

647TA(EE)

QUESTION
BOOKLET CODE

A



Government of India
Department of Space
LIQUID PROPULSION SYSTEMS CENTRE
Valiamala PO, Thiruvananthapuram - 695 547

**WRITTEN TEST FOR SELECTION TO THE POST OF
TECHNICAL ASSISTANT (ELECTRONICS)**

Date: 07.08.2016

Time: 2 hours

Maximum Marks: 300

Name of the Candidate:

Roll No.:

Instructions to the Candidates

1. Candidates should read carefully the instructions in the Question booklet and OMR Answer Sheet before start answering.
2. You have been called for the written test based on the data furnished by you in the on-line application. If you have wrongly entered in the application or you do not possess the required qualification as per our advertisement, your candidature will be rejected.
3. You should sign the Admit Card/Photograph only in the presence of the invigilator in the Examination Hall.
4. The question paper is in the form of Question Booklet with 75 questions. A separate OMR sheet is provided for answering the Questions.
5. **Question Booklet series code (A/B/C/D/E) printed on the right hand top corner should be written in the OMR answer sheet in the place provided.**
6. Enter your Name and Roll Number in the Question Booklet.
7. All entries in the OMR answer sheet should be with blue/black ball point pen only.

P.T.O

8. The written test will be of objective type based on the qualification prescribed for the post with four answers indicated, of which only one will be unambiguously correct.
 9. You have to select the right answer by marking the corresponding oval on the OMR answer sheet by blue/black ball point pen as per the instructions given in the OMR answer sheet.
 10. All questions carry **four** marks each, **zero** marks for no answer and **one negative** mark for a wrong answer.
 11. Multiple answers for a question will be regarded as a wrong answer.
 12. Marking in OMR may be done with utmost care. No spare OMR sheet will be provided.
 13. Computers, Calculators, mobile phones, reference books, logarithm table, electronic gadgets etc. will not be allowed inside the Examination Hall.
 14. Space available in the Question Booklet can be used for rough work.
 15. **On completion of the test, tear the OMR answer sheet along the perforation mark at the top and hand over the original OMR answer sheet to the invigilator and retain the duplicate copy with you.**
 16. Candidates are not permitted to leave the Examination Hall during the first one and a half hour of the examination.
 17. Candidates leaving the examination hall after 1220 hrs will be allowed to retain the Question Booklet.
 18. After the Examination, candidates should hand over OMR Answer Sheet and Admit Card to the Invigilator.
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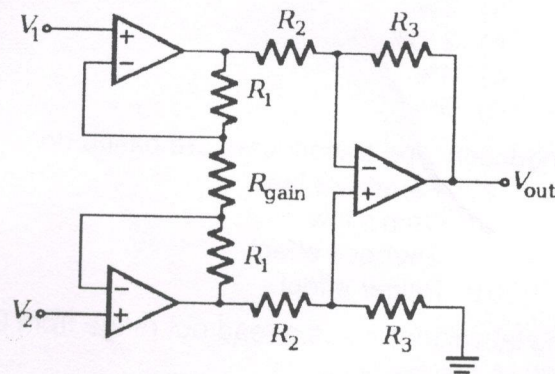
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647TA(EE)

TECHNICAL ASSISTANT (ELECTRONICS)

1. The 16 bit flag of 8086 microprocessor is responsible to indicate:
 - a) Condition of result of ALU operation
 - b) Condition of memory
 - c) Result of addition
 - d) Result of subtraction
2. Which method bypasses the CPU for certain types of data transfer?
 - a) Software interrupts
 - b) Interrupt-driven I/O
 - c) Polled I/O
 - d) Direct memory access (DMA)
3. In 8086, example for non maskable interrupts is:
 - a) TRAP
 - b) RST6.5
 - c) INTR
 - d) RST6.6
4. The total external data memory that can be interfaced to the 8051 is:
 - a) 32K
 - b) 64K
 - c) 128K
 - d) 256K
5. The 8051 can handle _____ interrupt sources.
 - a) 3
 - b) 4
 - c) 6
 - d) 5
6. Which of the following instructions will move the contents of register 3 to the accumulator?
 - a) MOV A, R3
 - b) MOV R3, A
 - c) MOV 3R, A
 - d) MOV A, 3R
7. A megger is a device used for measuring:
 - a)Extremely high voltages
 - b)Extremely high currents
 - c)Extremely high resistances
 - d)All of the above
8. An ammeter of 0-25 A range has a guaranteed accuracy of 1% of full scale reading. The current measured is 5 A. The limiting error is
 - a) 2%
 - b) 2.5%
 - c) 4%
 - d) 5%
9. All induction type transducers are based on
 - a) Faraday's law
 - b) Ohm's law
 - c) Seebeck effect
 - d) Peltier effect
10. A digital voltmeter has a read out range from 0 to 9999 counts. If the full scale reading is 9.999 V, the resolution is:
 - a) 1 V
 - b) 0.01 V
 - c) 1 milli V
 - d) 1micro V

11. Which of the following is a digital transducer
- Strain Gauge
 - Thermistor
 - Encoder
 - LVDT
12. If meter A requires 100 mA to give full scale deflection , meter B requires 50 mA to give full scale deflection and meter C requires 80 mA to give full scale deflection, then the
- Meter A is more sensitive
 - All meters are equally sensitive
 - Meter B is more sensitive
 - Meter C is more sensitive
13. A variable reluctance tachometer has 180 teeth on rotor. The speed of shaft on which it is mounted is 1800 rpm. The frequency of output pulses is
- 1800 Hz
 - 3600 Hz
 - 4800 Hz
 - 5400 Hz
14. The ratio between differential gain and common-mode gain is called:
- Amplitude
 - common-mode rejection
 - differential-mode rejection
 - phase
15. If the gain of a closed-loop inverting amplifier is 3.9, with an input resistor value of 1.6 K ohms, what value of feedback resistor is necessary?
- 2.4 K ohms
 - 6.24K ohms
 - 0.62 K ohms
 - 410 ohms
16. If the input to a comparator is a sine wave, the output is a
- ramp voltage
 - sine wave
 - rectangular wave
 - saw tooth wave
17. This circuit is a setup for



- an antilog amplifier
- a constant-current source
- an instrumentation amplifier
- an isolation amplifier

18. In dual slope type of ADCs, an input hold time is _____.

- a) Almost zero
- b) Higher than that of flash type ADCs
- c) Longest
- d) All of the above

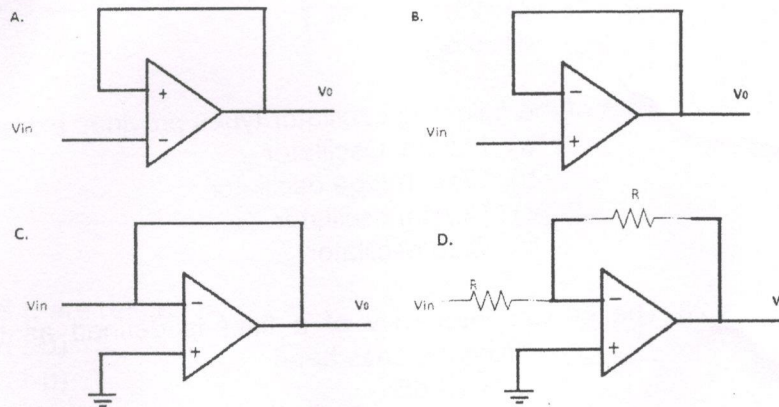
19. In a linear IC voltage regulator, series pass transistor always operates in _____ region.

- a) Active
- b) Saturation
- c) Cut-off
- d) All of the above

20. Switching regulators are series type regulators, which has _____ power dissipation & _____ efficiency.

- a) increased, increased
- b) increased, reduced
- c) reduced, increased
- d) reduced, reduced

21. Which of the following is a true op-amp voltage follower

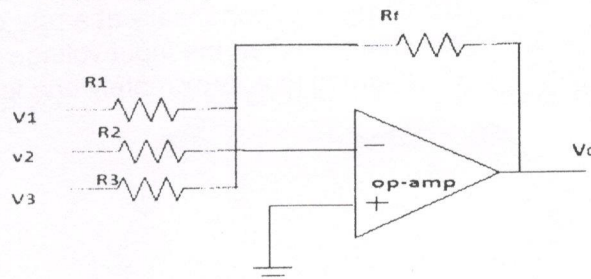


- a) A
- b) B
- c) C
- d) D

22. A given op-amp has an open loop gain of 110 dB and a CMRR rating of 100 dB. What should be the open loop common mode gain of this op-amp?

- a) 1.10 dB
- b) 10 dB
- c) 210 dB
- d) 105 dB

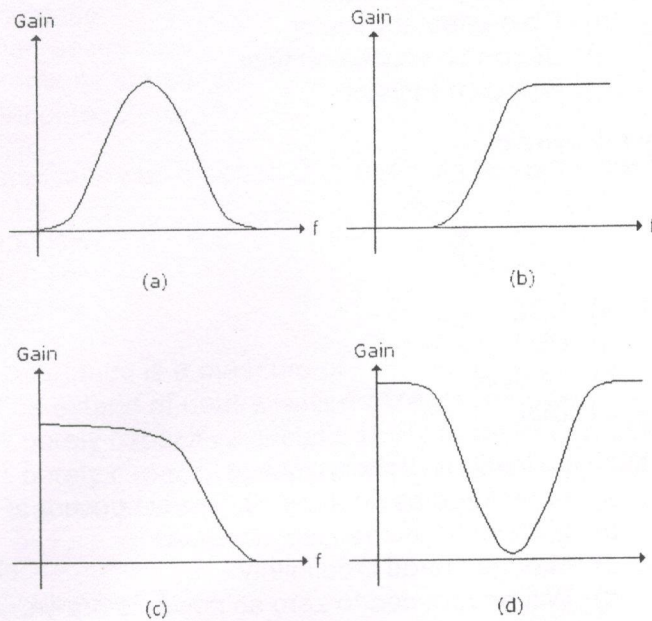
23. Calculate the output voltage if $R_1 = R_2 = R_3 = 50 \Omega$, $R_f = 1 \text{ k}\Omega$, and $V_1 = V_2 = V_3 = 50 \text{ mV}$.



- a) -3.0 V
- b) 3.0 V
- c) 1.0 V
- d) -1.0 V

24. A filtered full-wave rectifier voltage has a smaller ripple than does a half-wave voltage for the same load resistance and capacitor values because:
- there is a shorter time between peaks
 - there is a longer time between peaks
 - the larger the ripple, the better the filtering action
 - none of the above
25. A capacitor may be needed in a discrete voltage regulator to prevent
- Negative feedback
 - Excessive load current
 - Oscillations
 - Current sensing
26. If the output of a voltage regulator varies from 15 to 14.7 V between the minimum and maximum load current, the load regulation is:
- 0
 - 1%
 - 2%
 - 5%
27. One of the following oscillator types provides extremely stable output frequency
- Hartley Oscillator
 - Wein bridge oscillator
 - Crystal oscillator
 - Clap oscillator
28. The critical frequency of a filter is defined as the point at which the response drops _____ from the pass band.
- 20 dB
 - 3 dB
 - 6 dB
 - 40 dB
29. A resonant circuit contains _____ elements
- R and L only
 - R and C only
 - Only R
 - L and C
30. In an RC differentiator, the capacitor
- charges exponentially at a rate depending on the RC time constant
 - charges exponentially at a rate depending on the input voltage
 - charges when the input voltage is decreasing
 - charges to approximately one time constant

31. Identify the frequency response curve for a band-pass filter



- a) a
- b) b
- c) c
- d) d

32. The transistor's α & β are related by

- a) $\beta = \alpha/(1-\alpha)$
- b) $\alpha = \beta/(1-\beta)$
- c) $\beta = \alpha/(1+\alpha)$
- d) $\alpha = (1+\beta)/\beta$

33. When the current through a Zener diode increases by a factor of 2, the voltage across its terminals

- a) is halved
- b) is doubled
- c) is practically unchanged
- d) None of these

34. A diode for which you can change the reverse bias and thus vary the capacitance is called

- a) Tunnel diode
- b) Varactor diode
- c) Zener diode
- d) Switching diode

35. For a transistor with β_{DC} of 250 and a base current I_B of 20 micro A, the collector current I_C equals:

- a) 500 micro A
- b) 5 milli A
- c) 50 milli A
- d) 5 A

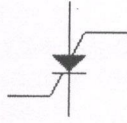
36. The PUT (programmable unijunction transistor) is actually a type of

- a) UJT thyristor
- b) FET device
- c) TRIAC
- d) SCR

37. One of the following is a negative resistance device

- a) P-N junction diode
- b) Field effect transistor
- c) Silicon controlled rectifier
- d) Bipolar transistor

38. Identify the symbol



- a) SCS
- b) PUT
- c) LASCR
- d) Diac

39. In practical applications, battery voltage

- a) Is restored as soon as disconnect occurs
- b) Is lowered as the load increases
- c) May be stored indefinitely
- d) Will be reduced to zero as power is drawn

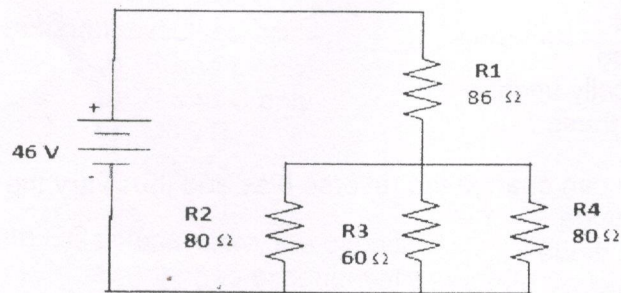
40. The current flowing through an unloaded voltage divider is called the

- a) Resistor current
- b) Load current
- c) Bleeder current
- d) Voltage current

41. ----- is the rms value of rectangular voltage wave with an amplitude of 10 V

- a) 11.2 V
- b) 5.2 V
- c) 7.7 V
- d) 10 V

42. What is the total resistance of the circuit?



- a) 306 Ω
- b) 177 Ω
- c) 288 Ω
- d) 110 Ω

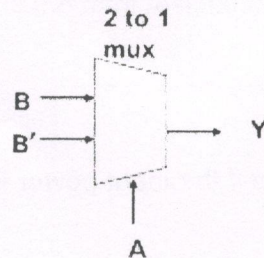
43. The frequency that has the longest period is

- a) 10 KHz
- b) 1 KHz
- c) 10 Hz
- d) 1 Hz

44. If R1 is in series with parallel connected to R2 & R3, what happens to total current if R2 opens
- Increase
 - Decreases
 - Remains the same
 - Becomes Zero
45. A certain square wave has a period of 4 msec. Its fundamental frequency will be
- 0 Hz
 - 230 Hz
 - 250 Hz
 - 430 Hz
46. Capacitive susceptance is a measure of
- The extend of neutralisation of reactive power in a circuit
 - A purely capacitive circuit's ability to resist flow of current
 - A purely capacitive circuit's ability to pass current
 - Reactive power in a circuit
47. Current equals
- Coulombs / Time
 - Coulombs X Time
 - Voltage / Time
 - Voltage X Time
48. The difference between analog voltage represented by two adjacent digital codes of an analog to digital converter is
- Accuracy
 - Resolution
 - Quantization
 - Precision
49. The relationship between wavelength and frequency of an electromagnetic wave
- $c = f\lambda$
 - $c = f/\lambda$
 - $f = 1/\lambda$
 - $f = c\lambda$
50. Calculate the radiation efficiency of an antenna if the input power is 100W and the power dissipated is 5W:
- 0.05
 - 0.95
 - 1
 - 0.4
51. Bending of light wave as it passes between material of different optical density
- Reflection
 - Refraction
 - Scattering
 - Polarization
52. Signal to Noise Ratio(SNR) in dB is equal to
- $10 \log_{10} (\text{Signal energy} / \text{Noise energy})$
 - $20 \log_{10} (\text{Signal energy} / \text{Noise energy})$
 - $10 \log_e (\text{Signal energy} / \text{Noise energy})$
 - $20 \log_e (\text{Signal energy} / \text{Noise energy})$

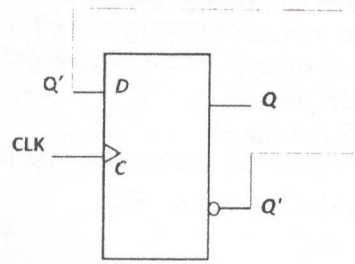
53. Antenna is an electrical device which converts
- Electrical signals to electromagnetic waves
 - Electromagnetic waves to Electrical signals
 - Both a & b
 - None of the above
54. The RF receiver's ability to reject unwanted signal is called
- Selectivity
 - Sensitivity
 - SNR
 - Efficiency
55. The electric permittivity of free space ' ϵ_0 ' is
- 8.85×10^{-12} F/m
 - 8.85×10^{-12} pF/m
 - 8.85×10^{-12} μ F/m
 - 8.85×10^{-12} fF/m
56. Modulation is required
- To transmit electrical signals over an antenna through free space
 - To improve the signal to noise ratio
 - To make the low frequency signals travel long distance
 - All the above
57. The 2's complement of 11011111
- 11011111
 - 00100001
 - 00110001
 - 00100000

58. What is the Boolean expression for the given logic diagram?



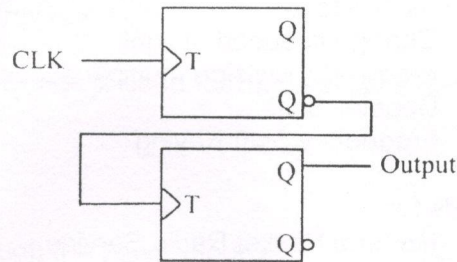
- A NAND B
 - A XNOR B
 - A XOR B
 - A NOR B
59. A tristate logic device is a
- Special logic device which has three states "High" "LOW" & Low Impedance
 - Special logic device which has three states "High" "LOW" & "Always High"
 - Quantization Special logic device which has three states "High" "LOW" & High Impedance
 - Precision Special logic device which has three states "High" "LOW" & "Always High"

60. What does the following flip flop configuration does?



- a) Q=1 always
- b) Q=0 always
- c) Acts as 1-bit counter
- d) Act as 1-bit memory

61. Determine the output frequency of the given circuit if the input CLK frequency is 1MHz



- a) 0.5 MHz
- b) 250 KHz
- c) 4 MHz
- d) 1 KHz

62. A decade counter is also referred to as

- a) BCD counter
- b) BCD decade counter
- c) Modulo – 10 counter
- d) Ring counter

63. The distance between point P (2m,3m,4m) with respect to origin is

- a) $\sqrt{29}m$
- b) $\sqrt{13}m$
- c) 5m
- d) $\sqrt{20}m$

64. Which of the following is not a scalar quantity"

- a) Time
- b) Mass
- c) Volume
- d) Acceleration

65. From a circular plate of diameter 6cm, a circle is cut out whose diameter is radius of the plate. The area of the remaining plate is

- a) $27\pi/2cm^2$
- b) $27\pi/4cm^2$
- c) $27\pi^2/4cm^2$
- d) $27\pi cm^2$

66. A car starts from rest and accelerated uniformly over a time of 6sec for a distance of 18m. The acceleration of the car is:

- a) 5 m/sec^2
- b) 10 m/sec^2
- c) 15 m/sec^2
- d) 2.5 m/sec^2

67. Find the derivative of $f(x) = 1/x^2$

- a) $-2/x^3$
- b) $2/x^3$
- c) $-1/2x$
- d) $1/2x$

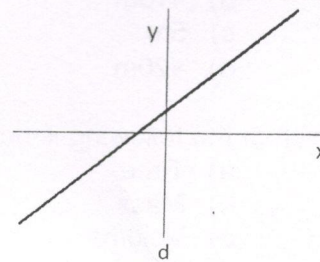
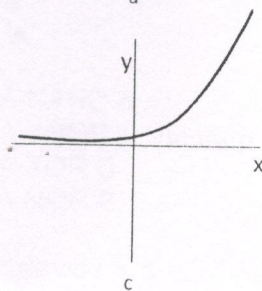
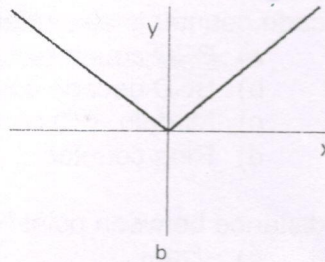
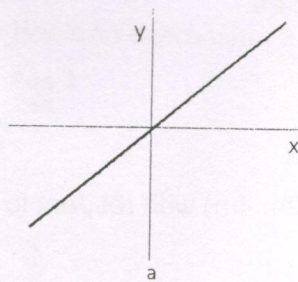
68. For an observer, the redshift happens when light or other electromagnetic radiation from an object is increased in wavelength, or shifted to the red end of the spectrum. This phenomenon is due to

- a) Change in speed of light
- b) Frequency division multiple access
- c) Doppler Shift
- d) Frequency Shift Keying

69. GPRS stands for

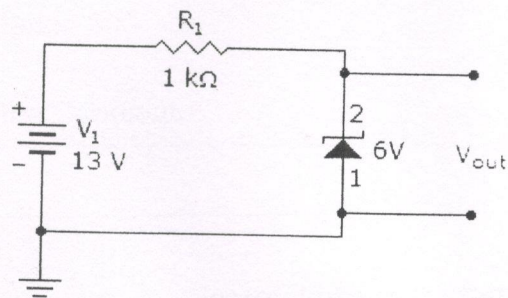
- a) General Packet Radio Service
- b) Global Positioning Radio Service
- c) Geological Packet Radio Service
- d) Geological Positioning Radio Service

70. Name the functions of the graphs a,b,c,d



- a) a: $f(x)=x$; b: $f(x)=|x|$; c: $f(x) = e^x$; d : $f(x)=x+2$
- b) a: $f(x)=x+1$; b: $f(x)=x^2$; c: $f(x) = \log x$; d : $f(x)=x-2$
- c) a: $f(x)=-x$; b: $f(x)=|x|$; c: $f(x) = -e^x$; d : $f(x)=x+2$
- d) a: $f(x)=x$; b: $f(x)=|x^2|$; c: $f(x) = e^x$; d : $f(x)=x-2$

71. Structured programming is
- a) Dividing the programme into different modules
 - b) Using structures in the programme
 - c) Using classes in the programme
 - d) None of the Above
72. Which one of the following is most appropriate description of "algorithm"
- a) Source code
 - b) Executable image
 - c) Object file
 - d) Statements laying down a step-by-step execution of the programme
73. The identification given to a computer connection to a network is known as
- a) Process ID
 - b) IP address
 - c) SYSID
 - d) System Serial number
74. Which of the following devices is used for modulation & demodulation
- a) Multiplexer
 - b) Serial port
 - c) Modem
 - d) Gate way
75. What is the current through the zener diode?



- a) 0 mA
- b) 7 mA
- c) 8.3 mA
- d) 13 mA