

Department of Examination, Sri Lanka

EXAMINATION FOR THE AMATEUR RADIO OPERATORS CERTIFICATE OF PROFICIENCY ISSUED
BY THE DIRECTOR GENERAL OF TELECOMMUNICATION OF SRI LANKA – OCTOBER 1995
(GENERAL CLASS)

FUNDAMENTALS OF ELECTRICITY & RADIO COMMUNICATION.

One hour

Index No:-.....

Answer all questions on this paper itself. A minimum of 50 marks is required for a pass.

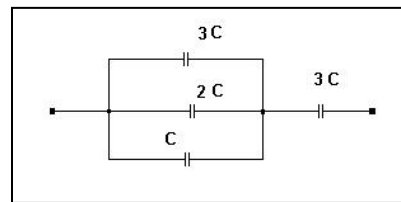
Pick out the correct answer and underline it.

1. The peak-to-peak value of the 220V, 50Hz main supply is

- (a) $(2/\pi) \times 220$ V (b) 2×220 V (c) $220\sqrt{2}$ V (d) $2 \times 220\sqrt{2}$ V

2. Total capacitance in the circuit shown is

- (a) 2C (b) 3C
(c) 6C (d) 4C



3. As the frequency rises the reactance of a capacitor

- (a) stays constant (b) increases
(c) decreases (d) non of these

4. In a RLC parallel circuit, the impedance at resonance is

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

5. The very high frequency extends from

- (a) 300 kHz to 3 MHz (b) 3 MHz to 30 MHz
(c) 30 MHz to 300 MHz (d) 300 MHz to 3 GHz

6. Power advantage of SSB over AM is

- (a) 2:1 (b) 3:1 (c) 3:2 (d) 4:3

7. A transformer is laminated to

- (a) increase the exciting current (b) increase the magnetic flux
(c) reduce the hysteresis losses (d) reduce the eddy current losses

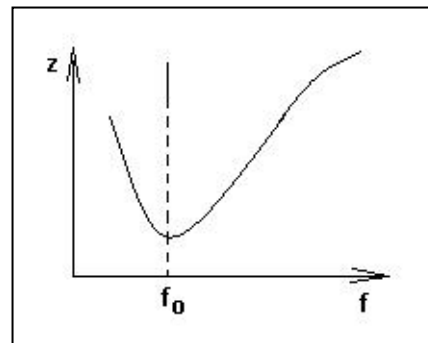
8. Field effect transistors (FET) are

- (a) unipolar devices (b) bipolar devices
(c) either unipolar or bipolar (d) non of these

9. FET is a useful device as it always exhibits

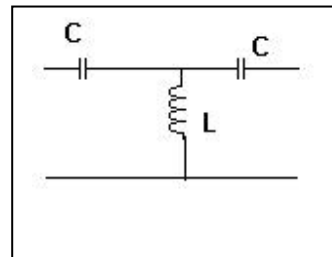
- (a) very low output resistance (b) very high output resistance
(c) very low input resistance (d) very high input resistance

10. In a class A amplifier with sinusoidal input signal , the output current flows for
 (a) a full cycle (b) three quarter of a cycle
 (c) half a cycle (d) less than half a cycle
11. Pre-emphasis circuit is used
 (a) before detection (b) after detection
 (c) before modulation (d) after modulation
12. De- emphasis circuit is used to attenuate
 (a) high frequencies (b) low frequencies
 (c) mid band frequencies (d) both low & high frequencies
13. Induced emf is defined as
 (a) rate of change of charge (b) rate of change of voltage
 (c) rate of change of flux linkage (d) work done in moving unit charge
14. For constant d.c. voltage a capacitor acts as
 (a) an open circuit (b) a short circuit
 (c) a finite resistance (d) a current source
15. Information in an AM signal is conveyed in the
 (a) carrier only (b) side bands
 (c) single side band only (d) both carrier & sidebands
16. Frequency translation is carried out by a circuit called
 (a) Translator (b) Local oscillator
 (c) Balanced modulator (d) converter
17. The output power of a SSB transmitter is usually expressed in terms of
 (a) peak to peak power (b) peak envelope power
 (c) RMS power (d) average power
18. The Impedance-frequency curve represents
 (a) an inductance (b) a capacitance
 (c) a parallel-tuned circuit (d) a series-tuned circuit
19. A P-type semiconductor is
 (a) electrically neutral
 (b) positively charged
 (c) negatively charged
 (d) either positively or negatively charged



20. Which of the following does the Balanced modulator eliminate from its output?
 (a) Lower side band (b) Upper side band
 (c) carrier (d) both sidebands
21. The most commonly used filter in SSB generator use
 (a) Crystals (b) RC networks
 (c) LC networks (d) mechanical resonators
22. One disadvantage of FM compared to AM is that it has
 (a) Lower efficiency (b) Noise immunity
 (c) Capture effect (d) Excessive use of spectrum space
23. A transformer used for impedance matching is the
 (a) antenna tuner (b) balun (c) matching stub (d) Q section
24. A radio wave that propagates only over line-of-sight distance is called a
 (a) Surface wave (b) sky wave (c) space wave (d) none of them
25. The signals significantly affected by the ionosphere are in the range of
 (a) 300kHz to 3 MHz (b) 3 MHz to 30 MHz
 (c) 30 MHz to 300 MHz (d) above 300 MHz

26. The circuit shown represents a
 (a) high pass filter (b) low pass filter
 (c) band pass filter (d) band stop filter



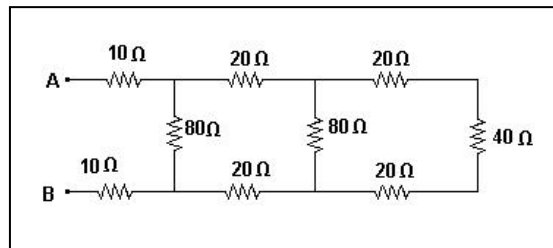
27. The most efficient RF amplifier is
 (a) Class A (b) Class B (c) Class AB (d) Class.....
28. The best frequency demodulator is the,
 (a) Ratio detector (b) Foster secley discriminator
 (c) PLL discriminator (d) Pulse – averaging discriminator
29. Most of the gain and selectivity in a super heterodyne receiver is obtained in the
 (a) Mixer (b) RF amplifier (c) AF amplifier (d) IF amplifier
30. The ability of a receiver to separate signals on different frequencies is
 (a) selectivity (b) sensitivity (c) stability (d) gain
31. Tuning of a super heterodyne receiver is done by varying the frequency of its
 (a) RF amplifier (b) IF amplifier (c) Local oscillator (d) Mixer

32. The main cause of image interference is
(a) a low S/N ratio (b) poor selectivity (c) low gain (d) high gain
33. The bipolar transistor behaves as a
(a) current controlled current source (b) current controlled voltage source
(c) voltage controlled current source (d) voltage controlled voltage source
34. An open or shorted transmission line has a SWR of
(a) zero (b) one (c) two (d) infinity
35. The ionosphere causes radio signals to be
(a) absorbed (b) diffused (c) refracted (d) reflected
36. The characteristic impedance of a transmission line does not depend on its
(a) conductor spacing (b) conductor diameter
(c) length (d) none of the above
37. The frequency change of a crystal oscillator produced by a varactor diode is
(a) zero (b) small (c) medium (d) large
38. For best reception, the S/N ratio should be
(a) zero (b) low (c) high (d) medium
39. One way communication is called ,
(a) monocomm (b) full duplex (c) half duplex (d) simplex
- 40 Which of the instruments below has the highest accuracy?
(a) a heterodyne wave meter (b) a digital frequency counter
(c) an absorption wave meter (d) an oscilloscope
41. The skip zone is where the ground wave
(a) is enhanced
(b) is reflected
(c) and reflected wave combined
(d) has diminished and the reflected has not returned to earth
42. A VFO should ideally be followed by a
(a) class C amplifier (b) power amplifier (c) buffer amplifier (d) notch filter
43. Electrostatic instruments are not free from effect of
(a) temperature (b) frequency
(c) stray magnetic field (d) stray electrostatic field
44. The main disadvantage of using resistors as voltage dividers is the
(a) complicated calculation (b) small current in the load
(c) large power dissipation (d) high voltage of the battery

45. The principal of operation of Q-meter is based on
 (a) self inductance (b) mutual inductance
 (c) series resonance (d) parallel resonance
46. The instruments used only for a.c. measurements are
 (a) permanent magnet type (b) hot wire type
 (c) electrostatic type (d) induction type
47. The following stage in a radio receiver provides the maximum image signal selectivity
 (a) RF amplifier (b) IF amplifier
 (c) audio amplifier (d) frequency mixer
48. 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
49. When the antenna length is doubled the resonance frequency
 (a) remains the same (b) doubles (c) becomes half (d) becomes one fourth

50. The equivalent resistance of the given circuit is

- (a) $40\ \Omega$ (b) $60\ \Omega$
 (c) $80\ \Omega$ (d) $100\ \Omega$



Answers:-

FUNDAMENTALS OF ELECTRICITY & RADIO COMMUNICATION

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

Q-6 Correct answer is 4:1

Q-13 Most suitable answer is (2), but actually there is no correct answer.

Correct answer is:- Induced emf is **proportional** to the rate of change of flux linkage.

Q-31 No answer. Correct answer is RF amplifier and Local oscillator

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LICENSING CONDITIONS, OPERATING PRACTICES AND PROCEDURES.

One hour

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Pick out the correct answer and underline it.

1. The purpose of a CQ call is
 - (a) to indicate that there is an emergency
 - (b) inviting to any one to establish contact
 - (c) to check interference
 - (d) to indicate that you are testing

2. Frequencies allocated for amateur service from 14000kHz – 14350kHz are
 - (a) exclusively for Amateur service
 - (b) to share with broadcast stations
 - (c) to be shared with fixed services
 - (d) to be used as a Citizen Band

3. When Telephony is used it is a good operating practice to
 - (a) use a Phonetic Alphabet for spelling call signs.
 - (b) Repeat all names several times.
 - (c) Use the Q-code
 - (d) Use Phonetic Alphabet whenever reception is difficult.

4. The Q-Code for “Change of transmission to another frequency” is
 - (a) QRS (b) QRV (c) QRT (d) QSY

5. When operating under “Novice B” licence, the holder should operate on frequencies above
 - (a) 25MHz (b) 52MHz (c) 144MHz (d) 70MHz

6. Which one of the following need not be recorded in the log?
 - (a) Power (b) Frequency (c) Date (d) Initial call

7. A neighbour complains an amateur of his transmission causing interference to his TV reception, What action should be amateur take?
 - (a) Inform DGT’s Office.
 - (b) Request the complainant to inform DGT’s office.
 - (c) Ask the RSSL to traise on behalf of the amateur.
 - (d) Attempt to cure the interference with cooperation of the complainer.

8. An amateur radio station must be equipped for the reception of
- (a) All frequency bands and emissions used in Amateur Radio.
 - (b) Telephony and Telegraphy
 - (c) The same frequencies and classes of emission used for transmission at the station.
 - (d) Broadcast stations.
9. A General Class licence holder is permitted to communicate with Amateur station of
- (a) All countries who are members of the ITU.
 - (b) All commonwealth countries.
 - (c) All countries that Sri Lanka has foreign missions
 - (d) Countries that have reciprocal agreement with Sri Lanka.
10. Morse telegraphy by on /off keying without the use of a modulated frequency is designated by the symbol
- (a) F1A
 - (b) F3E
 - (c) A1A
 - (d) A2A
11. In the Q-code “Are you busy?” is
- (a) QSL
 - (b) QRZ
 - (c) QRL
 - (d) QRK
12. In an Amateur Radio Station which derives its power from the Public Electric Supply,
- (a) All equipment should be controlled by one Master Switch.
 - (b) Access to equipment should be by the licensee only.
 - (c) All equipment must be isolated from the Mains supply by an isolating transformer.
 - (d) Equipment should be disconnected from the mains at all times when the station is unattended.
13. If an Amateur station is situated within 1km of the boundary of an Airport the antenna height above ground should not exceed
- (a) 15 meters
 - (b) 20 meters
 - (c) 50 meters
 - (d) 30 meters
14. When equipment is being repaired the mains supply should be disconnected because
- (a) Valves/Transistors could get hot
 - (b) Components could get overheated.
 - (c) The repairer could receive a shock.
 - (d) Components could be damaged due surges.
15. The wearing of headphones in order to monitor signals while adjusting high voltage equipment is not recommended because
- (a) The headphones could form a dangerous path to earth via the operator.
 - (b) Signal from a Transmitter very close to a receiver is not a true guide to performance.
 - (c) The equipment could become unstable and radiate oscillations.
 - (d) Coupling between headphone and Transmitter could setup a feed back loop that would lead to damage of the receiver.

16. Which one of the following words is recommended to identify the letter “Q” when using radio telephony?
 (a) Quota (b) Queerie (c) Quebec (d) Quarter
17. In which ITU region in Sri Lanka?
 (a) Region (1) (b) Region(2) (c) Region (3) (d) Region (4)
18. For uniformity in International Radio Communications , the time standard for Amateur Radio Operators world wide should be :
 (a) U.T.C. (b) E.S.T. (c) U.C.T (d) C.U.T.
19. What is the common name for the circuit that causes a transmitter to automatically transmit when a person speaks into the Microphone?
 (a) VXO (b) VOX (c) VFO (d) VCO
20. What is the meaning of ARQ?
 (a) Automatic Repeat Request (b) Automatic Repeater Queue
 (c) Automatic Receiver Quieting (d) Automatic Receive Quickly
21. When selecting a S.S.B. (Single Side Band) phone transmitting frequency, what is the minimum frequency separation from a QSO in progress that should be allowed in order to minimise interference ?
 (a) Approximately 150 Hz – 500 Hz between suppressed carriers.
 (b) Approximately 10 kHz from suppressed carriers.
 (c) Approximately 6 kHz from suppressed carriers.
 (d) Approximately 3 kHz from suppressed carriers.
22. What is the most useful type of Map when orienting a directional antenna towards a station 5000 miles distant?
 (a) Topographical (b) Azimuthal (c) Polar projection (d) Mercator
23. What is the call sign prefix for Amateur Radio given to Australia?
 (a) 4S7 (b) VE (c) VC (d) VK
24. What is meant by “repeater operation”
 (a) A phone patch to pass 3rd party communication.
 (b) Manual Retransmission.
 (c) Radio communication in which an Amateur Station signals are automatically retransmitted.
 (d) Non of the above.
25. In telegraph examination how many characters are counted as one word?
 (a) 8 (b) 10 (c) 2 (d) 5

Answers:-**LICENSING CONDITIONS,
OPERATING PRACTICES AND PROCEDURES.**

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