

EXAMINATION FOR THE AMATEUR RADIO OPERATORS' CERTIFICATE OF PROFICIENCY
ISSUED BY THE DIRECTOR GENERAL OF TELECOMMUNICATION OF SRI LANKA – 2000
(GENERAL CLASS)

Fundamentals of Electricity & Radio Communications

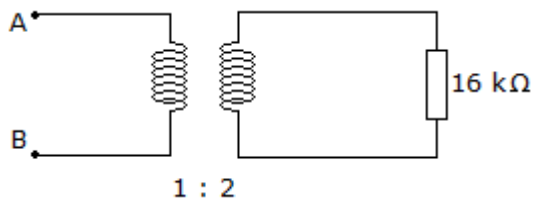
Two hours

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.

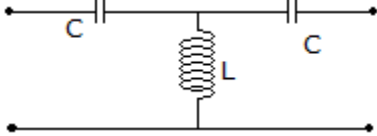
- For a sine wave the RMS value is
(a) $\sqrt{2}$ time the peak value. (b) $1/\sqrt{2}$ time the peak value.
(c) $\sqrt{3}$ time the peak value. (d) $1/\sqrt{3}$ time the peak value.
- A current of 50 mA. Flows through a resistor of 1.5 k Ω . The voltage across the resistor
(a) 100 V (b) 75 V (c) 50 V (d) 25 V
- In a stage of a receiver 12 V are applied across a potential divider of 3300 Ω and 2700 Ω , the current through The resistors.
(a) 5 mA. (b) 4 mA. (c) 3 mA. (d) 2 mA.
- Resistor of 33 k Ω and 27 k Ω are connected in series, the effective resistance
(a) 60 k Ω (b) 33 k Ω (c) 27 k Ω (d) 50 k Ω
- Resistors of 100 Ω and 150 Ω are connected in parallel, the effective resistance
(a) 60 Ω (b) 100 Ω (c) 150 Ω (d) 250 Ω
- In a smoothing circuit of a power supply , capacitor of 8 μ F, 4 μ F and 2 μ F are connected in parallel. The effective capacitance.
(a) 8 μ F (b) 12 μ F (c) 14 μ F (d) 20 μ F
- Two inductors of 10 μ H and 20 μ H are connected in series and two others of 30 μ H and 40 μ H are also connected in Series. the equivalent inductance, if these series combinations are connected in parallel
(a) 30 μ H (b) 70 μ H (c) 100 μ H (d) 21 μ H
- the power dissipated by a 15 Ω resistor when it is passing 1.2 A current
(a) 18 W (b) 21.6 W (c) 25.3 W (d) 30 W
- A coil of inductance 25 μ H has a resistance of 7 Ω at the frequency of 2.5 MHz, the Q at this frequency
(a) 62.5 (b) 56 (c) 25 (d) 2.5

10. The impedance seen at terminals A and B in the given diagram.

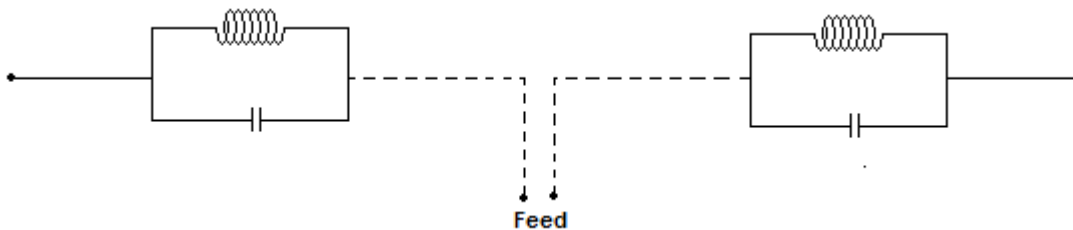


- (a) 0 Ω (b) 250 Ω (c) 1000 Ω (d) 4000 Ω

- In a series tuned (RLC) circuit at the resonance
(a) current is maximum. (b) Impedance is maximum.
(c) current is minimum. (d) Voltage across C is minimum.

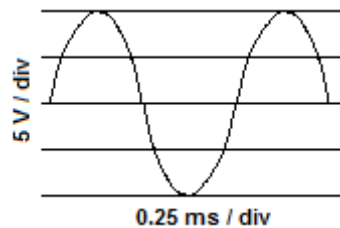
12. A FET behave as
 (a) a current controlled current source. (b) a variable voltage regulator.
 (c) a constant voltage regulator. (d) a voltage controlled current source.
13. The piezoelectric effect is the production electricity by
 (a) Mechanical energy. (b) electrical energy. (c) pressure. (d) temperature.
14. The circuit shown represent is

 (a) filter. (b) mixer. (c) Oscillator. (d) amplifier.
15. The best frequency demodulation is the
 (a) PLL discriminator (b) envelop detector
 (c) Ratio detector (d) Pulse averaging discriminator
- 16 Most of the gain and selectivity in a superhet is obtained in the
 (a) RLC circuit (b) IF amplifier (c) AF amplifier (d) none of these
17. The main reason of image interference is
 (a) high signal noise ratio. (b) low signal noise ratio.
 (c) poor selectivity . (d) poor gain.
18. An open or short transmission line has a standing wave ratio of
 (a) infinity (b) seventy (c) three hundred (d) zero
19. A single winding transformer is known as a
 (a) normal transformer. (b) three phase transformer
 (c) auto transformer. (d) toroid transformer.
20. For best selectivity and stability, the IF should be
 (a) low. (b) infinity. (c) average. (d) zero.
21. The instrument used for d.c. measurement only is
 (a) Permanent magnet type. (b) induction type.
 (c) electromagnetic type. (d) moving iron type.
22. In which type of transmitter class C amplifiers are not used
 (a) DSB (b) AM (c) FM (d) CW
23. The following can not be used to remove the unwanted sideband in SSB.
 (a) RC filter system. (b) LC filter system.
 (c) balanced shift method. (d) phase shift method.

24.



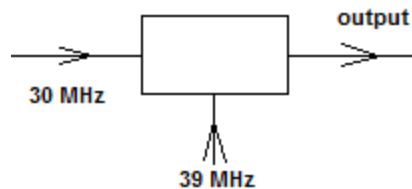
- The above antenna represents
 (a) an end-fed wire (b) a simple dipole
 (c) a cubical Quad (d) a trap dipole

25. The coaxial cable from an SWR meter to an antenna develop a fault so that no power reaches the antenna. The SWR meter will read
 (a) zero (b) 1:1 (c) high (d) very low
26. A dummy load for use at VHF should be made from
 (a) a wire wound resistor. (b) carbon resistor.
 (c) metal oxide resistor. (d) electric fire heating element.
27. Which of the following would be used to examine the shape of waveform
 (a) an oscilloscope. (b) a digital multimeter.
 (c) an analog multimeter. (d) a digital frequency counter.
28. An amateur radio transmitter antenna system has an ERP of 100 W, the field strength at a distance of 100 m in free space is about
 (a) 7.02 V/m (b) 3.5 V/m (c) 0.7 V/m (d) 0.35 V/m
29. Two 10 k Ω resistors are connected in parallel across a 5 V DC supply. The total current taken is
 (a) 50 μ A. (b) 0.5 mA. (c) 1 mA. (d) 1 A.
30. The diagram shown in the figure represents a trace on an oscilloscope. What is the frequency of displayed waveform?
 (a) 1 kHz. (b) 5 kHz.
 (c) 10 kHz. (d) 100 kHz.



31. In the diagram in question 30, what is the peak to peak value of the wave form.
 (a) 1 V (b) 2 V (c) 10 V (d) 20 V
32. A power gain of 4 is equivalent to
 (a) 3 dB. (b) 6dB. (c) 10 dB. (d) 16 dB.
33. Fading can be caused by
 (a) a poor antenna (b) horizontal polarization.
 (c) in reaction of the sky and ground wave. (d) poor coaxial cable.
34. Typical accuracy of a moving coil meter is
 (a) 0.03% (b) 0.3% (c) 3% (d) 10%
35. A VFO should ideally be followed by
 (a) a buffer amplifier. (b) a power amplifier.
 (c) a class C amplifier. (d) a notch filter.
36. Electrostatic instruments are not free from effect of
 (a) Inductance (b) Stray electrostatic field.
 (b) Magnetic field. (d) resistance
37. De-emphasis circuit is used
 (a) before demodulation. (b) after demodulation.
 (c) before detection. (d) after detection.
38. Generally the value of a component increases as the temperature
 (a) decreases (b) remains constant. (c) increases. (d) none of these.

39. A quarter wave antenna is resonant at 10 MHz. Its approximate length will be
 (a) 7.5 m. (b) 15 m. (c) 20 m. (d) 30 m.
40. An oscilloscope shows the peak to peak voltage of a sine wave to be 100 V. The RMS value is
 (a) 27.28 V (b) 35.35 V (c) 50 V (d) 70.7 V
41. To minimise interference on adjacent channels, voice frequencies should be kept below
 (a) 500 Hz. (b) 1 kHz. (c) 3 kHz. (d) 5 kHz.
42. If a transmitter is overdriven it is likely to cause
 (a) harmonics. (b) sub-harmonics
 (c) a change in the modulation. (d) small DC variation.
43. Using voice modulation, the no-menclature J3E correspond to
 (a) SSB with full carrier (b) SSB with suppressed carrier
 (c) FM using voice modulation (D) a CW transmission.
44. If the frequency stability of a transmitter is poor it may cause
 (a) electric shocks . (b) operation out of band.
 (c) excessive collector dissipation. (d) excessive power to be drawn from the supply.
45. The signals returned from the layers above the earth are
 (a) the ground wave. (b) the ionospheric wave.
 (c) the tropospheric wave. (d) the direct wave.
46. In order to radiate, an electromagnetic wave must have
 (a) E field. (b) H field. (c) E and H field . (d) air to travel in.
47. The wave length of a signal of 100 MHz. In free space is
 (a) 30 mm (b) 0.3 m (c) 3.0 m (d) 30 m
48. If a transmitter output impedance is 50 Ω for optimum power transfer the load should be
 (a) 50 Ω (b) 75 Ω (c) 100 Ω (d) 150 Ω
49. The principal outputs from the above circuit are



- (a) 9 and 39 MHz. (b) 9 and 69 MHz.
 (c) 30 and 39 MHz. (d) 39 and 69 MHz.
50. The typical accuracy of a dip oscillator might be
 (a) .001% (b) 0.05% (c) 1.0% (d) 10%

Answers:-

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

- Q-9 Error:- the question read as “ In a series resonance circuit, the coil of an inductance $25\mu\text{H}$
For parallel resonance circuit, different answer.
- Q-10 1:2 in the diagram is not clear. If turns ratio is 1:2 , answer is $4\text{k}\Omega$. If impedance ratio is 1:2 , no answer.
- Q-17 Typing error :- “high signal noise ratio” and “low signal noise ratio” should be corrected as
“high signal to noise ratio” and “low signal to noise ratio”
- Q-30 Diagram is incomplete because the horizontal scale not marked.
- Q-34 accuracy is about 95%, tolerance is about 5%
- Q-38 wrong interpretation
- Q-42 No meaning for the 3rd answer “ (c) a charge in the modulation.”
- Q-43 typing error “no-menclature” should be “nomenclature”.

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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.*

1. The call sign prefix for SINGAPORE is
(a) 9M2 (b) 9Q7 (c) 9K2 (d) 9V1
2. Over modulation causes
(a) to reduce output power of transmitter. (b) the signal to be less easily readable.
(c) generation of spurious. (d) the power amplifier is exceed its maximum ratings.
3. A neighbour has logged a complaint of interference from an Amateur transmitter. What should be the first action the Amateur should take to establish the likely cause?
(a) Fit filters to the neighbour's equipment
(b) Compare the Amateur log with that of the complaint for any likely correlation.
(c) Reduce transmitter power on all amateur bands.
(d) request the DGT's office to investigate.
4. When wearing a headphone it is not advisable to
(a) Have hands on inside live equipment. (b) Call CQ.
(c) To do any writing. (c) Be switching off.
5. The abbreviation for busy is
(a) QRO (b) QRP (c) QRM (d) QRL
6. Using the international Phonetic Alphabet **BOY** would be
(a) Bravo Oscar Yankee. (b) Beeta Omega Yankee.
(c) Bobby Ostritch Yellow (d) Blue Orange Yellow
7. If "N" appears after the report on a CW contact, it indicates
(a) A chirp on the signal. (b) A clean tone on the signal.
(c) A rough note on the signal. (d) A crystal controlled signal.
8. The speed in Morse to qualify for the General class license is
(a) 5 wpm. (b) 12 wpm. (c) 18 wpm. (d) 20 wpm.
9. The classification R3E is
(a) SSB with full carrier. (b) SSB with no carrier.
(c) SSB with reduced carrier. (d) AM using double sideband.
10. A test signal transmitted by an amateur whose call sign is 4S7XX using the Morse code would be
(a) V V V de 4S7XX 4S7XX 4S7XX
(b) V V V V V V de 4S7XX
(c) V de 4S7XX 4S7XX 4S7XX
(d) V V de 4S7XX
11. What does QRZ stand for
(a) What is the readability of my signal? (b) What is the power used?
(c) What is my signal strength? (d) Who is calling me?

12. The abbreviation for fading is
(a) QSA (b) QSL (c) QSO (d) QSB
13. If you are using voice modulation the nomenclature J3E stands for
(a) SSB with reintroduced carrier. (b) SSB with no carrier.
(c) SSB with full carrier. (d) SSB with full modulation.
14. The transmission defined as RTTY shall encompass
(a) Radio Teletype and AMTOR. (b) AMTOR only
(c) ASCII transmission (d) Binary coded decimal encoding.
15. For safety reasons all exposed metal work in an Amateur station should be
(a) left floating. (b) free of Earthing.
(c) connected to the live phase. (d) connected to the earth.
16. CQ should only be made
(a) after listening on a frequency which is not in use.
(b) On frequencies that are in use.
(c) When contents are on
(d) When band conditions are hopeless.
17. When operating via a Satellite, a station should
(a) use the minimum power needed to maintain contact.
(b) never call CQ.
(c) always use voice.
(d) be a member of AMSAT.
18. In which International Telecommunication Union Region is Sri Lanka.
(a) Region 1 (b) Region 2 (c) Region 3 (d) Region 4
19. A directional antenna is pointed in the long path direction. How many degrees should you rotate your antenna to point it towards short path.
(a) 45 degrees. (b) 90 degrees. (c) 180 degrees. (d) 270 degrees.
20. If a readability signal is given as 5 this indicates that the signal is
(a) perfectly readable. (b) unreadable
(c) readable with practically no difficulty. (d) readable with considerable difficulty.
21. What is meant by the term flattopping in a SSB phone transmission.
(a) Signal distortion caused by insufficient collector current.
(b) The transmitter ALC is properly adjusted.
(c) Signal distortion caused by excessive drive.
(d) The transmitter's carrier is properly suppressed.
22. How should the microphone gain control be adjusted in a SSB transmitter
(a) for full deflection of the ALC meter on modulation peaks.
(b) for slight movement of the ALC meter on modulation peaks.
(c) for 100% frequency deviation on modulation peaks.
(d) for a dip in plate current.
23. In what segment of the 20 meter band do most RTTY transmission takes place
(a) between 14.000 MHz to 14.050 MHz. (b) between 14.075 MHz to 14.100 MHz.
(c) between 14.150 MHz to 14.225 MHz. (d) between 14.275 MHz to 14.350 MHz.
24. What is the most common frequency shift on (frequency shift) RTTY in HF amateur bands.
(a) 85 Hz. (b) 170 Hz. (c) 425 Hz. (d) 850 Hz
25. What is the meaning of ARQ?
(a) Automatic Repeater Queue (b) Automatic Receiver Quieting.
(c) Automatic Resend Quickly. (d) Automatic Repeat Request.

Answers :-

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

Q-1 9M2 = malasia, 9Q7 = Zeira, 9K2 = Kuwait 9V1 = Singapore

Q-8 For old regulations answer is “b”, new regulation no correct answer (because no Morse required)

Q-16 typing error “(c) When **contents** are on” corrected as “(c) When **contests** are on”