter output impedance is 50Ω , for optimum power transfer the load should be
(a) 50Ω (b) 75Ω (c) 100Ω (d) 150Ω
4. The effective resistance between A and B in the circuit shown is
(a) 115Ω (b) 225Ω (c) 60Ω (d) 55Ω



5. What is the power consumed by a transmitter taking 1.5 A at 12 V ?
(a) 8 W (b) 18 W (c) 12 W (d) 1.5 W
6. 0.01 nF is equivalent to
(a) $1 \times 10^{-9} \text{ F}$ (b) $1 \times 10^{-10} \text{ F}$ (c) $1 \times 10^{-11} \text{ F}$ (d) $1 \times 10^{-12} \text{ F}$
7. A transformer has a coil 8Ω resistance and a reactance of 6Ω . The impedance is
(a) 8Ω (b) 6Ω (c) 10Ω (d)
8. As the frequency rises the reactance of a capacitor
(a) increases (b) decreases (c) stays constant (d) none of these
9. What is the power consumed by a transmitter taking 0.5 A at 24 V ?
(a) 2.4 W (b) 4.8 W (c) 12 W (d) 24 W
10. The symbol in the figure is that of a
(a) Piezo electric crystal (b) zener diode (c) field effect transistor (d) varactor diode

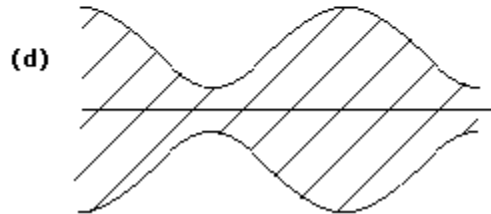
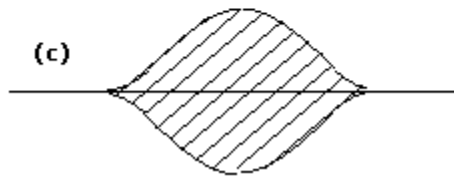
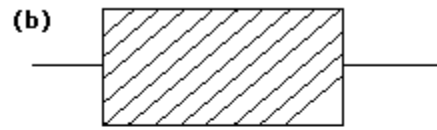
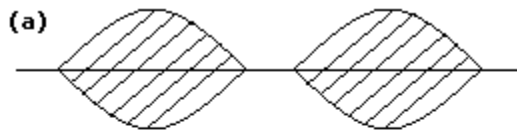


11. The effective capacitance between A and B is
 (a) 24 pF (b) 45 pF (c) 55 pF (d) 100 pF



12. The maximum current that may be safely passed through a 10000Ω resistor rated at 25 W is
 (a) 0.005 A (b) 0.05 A (c) 0.5 A (d) 1 A
13. Which one of the following frequencies is in the VHF range ?
 (a) 5MHz. (b) 25 MHz. (c) 250 MHz. (d) 500 MHz.
14. The prefix pico is equivalent to
 (a) 10^{-3} (b) 10^{-6} (c) 10^{-9} (d) 10^{-12}
15. For ideal amplitude modulation the modulating index must be
 (a) smaller than one (b) unity (c) zero (d) greater than one
16. The output signal of a balanced modulator is
 (a) AM (b) DSB (c) SSB (d) FM
17. Ground wave communication is most effective in the frequency range of
 (a) 300 kHz to 3 MHz. (b) 3 MHz to 30 MHz.
 (c) 30 MHz to 300 MHz (d) above 300 MHz.
18. The equation which gives the power dissipated in a resistor R is
 (a) $P = V^2/R$ (b) $P = IR$ (c) $P = VI^2$ (d) $P = R/V^2$
19. For a silicon transistor the base emitter voltage for biasing must be above
 (a) 0.3V (b) 0.6 V (c) 0.8 V (d) 1.0 V
20. Transformers operates on
 (a) an ac. supply only. (b) both on ac. and dc.
 (c) a dc. supply only. (d) all the above are correct.
21. The velocity of radio waves in free space
 (a) 3×10^7 m/s (b) 3×10^8 m/s (c) 3×10^9 (d) 3×10^{10} m/s
22. The energy stored in a capacitor C is not given by
 (a) $\frac{1}{2} CV$ (b) $\frac{1}{2} C/V^2$ (c) $\frac{1}{2} V^2/C$ (d) all the above are correct
23. The most widely used conducting materials are
 (a) gold and silver. (b) copper and aluminium.
 (c) copper and gold. (d) copper and silver.

24. Which of the following represents 100% amplitude modulation ?



25. A moving coil meter depends on which of the following in order to operate

- (a) interaction of an electric and magnetic field.
- (b) interaction of a permanent and electromagnetic field.
- (c) the interaction of two permanent magnetic fields.
- (d) an electric only.

26. Which of the following could be attached to a moving coil meter in an attempt to measure power ?

- (a) a resistor
- (b) a thermistor
- (c) a thermocouple
- (d) a thermostat

27. There are two basic forms of transistors, these are

- (a) PNP and NNP
- (b) PNP and NPN
- (c) PPN and NNP
- (d) NPP and PNN

28. A varactor diode acts like

- (a) variable resistor
- (b) a variable capacitor
- (c) a variable regulator
- (d) a variable inductor

29. The tolerance of a resistor is given as 10%. If the nominal value is 4700Ω , then its value must be lie Between

- (a) 4230 and 5170Ω
- (b) 4653 and 4747Ω
- (c) 4230 and 4747Ω
- (d) 4656 and 5170Ω

30. A light bulb is rated at 12V , 3W. The current drawn when used on a 12V source is

- (a) 250 mA.
- (b) 750 mA
- (c) 4 A.
- (d) 36 A.

31. Which of the instrument below has highest accuracy ?

- (a) A heterodyne wave meter
- (b) A digital frequency counter
- (c) An absorption wave meter
- (d) An oscilloscope

32. The typical accuracy of a dip oscillator might be

- (a) 0.001%
- (b) 0.05%
- (c) 10%
- (d) 1%

33. A good dummy load is constructed from

- (a) light bulb
- (b) a column
- (c) wire-wound resistors
- (d) nine-reactive resistors.

34. An SWR meter is inserted into a perfectly matched transmitter/antenna system the value shown should indicate

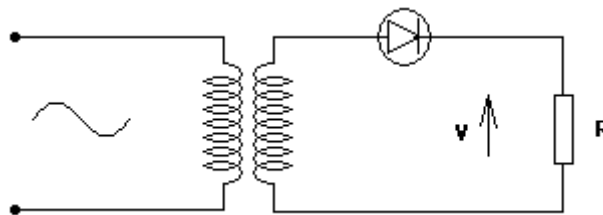
- (a) 10 W reflected power. (b) 1:1 SWR (c) 1:0 SWR (d) 0:1 SWR

35. To check that a crystal is working on its correct overtone the simplest piece of equipment is

- (b) a Voltmeter (b) an ammeter
(c) an absorption wave meter (d) a dip oscillator

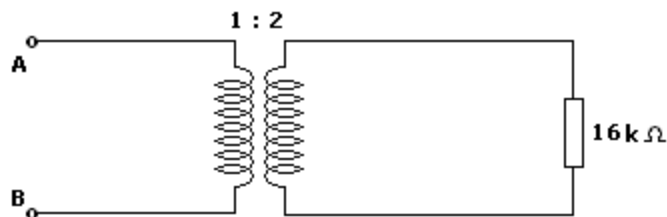
36. The circuit is shown in the figure for

- (a) half wave rectification (b) full wave rectification
(c) reverse bias protection (d) voltage multiplication



37. The impedance seen at terminals AB in the given diagram is

- (a) 0 Ω (b) 250 Ω (c) 1000 Ω (d) 4000 Ω



38. To minimise unwanted radiation of sub-harmonics and harmonics, a VHF transmitter should be followed by

- (a) a low pass filter. (b) a band pass filter. (c) a high pass filter. (d) a notch filter.

39. The typical accuracy of a moving coil meter is

- (a) 0.03% (b) 0.3% (c) 3% (d) 10%

40. The current at the centre of a given $\lambda/2$ antenna is found to be 0.5 A. If this antenna has a radiation resistance of 70 Ω find the radiated power.

- (a) 70 W (b) 50 W (c) 17.5 W (d) none of these.

41. Resistors of 100 Ω and 150 Ω are connected in parallel the effective value is

- (a) 250 Ω (b) 150 Ω (c) 100 Ω (d) 60 Ω

42. In the smoothing circuit of a power supply capacitors of 8 μF , 4 μF and 2 μF are connected in parallel, the effective capacitance is

- (a) 14 μF (b) 8 μF (c) 4 μF (d) 8/7 μF

43. The input power of a transmitter stage running at 24V, 2.5A is
(a) 60 W (b) 150 W (c) 300 W (d) 600 W
44. The Reactance of a 15 H smoothing choke at a frequency of 50 Hz is approximately
(a) 4700 Ω (b) 750 Ω (c) 1500 Ω (d) 3000 Ω
45. 3GHz is equivalent to
(a) 300 MHz. (b) 30000MHz. (c) 3000MHz. (d) 30 MHz.
46. The function of a shunt in an ammeter is to
(a) increase the current in the coil (b) decrease the voltage drop.
(c) by pass the current (d) increase the meter's resistance
47. During the daytime the ionosphere is composed of
(a) D, E, F_1 , F_2 layers (b) D, E layers only. (c) D , F_1 layers only (d) D , F_2 layers only.
48. Power Factor of a pure inductor is
(a) 1 (b) $\sqrt{3}/2$ (c) $1/\sqrt{2}$ (d) zero
49. A 25 Ω resistor dissipates 4 W of power. The voltage across the resistor is
(a) 100 V (b) 25 V (c) 12.5 V (d) 10 V
50. Which amplifiers are used to increase the RF power level in AM transmitters ?
(a) class AB (b) class C (c) class B (d) class A

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(NOVICE CLASS)

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.

1. For safety reason all exposed metal work in an amateur station should be
(a) connected to mains neutral (b) free of earth connections
(c) left completely floating. (d) connected to a good RF earth.
2. When wearing headphones it is not advisable to
(a) be calling CQ (b) have one's hands inside live equipment.
(c) be switching off. (d) have rubber gloves on.
3. If a station asks 'please QSY' this means
(a) there is fading (b) change frequency (c) stop transmitting (d) reply in Morse.
4. The only general call allowed from an amateur station is
(a) a news bulletin (b) a CQ call (c) a third party call (d) on VHF
5. As well as amateur frequency transmission, the licence allows reception of
(a) diplomatic messages (b) standard frequency transmissions.
(c) news agency transmissions. (d) police transmissions.
6. Which of the following occurrences need not be entered into the station log?
(a) Test for interference.
(b) Station used by licenced operator other than licence
(c) Station operated at temporary location.
(d) Station temporarily dismantled.
7. Having established contact on a calling frequency it is good practice to
(a) stay on the same frequency (b) move to another frequency.
(c) invite others to join on the same frequency (d) be objectionable to all other callers
8. The Q-code for 'standby' is
(a) QRN (b) QRM (c) QRS (d) QRX
9. It is good safety practice to
(a) use plastic piping for earthing. (b) unearth all metal cases
(c) have no master switch. (d) supply all mains power via master switch.

10. When calling a station it is good practice to
 - (a) put your callsign first.
 - (b) use your callsign only.
 - (c) put the callsign of the station being called first.
 - (d) use the callsign of the other station.
11. In RST code S is for
 - (a) safety
 - (b) signal strength
 - (c) signal direction
 - (d) single station
12. To prevent annoying other users on a band a transmitter should always be tuned initially
 - (a) on a harmonic outside the band
 - (b) into an antenna
 - (c) into a dummy load
 - (d) into a dipole
13. Which of the following represents a valid log ?
 - (a) a loose-leaf book
 - (b) a none loose-leaf book
 - (c) a magnetic disk containing propagation and RTTY programmes.
 - (d) a magnetic tape which also includes games programmes.
14. A log must be kept for
 - (a) mobile operation
 - (b) pedestrian operation
 - (c) main station address and all temporary locations.
 - (d) main station address only
15. Q-code abbreviation 'QRG' means
 - (a) What is the correct time ?
 - (b) Will you tell me my exact frequency.
 - (c) Shall I stop sending ?
 - (d) What is your location ?
16. Q-code abbreviation 'QSY' means
 - (a) Shall I send more slowly ?
 - (b) Shall I change to another frequency ?
 - (c) Shall I decrease power ?
 - (d) Shall I increase power ?
17. 'Are you busy ?' is given by Q-code
 - (a) QRL
 - (b) QRK
 - (c) QSO
 - (d) QSZ
18. 'Are you troubled by static ?' is given by Q-code
 - (a) QRN
 - (b) QRO
 - (c) QRP
 - (d) QRQ
19. 'Can you give me acknowledgement of receipt' is given by Q-code
 - (a) QSB
 - (b) QSD
 - (c) QSL
 - (d) QSP
20. Abbreviation for 'wait' is
 - (a) AS
 - (b) VA
 - (c) KA
 - (d) K
21. Abbreviation for 'Break Sign' is
 - (a) =
 - (b) /
 - (c) +
 - (d) -
22. Abbreviation for 'starting signal' is
 - (a) BK
 - (b) K
 - (c) P
 - (d) KA
23. A person applying for an Amateur Radio Licence must be
 - (a) over 14 year old
 - (b) In possession of a frequency meter
 - (c) In possession of multimeter
 - (d) none of the above

24. Entries in the log-book shall not be
(a) type written (b) made in pencil (c) made in indelible ink (d) made in ink

25. Abbreviation for 'end of work' is
(a) AR (b) VA (c) C (d) WA

Answers-1999

Basic Electronics, Radio and Electronics Theory – 1999

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

Licensing Condition, Operating Practices and Procedures – 1999

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