

MIZORAM PUBLIC SERVICE COMMISSION

TECHNICAL COMPETITIVE EXAMINATIONS FOR RECRUITMENT TO JUNIOR ENGINEER (J.E) CONTRACT BASIS UNDER RURAL DEVELOPMENT DEPARTMENT, NOVEMBER, 2016.

ELECTRONICS & COMMUNICATION ENGINEERING PAPER - II

Time Allowed : 2 hours

Full Marks : 150

All questions carry equal marks of 2 each.

Attempt all questions

- Superposition theorem can be applied only to circuits having
 - Resistive elements
 - Passive elements
 - Non-linear elements
 - Linear bilateral elements
- An ideal voltage source should have
 - Large value of e.m.f.
 - Small value of e.m.f.
 - Zero source resistance
 - Infinite source resistance
- The nodal method of circuit analysis is based on
 - KVL & ohm's law
 - KCL & ohm's law
 - KVL & KCL
 - KVL, KCL, ohm's law
- What is the total reactance of a series RLC circuit at resonance?
 - Equal to XL
 - Equal to XC
 - Equal to R
 - Zero
- The capacitor charging current is
 - Exponentially growth function
 - Exponentially decay function
 - Linear decay function
 - Linear rise function
- The power consumed in a circuit element will be least when the phase difference between current & voltage is
 - 180°
 - 90°
 - 60°
 - 0°
- In RLC circuits, the current at resonance is
 - Maximum in parallel resonance and minimum in series resonance
 - Maximum in series resonance and minimum in parallel resonance
 - Maximum in both series & parallel resonance
 - Minimum in both series & parallel resonance
- In a series resonance circuit, the impedance of the circuit is
 - Minimum
 - Maximum
 - Zero
 - Infinite

9. In any A.C. circuit always
- (a) Apparent power is more than actual power
 - (b) Reactive power is more than apparent power
 - (c) Actual power is more than reactive power
 - (d) Reactive power is more than actual power
10. Power factor of magnetizing component of current of a transformer is
- (a) 0.8 lag
 - (b) 0.8 lead
 - (c) Zero
 - (d) Unity
11. The maximum torque of D.C. motor is limited by
- (a) Commutation
 - (b) Heating
 - (c) Speed
 - (d) Armature current
12. If the pole flux of D.C. motor approaches zero, its speed will
- (a) Approach zero
 - (b) Approach infinity
 - (c) No change due to corresponding change in back emf.
 - (d) Approach a stable value somewhere between zero and infinity
13. In performing the short circuit test of a transformer
- (a) High voltage side is usually short circuited
 - (b) Low voltage side is usually short circuited
 - (c) Any side is short circuited with preference
 - (d) None of these
14. In a D.C. machine, the armature windings are placed on the rotor because of the necessity for
- (a) Electromechanical energy conversion
 - (b) Generation of voltage
 - (c) Commutation
 - (d) Development of torque
15. In a CRO time base signal is
- (a) Square wave
 - (b) High frequency saw tooth wave
 - (c) Rectangular waveform
 - (d) High frequency sinusoidal wave
16. The scale of voltmeter is uniform. Its type is
- (a) Moving iron
 - (b) Induction
 - (c) Moving coil permanent magnet
 - (d) Moving coil dynamometer
17. A thermocouple is a _____ transducer
- (a) Variable resistance
 - (b) Voltage generating
 - (c) Variable inductance
 - (d) Voltage divider
18. The principle of operation of LVDT is based on variation of
- (a) Self inductance
 - (b) Mutual inductance
 - (c) Reluctance
 - (d) Capacitance
19. The output of LVDT is in the form of
- (a) Pulse
 - (b) High frequency signals
 - (c) Rotary movement of core
 - (d) Linear displacement of core

20. Norton theorem results in
- (a) Current source only
 - (b) Voltage source only
 - (c) A current source in parallel with impedance
 - (d) A current source and impedance in series.
21. For bringing the SCR to off condition
- (a) Gate current is removed
 - (b) Gate current is reversed
 - (c) Anode voltage is reduced to a value below holding voltage
 - (d) None of these
22. A GTO thyristor
- (a) Requires a special turn-off circuit like a thyristor
 - (b) Can be turned off by removing the gate pulse
 - (c) Can be turned off by a negative current pulse at the gate
 - (d) Can be turned off by a positive current pulse at the gate
23. In case of a thyristor di/dt capability can be improved by
- (a) Thermal triggering
 - (b) Voltage triggering
 - (c) dv/dt triggering
 - (d) Gate pulse triggering
24. In a SCR circuit, the angle of conduction can be changed by changing
- (a) Anode voltage
 - (b) Anode current
 - (c) Holding current
 - (d) Latching current
25. Thermal runaway of a thyristor occurs because
- (a) Positive resistance coefficient of the junction
 - (b) Negative resistance coefficient of the junction
 - (c) If the latching current is more
 - (d) If the thyristor is loaded with wider current pulses
26. In a UJT, intrinsic stand-off ratio η is typically
- (a) 0.2
 - (b) 0.4
 - (c) 0.7
 - (d) 0.99
27. String efficiency is used to measure
- (a) Voltage rating of SCRs
 - (b) Current rating of SCRs
 - (c) Temperature rating of SCRs
 - (d) Degree of utilization of SCRs
28. In a single phase full converter, if α and β are firing and extinction angles respectively, then the load current is
- (a) Discontinuous if $(\beta - \alpha) < \pi$
 - (b) Discontinuous if $(\beta - \alpha) > \pi$
 - (c) Discontinuous if $(\beta - \alpha) = \pi$
 - (d) Discontinuous if $(\beta - \alpha) \leq \pi$
29. A step-up chopper has V_s as source voltage and α as the duty cycle. The output voltage for this chopper is given by
- (a) $V_s(1 + \alpha)$
 - (b) $V_s/(1 - \alpha)$
 - (c) $V_s(1 - \alpha)$
 - (d) $V_s/(1 + \alpha)$

30. In a DC chopper, for periodic time T , the output voltage can be controlled by FM by varying
- (a) T keeping T_{on} constant
 - (b) T_{on} keeping T constant
 - (c) T keeping T_{off} constant
 - (d) T_{off} keeping T constant
31. In a single phase full converter, if output voltage has peak and average values of 325V and 133V respectively, then firing angle is
- (a) 40°
 - (b) 50°
 - (c) 70°
 - (d) 130°
32. A single phase full – bridge inverter can operate in load commutation mode in case load consists of
- (a) RLC overdamped
 - (b) RLC underdamped
 - (c) RLC critically damped
 - (d) None of these
33. A SMPS operating at 20 kHz to 100kHz range uses _____ as the main switching elements
- (a) SCR
 - (b) MOSFET
 - (c) Transistor
 - (d) SIT
34. The on-state voltage drop across the IGBT is
- (a) Less than that across the MOSFET
 - (b) Greater than that across the MOSFET
 - (c) Equal to that of MOSFET
 - (d) None of these
35. The temperature coefficient of resistivity of an IGBT is
- (a) Positive
 - (b) Negative
 - (c) Flat
 - (d) Exponential
36. The turn-on time of an SCR with inductive load is 20 μ s. The pulse train frequency is 2.5kHz with a mark/space ratio of 1/10. Then the SCR will
- (a) Turn on
 - (b) Not turn on
 - (c) Turn on if inductance is removed
 - (d) Turn-on if pulse frequency is increased to two times.
37. A SCR has half cycle surge current rating of 3000A for 50Hz supply. One cycle surge current rating will be
- (a) 1500A
 - (b) 2121.32A
 - (c) 4242.64A
 - (d) 6000A
38. A fully controlled thyristor bridge drives a DC motor. The system is capable of
- (a) Motoring & braking in both directions
 - (b) Only motoring in both directions, no braking
 - (c) Motoring in forward direction & braking in reverse direction
 - (d) Only motoring in forward directions, no braking
39. A UJT has one base resistance of 5.2k. Its intrinsic stand of ratio is 0.67. The inter-base voltage of 12V is applied across the two passes. The value of base current will be
- (a) 1.16mA
 - (b) 1.28mA
 - (c) 1.34mA
 - (d) 1.41mA
40. The Safe Operating Area (SOA) of IGBT is better than that of a power transistor because
- (a) It is a majority carrier device
 - (b) It is a minority carrier device
 - (c) Second breakdown is absent due to its flat temperature coefficient of temperature
 - (d) None of these

41. The image (second) channel selectivity of a super heterodyne communication receiver is determined by
- (a) Antenna and pre-selector
 - (b) The preselect or and RF amplifier
 - (c) The pre selector and IF amplifier
 - (d) The RF and IF amplifier
42. A super heterodyne receiver with an I.F of 450 kHz is tuned to a signal at 1200 kHz. The image frequency is
- (a) 750 kHz
 - (b) 900 kHz
 - (c) 1650 kHz
 - (d) 2100 kHz
43. Pre-emphasis in FM systems involves
- (a) Compression of the modulating signal
 - (b) Expansion of the modulating signals
 - (c) Amplification of lower frequency components of the modulating signals
 - (d) Amplification of higher frequency components of the modulating signals
44. If antenna directivity and antenna gain are equal, then antenna efficiency is _____ %.
- (a) 20
 - (b) 50
 - (c) 75
 - (d) 100
45. When microwave propagate around the curvature of the Earth for long distance, it is called
- (a) Skip distance
 - (b) Ducting
 - (c) Troposcatter
 - (d) Faraday effect
46. In a radio receiver AGC is used
- (a) To improve the noise figure of the receiver
 - (b) To maintain the carrier level at the second detector input constant
 - (c) To improve selectivity of the receiver
 - (d) None of these
47. _____ wave remains unaffected during day and night
- (a) Ground
 - (b) Tropospheric
 - (c) Sky
 - (d) None of these
48. The radiation pattern of a parabolic antenna is
- (a) A figure of eight
 - (b) Highly directional
 - (c) Omni-directional
 - (d) None of these
49. When installing PCI NICS one can check IRQ availability by looking at
- (a) Dip switch
 - (b) CONFIG.SYS
 - (c) Jumper setting
 - (d) Motherboard BIOS
50. A hard disk is divided into tracks which are further subdivided into
- (a) Cluster
 - (b) Sectors
 - (c) Vectors
 - (d) Heads
51. Which type of system board is the MOST likely candidate for processor upgrading to get maximum performance and future compatibility?
- (a) ML
 - (b) PCI
 - (c) ISA
 - (d) EISA

52. The terms "red book", "yellow book", and "orange book" refer to
- (a) SCSI
 - (b) Ide
 - (c) Floppy drive technology
 - (d) CD-ROM standards
53. Which of the following best describes static memory devices?
- (a) Semiconductor memory devices in which stored data is retained as long as power is applied.
 - (b) Semiconductor memory devices in which stored data will not be retained with the power applied unless constantly refreshed
 - (c) Memory devices that are magnetic in nature and do not require constant refreshing
 - (d) Memory devices that are magnetic in nature and require constant refreshing
54. When installing a SCSI CD-ROM drive, one must set the CD-ROM SCSI adapter to
- (a) B0007
 - (b) An unused SCSI address
 - (c) The same address as the SCSI device before the CD-ROM
 - (d) SCSI ID=1
55. During the normal PC boot process, which of the following is active first?
- (a) RAM BIOS
 - (b) CMOS
 - (c) ROM BIOS
 - (d) Hard disk information
56. A scheme in which portions of I/O address space are given to I/O devices, is called
- (a) Data mapped
 - (b) Memory-mapped I/O
 - (c) Backplane
 - (d) Both (a) and (b)
57. In a modem using dibit phase, encoding has bit rate
- (a) Same as the baud rate
 - (b) Higher than its baud rate
 - (c) Lower than its baud rate
 - (d) Independent of its baud rate
58. The temporary storage area, attached to the CPU for I/O operation is
- (a) Channel
 - (b) Buffer
 - (c) Register
 - (d) Code
59. Topology with highest reliability is
- (a) Mesh
 - (b) Star
 - (c) Bus
 - (d) Ring
60. _____ refers to the physical or logical arrangement of a network.
- (a) Data flow
 - (b) Mode of operation
 - (c) Topology
 - (d) None of these
61. ARM stands for _____.
- (a) Advanced Rate Machines
 - (b) Advanced RISC Machines
 - (c) Artificial Running Machines
 - (d) Aviary Running Machines
62. The main importance of ARM micro-processors is providing operation with,
- (a) Low cost and low power consumption
 - (b) Higher degree of multi-tasking
 - (c) Lower error or glitches
 - (d) Efficient memory management
63. The additional duplicate register used in ARM machines are called as _____.
- (a) Copied-registers
 - (b) Banked registers
 - (c) Extra registers
 - (d) Extential registers

64. Each instruction in ARM machines is encoded into ____ Word.
(a) 2 byte (b) 3 byte
(c) 4 byte (d) 8 byte
65. The instruction, MLA R0, R1, R2, R3 performs _____.
(a) $R0 < -[R1] + [R2] + [R3]$ (b) $R3 < -[R0] + [R1] + [R2]$
(c) $R0 < -[R1] * [R2] + [R3]$ (d) $R3 < -[R0] * [R1] + [R2]$

Directions (Questions 66): Choose the correct alternative that will continue the same pattern and replace the question mark in the given series.

66. 120, 99, 80, 63, 48 ?
(a) 35 (b) 38
(c) 39 (d) 40

67. Study the following table and answer the questions based on it.
Expenditures of a Company (in Lakh Rupees) per Annum Over the given Years.

Year	Item of Expenditure				
	Salary	Fuel and Transport	Bonus	Interest on Loans	Taxes
1998	288	98	3.00	23.4	83
1999	342	112	2.52	32.5	108
2000	324	101	3.84	41.6	74
2001	336	133	3.68	36.4	88
2002	420	142	3.96	49.4	98

What is the average amount of interest per year which the company had to pay during this period?

- (a) Rs. 32.43 lakhs (b) Rs. 33.72 lakhs
(c) Rs. 34.18 lakhs (d) Rs. 36.66 lakhs
68. Arrange the words given below in a meaningful sequence.
1. Word 2. Paragraph 3. Sentence
4. Letters 5. Phrase
(a) 4, 1, 5, 2, 3 (b) 4, 1, 3, 5, 2
(c) 4, 2, 5, 1, 3 (d) 4, 1, 5, 3, 2
69. Arrange the words given below in a meaningful sequence.
1. Police 2. Punishment 3. Crime
4. Judge 5. Judgement
(a) 3, 1, 2, 4, 5 (b) 1, 2, 4, 3, 5
(c) 5, 4, 3, 2, 1 (d) 3, 1, 4, 5, 2

Directions (Questions 70): Pick out the most effective word(s) from the given words to fill in the blank to make the sentence meaningfully complete.

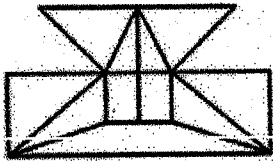
70. Catching the earlier train will give us the to do some shopping.
(a) chance (b) luck
(c) possibility (d) occasion

71. Find the number of triangles in the given figure.



- (a) 8
- (b) 10
- (c) 12
- (d) 14

72. Find the minimum number of straight lines required to make the given figure.



- (a) 16
- (b) 17
- (c) 18
- (d) 19

Directions (Questions 73): In each of the following questions, arrange the given words in a meaningful sequence and thus find the correct answer from alternatives.

73. Y is in the East of X which is in the North of Z. If P is in the South of Z, then in which direction of Y, is P?

- (a) North
- (b) South
- (c) South-East
- (d) None of these

Directions (Questions 74): Find the statement that must be true according to the given information.

74. Vincent has a paper route. Each morning, he delivers 37 newspapers to customers in his neighbourhood. It takes Vincent 50 minutes to deliver all the papers. If Vincent is sick or has other plans, his friend Thomas, who lives on the same street, will sometimes deliver the papers for him.

- (a) Vincent and Thomas live in the same neighbourhood.
- (b) It takes Thomas more than 50 minutes to deliver the papers.
- (c) It is dark outside when Vincent begins his deliveries.
- (d) Thomas would like to have his own paper route.

Directions (Questions 75): Read the question carefully and choose the correct answer.

75. Four people witnessed a mugging. Each gave a different description of the mugger. Which description is probably right?

- (a) He was average height, thin, and middle-aged.
- (b) He was tall, thin, and middle-aged.
- (c) He was tall, thin, and young.
- (d) He was tall, of average weight, and middle-aged.