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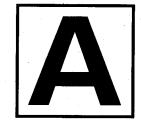
Serial 1048725

Test Booklet Series

A

TEST BOOKLET

ELECTRICAL ENGINEERING

Time Allowed : Three Hours   *Maximum Marks : 300*

INSTRUCTIONS

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS TEST BOOKLET *DOES NOT* HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS, ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.

2. **Please note that it is the candidate's responsibility to encode and fill in the Roll Number and Test Booklet Series Code A, B, C or D carefully and without any omission or discrepancy at the appropriate places in the OMR Answer Sheet. Any omission/discrepancy will render the Answer Sheet liable for rejection.**

3. You have to enter your Roll Number on the Test Booklet in the Box provided alongside. *DO NOT* write *anything else* on the Test Booklet.

4. This Test Booklet contains **150** items (questions). Each item comprises four responses (answers). You will select the response which you want to mark on the Answer Sheet. In case, you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose *ONLY ONE* response for each item.

5. You have to mark all your responses *ONLY* on the separate Answer Sheet provided. See directions in the Answer Sheet.

6. All items carry equal marks.

7. Before you proceed to mark in the Answer Sheet the response to various items in the Test Booklet, you have to fill in some particulars in the Answer Sheet as per instructions sent to you with your Admission Certificate.

8. After you have completed filling in all your responses on the Answer Sheet and the examination has concluded, you should hand over to the Invigilator *only the Answer Sheet*. You are permitted to take away with you the Test Booklet.

9. Sheets for rough work are appended in the Test Booklet at the end.

10. **Penalty for wrong answers :**

   THERE WILL BE PENALTY FOR WRONG ANSWERS MARKED BY A CANDIDATE.

   (i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, **one-third (0·33)** of the marks assigned to that question will be deducted as penalty.

   (ii) If a candidate gives more than one answer, it will be treated as a **wrong answer** even if one of the given answers happens to be correct and there will be same penalty as above to that question.

   (iii) If a question is left blank, i.e., no answer is given by the candidate, there will be **no penalty** for that question.

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1. If λ is eigenvalues of A, and A is idempotent matrix, then
   (a) $\lambda \neq 0$
   (b) $\lambda \neq 1$
   (c) Either $\lambda = 0$ or $\lambda = 1$
   (d) $\lambda \neq 0$ and $\lambda = 1$

2. The eigenvalues of the matrix $\begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}$ are
   (a) 5 and 2
   (b) 1 and 4
   (c) 1 and 6
   (d) 7 and 5

3. Using Runge's formula of order 2, when $x = 1 \cdot 1$, given $\dfrac{dy}{dx} = 3x + y^2$ and $y = 1 \cdot 2$ when $x = 1$, taking $h = 0 \cdot 1$. The value of y will be nearly
   (a) $1 \cdot 3$
   (b) $1 \cdot 5$
   (c) $1 \cdot 7$
   (d) $1 \cdot 9$

4. The expression $\left(\dfrac{\Delta^2}{E}\right) e^x \cdot \dfrac{E\,e^x}{\Delta^2 e^x}$ (the interval of differencing being h) is
   (a) e^{x-h}
   (b) e^{x+h}
   (c) e^x
   (d) $2e^x$

5. The solution of differential equation
   $(x^2 y - 2xy^2)\,dx - (x^3 - 3x^2 y)\,dy = 0$, is
   (a) $\dfrac{x}{y} - 2\log x + 3\log y = c$
   (b) $\dfrac{y}{x} - 2\log y + 3\log x = c$
   (c) $\dfrac{x}{y} + 2\log x - 3\log y = c$
   (d) $\dfrac{y}{x} + 2\log y - 3\log x = c$

6. If $u = x \log xy$, where $x^3 + y^3 + 3xy = 1$, then $\dfrac{du}{dx}$ is
   (a) $1 - \log xy + \dfrac{x\,(x^2 + y)}{y\,(y^2 + x)}$
   (b) $1 - \log xy - \dfrac{y\,(x^2 + y)}{x\,(y^2 + x)}$
   (c) $1 + \log xy - \dfrac{x\,(x^2 + y)}{y\,(y^2 + x)}$
   (d) $1 + \log xy + \dfrac{x\,(x^2 + y)}{y\,(y^2 + x)}$

7. The solution of differential equation
   $$\dfrac{\partial^3 z}{\partial x^3} - 3\dfrac{\partial^3 z}{\partial x^2 \partial y} + 4\dfrac{\partial^3 z}{\partial y^3} = e^{x + 2y} \text{ is}$$
   (a) $z = f_1(y - x) + f_2(y + 2x) + xf_3(y + 2x) + \dfrac{e^{x + 2y}}{27}$
   (b) $z = f_1(y - x) + f_2(y + 2x) + xf_3(y + 2x) + \dfrac{e^{x + 2y}}{23}$
   (c) $z = f_1(y + x) + f_2(y + 2x) + xf_3(y + 2x) + \dfrac{e^{x + 2y}}{27}$
   (d) $z = f_1(y - x) + f_2(y - 2x) + xf_3(y + 2x) + \dfrac{e^{x + 2y}}{23}$

8. If the imaginary part $v = e^x\,(x \sin y + y \cos y)$ is part of analytic function $f(z) = u + iv$, then $f(z)$ is
   (a) $(1 + z)\,e^z + c$
   (b) $z\,e^z + c$
   (c) $z\,e^{2z} + c$
   (d) $(1 - z)\,e^z + c$

9. The first four terms of the Taylor series expansion of $f(z) = \dfrac{z+1}{(z-3)(z-4)}$, when $z = 2$ is

(a) $\dfrac{11}{4}(z-2) + \dfrac{27}{8}(z-2)^2 + \dfrac{59}{16}(z-2)^3 + \ldots$

(b) $\dfrac{11}{4}(z+2) - \dfrac{27}{8}(z-2)^2 - \dfrac{59}{16}(z+2)^3 + \ldots$

(c) $\dfrac{3}{2} + \dfrac{11}{4}(z-2) + \dfrac{27}{8}(z-2)^2 + \dfrac{59}{16}(z-2)^3 + \ldots$

(d) $\dfrac{3}{2} - \dfrac{11}{4}(z-2) - \dfrac{27}{8}(z-2)^2 - \dfrac{59}{16}(z-2)^3 + \ldots$

10. The mean deviation about mean μ of a normal distribution is nearly

(a) $\dfrac{3}{5}\sigma$

(b) $\dfrac{5}{3}\sigma$

(c) $\dfrac{4}{5}\sigma$

(d) $\dfrac{5}{4}\sigma$

11. Consider the following regression equations obtained from a correlation table :

$$y = 0{\cdot}516x + 33{\cdot}73$$
$$x = 0{\cdot}512y + 32{\cdot}52$$

The value of the correlation coefficient will be

(a) $0{\cdot}514$

(b) $0{\cdot}586$

(c) $0{\cdot}616$

(d) $0{\cdot}684$

12. If the probability of a bad reaction from a certain injection is $0{\cdot}001$, the chance that out of 2000 individuals, more than two will get a bad reaction will be

(a) $0{\cdot}72$

(b) $0{\cdot}54$

(c) $0{\cdot}32$

(d) $0{\cdot}14$

13. As per de Broglie's relationship, the wavelength λ related to its mass m and velocity v is

(a) $\dfrac{h}{mv}$

(b) $\dfrac{hv}{m}$

(c) $\dfrac{hm}{v}$

(d) $\dfrac{mv}{h}$

where :

    h = Planck's constant

14. Which of the following statements regarding an atom are correct ?

1. If two atoms with similar ionization potential form a bond, then this bond will most probably be either covalent or metallic.

2. When atoms with different ionization potentials form a bond, the bond will be mainly ionic.

3. If the atom or molecule already has its outer shells completely full, then the bonding between the atoms or molecules will be a secondary bond when it solidifies.

(a) 1 and 2 only

(b) 1 and 3 only

(c) 2 and 3 only

(d) 1, 2 and 3

15. A barium titanate crystal is inserted in a parallel plate condenser of area 10 mm × 10 mm. The plates having a separation of 2 mm, give a capacitance of 10^{-9} F. If the value of $\varepsilon_0 = 8.854 \times 10^{-12}$ Fm^{-1}, the relative dielectric constant of the crystal will be nearly

    (a) 2640

    (b) 2450

    (c) 2260

    (d) 2080

16. A transformer core is wound with a coil carrying an alternating current at a frequency of 50 Hz. The hysteresis loop has an area of 60,000 units when the axes are drawn in units of 10^{-4} Wb m^{-2} and 10^2 Am^{-1}. If the magnetization is uniform throughout the core volume of 0.01 m^3, the power loss due to hysteresis will be

    (a) 300 W

    (b) 350 W

    (c) 400 W

    (d) 450 W

17. When ferromagnetic or ferrimagnetic materials are magnetized, the direction of magnetization in any domain will be rotated from its preferential direction. This will show an anisotropic behaviour. On removal of the magnetizing force, the total magnetization will in general have a non-zero value. This behaviour is due to

    (a) Crystal anisotropics

    (b) Stress anisotropics

    (c) Shape anisotropics

    (d) Crystal, stress and shape anisotropics

18. The paramagnetic susceptibility varies inversely with the absolute temperature for ordinary fields and temperatures. It is given by the relation

    $$\chi = \frac{C}{T}.$$

    The relation is known as

    (a) Phenomenon of magnetostriction

    (b) Curie law of paramagnetism

    (c) Hall Effect

    (d) Diamagnetism

19. If the interaction between the atomic permanent dipole moments is zero or negligible and the individual dipole moments are oriented at random, the material will be a

    (a) Ferromagnetic material

    (b) Ferrimagnetic material

    (c) Paramagnetic material

    (d) Antiferromagnetic material

20. The magnetic moments of diamagnetic materials are mainly due to

    (a) Electron spin angular momentum

    (b) Nuclear spin angular momentum

    (c) Orbital angular momentum of the electrons

    (d) Centrifugal angular momentum

21. The inductance of an air-cored coil is proportional to

    1. The square of the number of turns.

    2. The diameter of the coil.

    3. A form factor, F, dependent on the ratio of coil radius to coil length plus winding depth.

    Which of the above statements are correct ?

    (a) 1 and 2 only

    (b) 1 and 3 only

    (c) 2 and 3 only

    (d) 1, 2 and 3

22. Light is capable of transferring electrons to the free-state inside a material thus increasing the electrical conductivity of the material. When the energy imparted to the electrons is quite large, the latter may be emitted from the material into the surrounding medium. This phenomenon is known as

(a) Photoemissive effect

(b) Photovoltaic effect

(c) Photoconductivity effect

(d) Photo absorptive effect

23. Which of the following statements is/are correct ?

1. Conductor contains a large number of electrons in the conduction band at room temperature. No energy gaps exist and the valence and conduction bands overlap.

2. A semiconductor is a material in which the energy gap is so large that practically no electron can be given enough energy to jump this gap.

3. An insulator is a solid with an energy gap small enough for electrons to cross rather easily from the valence band to the conduction band.

(a) 1 only

(b) 2 only

(c) 3 only

(d) 1, 2 and 3

24. Which of the following statements regarding superconducting materials are correct, when a large number of metals become superconducting below a temperature ?

1. The resistivity ρ of the superconductor is zero.

2. The magnetic flux density B vanishes through the substance.

3. Ferromagnetic and Antiferromagnetic metals are good examples of superconducting materials.

(a) 1, 2 and 3

(b) 1 and 3 only

(c) 1 and 2 only

(d) 2 and 3 only

25. A voltage source-series resistance combination is equivalent to a current source-parallel resistance combination if and only if their

1. Respective open-circuit voltages are equal.

2. Respective short-circuit currents are equal.

3. Resistance remains same in both cases.

Which of the above statements are correct ?

(a) 1 and 2 only

(b) 1 and 3 only

(c) 2 and 3 only

(d) 1, 2 and 3

26. For a network graph having its fundamental loop matrix B_f and its sub-matrices B_t and B_l corresponding to twigs and links, which of the following statements are correct ?

1. B_l is always an identity matrix.

2. B_t is an identity matrix.

3. B_f has a rank of $b - (n - 1)$, where b is the number of branches and n is the number of nodes of the graph.

(a) 1 and 2 only

(b) 2 and 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

27. The resistance R of a conductor is

(a) $\dfrac{EA}{Jl}$

(b) $\dfrac{EJ}{Al}$

(c) $\dfrac{El}{JA}$

(d) $\dfrac{JA}{El}$

where :

E = Electric field intensity

A = Cross-sectional area

J = Current density

l = Length of conductor

28. Which of the following statements are correct for an ideal constant voltage source ?

1. Its output voltage remains absolutely constant whatever the change in load current.

2. It possesses zero internal resistance so that internal voltage drop in the source is zero.

3. Output voltage provided by the source would remain constant irrespective of the amount of current drawn from it.

4. Output voltage provided by the source varies with the amount of current drawn from it.

(a) 1, 2 and 4 only

(b) 1, 3 and 4 only

(c) 2, 3 and 4 only

(d) 1, 2 and 3 only

29. Which of the following statements are correct ?

1. A lowpass filter passes low frequencies and stops high frequencies.

2. A highpass filter passes high frequencies and rejects low frequencies.

3. A bandpass filter passes frequencies within a frequency band and attenuates frequencies outside the band.

4. A bandstop filter passes frequencies within the band and blocks/attenuates frequencies outside a frequency band.

(a) 1, 2 and 4 only

(b) 1, 3 and 4 only

(c) 2, 3 and 4 only

(d) 1, 2 and 3 only

30. A point charge of 10^{-9} C is placed at a point A in the free space. The potential difference between the two points 20 cm and 10 cm away from the charge at A will be

(a) 40 V

(b) 45 V

(c) 50 V

(d) 55 V

31. According to Gauss's theorem, the surface integral of the normal component of electric flux density D over a closed surface, containing free charge is

(a) Q

(b) $\dfrac{Q}{\varepsilon_0}$

(c) $\varepsilon_0 Q$

(d) $\dfrac{Q^2}{\varepsilon_0}$

32. A unit magnetic pole may be defined as that pole which when placed in vacuum at a distance of one metre from a similar and equal pole repels it with a force of

(a) $\dfrac{1}{4\pi}$ Newtons

(b) $\dfrac{\mu_0}{4\pi}$ Newtons

(c) $\dfrac{\pi}{4\mu_0}$ Newtons

(d) $\dfrac{1}{4\pi\mu_0}$ Newtons

33. An analogous of magnetic circuit 'permeability' in electrical circuit is

(a) Reluctivity

(b) Conductance

(c) Conductivity

(d) Resistivity

34. The magnetizing force at the centre of a circular coil varies

1. Directly as the number of its turns.

2. Directly as the current.

3. Directly as its radius.

4. Inversely as its radius.

Which of the above statements are correct ?

(a) 1, 2 and 3 only

(b) 1 and 4 only

(c) 1, 2 and 4 only

(d) 2 and 3 only

35. An uncharged capacitor of 0·01 F is charged first by a current of 2 mA for 30 s and then by a current of 4 mA for 30 s. The final voltage in it will be

(a) 12 V

(b) 18 V

(c) 24 V

(d) 30 V

36. A capacitor of 10 pF is connected to a voltage source of 100 V. If the distance between the capacitor plates is reduced to 50%, while it remains connected to the 100 V supply, the value of potential gradient in the second case will be

(a) Half of earlier value

(b) Same as earlier value

(c) Twice of earlier value

(d) One-fourth of earlier value

37. Which of the following statements are correct ?

1. Accuracy is the closeness with which an instrument approaches the true value of the quantity being measured.

2. Precision is a measure of the reproducibility of the measurement.

3. Precision of an instrument can be improved upon by calibration.

4. Accuracy may be specified in terms of limits of errors.

(a) 1, 2 and 3 only

(b) 1, 3 and 4 only

(c) 1, 2 and 4 only

(d) 2, 3 and 4 only

38. An electrodynamometer instrument can be used as

1. Wattmeter and VAR meter.

2. Power factor meter and Frequency meter.

3. Transfer instrument.

Which of the above statements are correct ?

(a) 1 and 2 only

(b) 1 and 3 only

(c) 2 and 3 only

(d) 1, 2 and 3

39. The moving iron instruments when measuring voltages or currents

(a) Indicate the same values of the measurement for both ascending and descending values of current

(b) Indicate higher values of the measurement for ascending values of current

(c) Indicate higher values of the measurement for descending values of current

(d) Indicate lower values of the measurement for both ascending and descending values of current

40. True RMS-reading voltmeter

1. Measures the RMS value of voltage accurately.

2. Eliminates the error due to waveform.

3. Uses the thermocouple for heating.

Which of the above statements are correct ?

(a) 1 and 2 only

(b) 1 and 3 only

(c) 2 and 3 only

(d) 1, 2 and 3

41. Instrument transformers are

(a) Used to extend the range of the AC measuring instruments only

(b) Used to isolate the measuring instruments from the high voltage only

(c) Used to extend the range and isolate the measuring instruments

(d) Not used at generating stations and transformer stations

42. The power in a 3-phase circuit is measured with the help of 2-wattmeters; the readings of one of the wattmeters is positive and that of the other is negative. The magnitude of readings is different. It can be concluded that the power factor of the circuit will be

(a) Unity

(b) Zero

(c) 0·5

(d) Less than 0·5

43. In a Q-meter, distributed capacitance of a coil is measured by changing the capacitance of the tuning capacitor. The values of tuning capacitor are C_1 and C_2 for resonant frequencies f_1 and $2f_1$ respectively. The value of distributed capacitance will be

(a) $\dfrac{C_1 - C_2}{2}$

(b) $\dfrac{C_1 - 2C_2}{3}$

(c) $\dfrac{C_1 - 4C_2}{3}$

(d) $\dfrac{C_1 - 3C_2}{2}$

44. In a digital voltmeter, during start of conversion, zero indication is displayed and is called auto zeroing. This is achieved by

(a) Using a positive reference voltage

(b) Using a negative reference voltage

(c) Properly charging the differentiator circuit capacitance to ground

(d) Properly discharging the integrator circuit capacitance to ground

45. A CRT has an anode voltage of 2000 V and parallel deflecting plates 2 cm long and 5 mm apart. The screen is 30 cm from the centre of the plates. If the input voltage is applied to the deflecting plates through amplifiers having an overall gain of 100, the input voltage required to deflect the beam through 3 cm will be

(a) 1 V

(b) 3 V

(c) 5 V

(d) 7 V

46. An aquadag is used in a CRO to collect

(a) Primary electrons only

(b) Secondary emission electrons only

(c) Both primary electrons and secondary emission electrons

(d) Heat emission electrons

47. A resistance wire strain gauge with a gauge factor of 2 is bonded to a steel structural member subjected to a stress of 100 MN/m^2. The modulus of elasticity of steel is 200 GN/m^2. The percentage change in the value of the gauge resistance due to the applied stress will be

(a) 0·1%

(b) 0·3%

(c) 0·5%

(d) 0·7%

48. Capacitive transducers can be used for the measurement of liquid level. The principle of operation used in this case is the change of capacitance with change of

    (a)   Distance between plates

    (b)   Area of plates

    (c)   Dielectric

    (d)   Resonance

49. The hexadecimal of the binary number $(11010011)_2$ is

    (a) $D3_{16}$

    (b) $D4_{16}$

    (c) $C3_{16}$

    (d) $C4_{16}$

50. Which one of the following relations from the Boolean algebra pertaining to 'AND' operation *cannot* be verified when A and B can take on only the value 0 or 1 ?

    (a)   AB = BA

    (b)   AA = A

    (c)   A1 = 1

    (d)   A0 = 0

51. Which of the following design levels of a computer are widely used in computer design ?

    1.   Gate level

    2.   Processor level

    3.   Register level

    4.   User level

    (a)   1 and 3 only

    (b)   2 and 4 only

    (c)   3 and 4 only

    (d)   1, 2 and 3 only

52. Which one of the following is a powerful web platform for web applications and web services, built-in virtualization technologies, variety of new security tools, enhancements and streamlined configuration and management tools ?

    (a)   Internet Explorer

    (b)   Internet Information Services

    (c)   Web Matrix

    (d)   Visual Web Developer

53. Which one of the following is the correct sequence of steps for executing an instruction during CPU's processing ?

    (a)   Fetch instruction, Read data, Decode instruction, Store data and Execute instruction

    (b)   Decode instruction, Read data, Execute instruction, Fetch Next instruction and Store data

    (c)   Decode instruction, Decode Next operands, Fetch Next instruction, Execute instruction and Store data

    (d)   Fetch instruction, Decode instruction, Read operands, Execute instruction and Store data

54. Which one of the following is the correct combination of registers in DMA controller ?

    (a)   Data register, Stack pointer and Data counter

    (b)   Data register, Address register and Data counter

    (c)   Data register, Stack pointer and Address register

    (d)   Data register, Program counter and Data counter

55. A multiprocessing technology which enables software to treat a single processor as two processors to utilize the processing power in the chip that would otherwise go unused and lets the chip operate more efficiently resulting in faster processing is called

   (a) Systematic multiprocessing

   (b) Massively parallel processing

   (c) Co-processing

   (d) Hyper threading

56. A physical implementation of the *type* declaration in high-level programming languages where major information types should be assigned formats for identification is called

   (a) Storage order

   (b) Tag

   (c) Error correction

   (d) Error detection

57. Which of the following factors are to be considered while selecting number representations to be used in a computer?

   1. Number types to be represented

   2. Range of values to be encountered

   3. Cost of the hardware to store and process the numbers

   4. Positional notation with fixed weight

   (a) 1, 2 and 4 only

   (b) 1, 3 and 4 only

   (c) 2, 3 and 4 only

   (d) 1, 2 and 3 only

58. If a negative binary number is to be represented by n-bits, then the standard format will be

   (a) Sign bit '0' on left and magnitude on right

   (b) Sign bit '1' on left and magnitude on right

   (c) Sign bit '0' on right and magnitude on left

   (d) Sign bit '1' on right and magnitude on left

59. The physical address translation in virtual memory address with Memory Management Unit (MMU) is done by which one of the following mechanisms?

   (a) Multiply virtual address by some constant

   (b) Translation lookaside buffer (TLB)

   (c) Encryption key

   (d) Using general purpose register in CPU

60. Which one of the following satellite systems is most often used for Global Positioning System (GPS)?

   (a) Geosynchronous

   (b) Geostationary

   (c) Low Earth Orbit

   (d) Medium Earth Orbit

61. In a tunnel diode, the width of the junction barrier is

(a) Directly proportional as the square root of impurity concentration

(b) Inversely proportional as the square root of impurity concentration

(c) Directly proportional as square of impurity concentration

(d) Inversely proportional as square of impurity concentration

62. In a grounded-emitter transistor, when emitter current becomes zero in cut-off region the emitter potential is called

(a) Floating Emitter Potential

(b) Breaking Emitter Potential

(c) Cascading Emitter Potential

(d) Cut-off Emitter Potential

63. When maximum reverse-biasing voltage is applied between the collector and base terminals of the transistor and emitter is open circuited, breakdown occurs due to

(a) Avalanche breakdown

(b) Avalanche multiplication

(c) Punch-through

(d) Reach-through

64. In a Field Effect Transistor (FET), the maximum voltage that can be applied between any two terminals is given by

(a) Low $|V_{DS}|$ causing avalanche breakdown

(b) Low $|V_{GS}|$ causing avalanche breakdown

(c) $|V_{DS}| = 0$ when gate is reverse-biased

(d) $|V_{GS}| = 0$ when gate is reverse-biased

65. A depletion-type MOSFET can be operated in an enhancement mode where negative charges are induced into n-type channel by applying

(a) Positive Gate Voltage

(b) Negative Gate Voltage

(c) Positive Drain Voltage

(d) Negative Drain Voltage

66. The double base diode which is operated with the emitter forward biased and a smaller emitter junction is called

(a) Field Effect Transistor (FET)

(b) Uni-Junction Transistor (UJT)

(c) Bipolar Junction Transistor (BJT)

(d) Metal Oxide Semiconductor Field Effect Transistor (MOSFET)

67. Which one of the following is *not* a distortion type that exists either separately or simultaneously in amplifiers ?

(a) Linear distortion

(b) Non-linear distortion

(c) Frequency distortion

(d) Delay distortion

68. Transistor noise caused by the recombination and generation of carriers on the surface of the crystal is called

(a) Thermal noise

(b) Excess noise

(c) White noise

(d) Shot noise

69. During a low frequency response of an amplifier which is invariably of RC-coupled type, there is a range of frequency characteristics over which the amplification is constant and delay is also constant, called

(a) Low band frequency

(b) Mid band frequency

(c) High band frequency

(d) Hyper band frequency

70. In a crystal oscillator, especially when piezoelectric crystal like quartz is applied, then the inductor L, capacitor C and resistor R are the analogs of the mechanical system as

(a) Mass, compliance, viscous-damping factor

(b) Mass, spring constant, viscous-damping factor

(c) Mass, momentum, viscous-damping factor

(d) Mass, displacement, viscous-damping factor

71. In a phase shift oscillator using an FET, at a certain frequency if the phase shift introduced by the RC network is 180°, then the total phase shift from gate around the circuit and back to the gate will be

(a) 0°

(b) 90°

(c) 180°

(d) 270°

72. In a feedback amplifier, which configuration increases bandwidth, decreases non-linear distortion and improves transconductance with negative feedback ?

(a) Voltage-series

(b) Current-series

(c) Voltage-shunt

(d) Current-shunt

73. In order to balance the offset voltage of an operational amplifier, a small DC voltage is applied to input terminals where the connection is

(a) Series with both inverting as well as non-inverting input

(b) Series with non-inverting input

(c) Shunt with inverting input

(d) Shunt with non-inverting input

74. Multivibrator circuit that remains in stable state until a triggering signal causes a transition to quasistable state and returns to stable state after certain time is called

(a) Astable multivibrator

(b) Monostable multivibrator

(c) Bistable multivibrator

(d) Unstable multivibrator

75. In a paraphase amplifier, where two amplifiers are connected in cascade, the output from second stage

(a) Equals signal input without change of sign

(b) Equals signal input with change of sign

(c) Does not equal to signal input and has no sign change

(d) Does not equal to signal input but has sign change

76. Which one of the following statements is *not* correct for an active filter used in the field of communications and signal processing ?

(a) It is more economical.

(b) It does not cause loading of the source or load.

(c) It is easier to tune or adjust.

(d) It exhibits insertion loss.

77. A two-step procedure in a typical diffusion apparatus to obtain the complementary-error-function Gaussian distribution involves the first step and second step respectively as
   (a) Predeposition and Drive-in
   (b) Predeposition and Drive-out
   (c) Drive-in and Postdeposition
   (d) Drive-out and Postdeposition

78. In AM modulation, the equation of the modulating signal is given by $f(t) = A_m \cos \omega_m t$. If the amplitude of the carrier wave is A and there is no over-modulation, the modulation efficiency will be
   (a) 33·3%
   (b) 38·6%
   (c) 43·3%
   (d) 48·6%

79. For a binary phase-shift keying modulator with a carrier frequency of 70 MHz and input bit rate of 10 Mbps, the maximum Upper Side Frequency (USF) and minimum Lower Side Frequency (LSF) are respectively
   (a) 85 MHz and 65 MHz
   (b) 75 MHz and 65 MHz
   (c) 55 MHz and 45 MHz
   (d) 75 MHz and 45 MHz

80. In modulation system, the energy per bit-to-noise power density ratio $\dfrac{E_b}{N_o}$ is
   (a) $\dfrac{C}{N} \times \dfrac{f_b}{B}$
   (b) $\dfrac{N}{C} \times \dfrac{B}{f_b}$
   (c) $\dfrac{C}{N} \times \dfrac{B}{f_b}$
   (d) $\dfrac{N}{C} \times \dfrac{f_b}{B}$

   where :
   N = Noise power of thermal (W)
   B = Bandwidth (Hz)
   C = Carrier power (W)
   f_b = Bit rate (bps)

81. Which one of the following is *not* a transmission parameter of a private line data circuit that utilizes public telephone network ?
   (a) Geographical parameter
   (b) Bandwidth parameter
   (c) Interface parameter
   (d) Facility parameter

82. The Shannon limit for information capacity I is
   (a) $B \log_2 \left(1 - \dfrac{S}{N} \right)$
   (b) $B \log_2 \left(1 + \dfrac{S}{N} \right)$
   (c) $B \log_{10} \left(1 - \dfrac{S}{N} \right)$
   (d) $B \log_{10} \left(1 + \dfrac{S}{N} \right)$

   where :
   N = Noise power (W)
   B = Bandwidth (Hz)
   S = Signal power (W)

83. In a time division multiplexing, there are 8000 samples for a digital signal-0 channel that uses 8 kHz sample rate and 8 bit PCM code. The line speed will be
   (a) 56 kbps
   (b) 64 kbps
   (c) 76 kbps
   (d) 84 kbps

84. For an 8-PSK system, operating with an information bit rate of 24 kbps, the baud rate will be

    (a)   16,000

    (b)   12,000

    (c)   8,000

    (d)   6,000

85. During transformation of independent variable, if two signals identical in shape are displaced relative to each other, then the difference in propagation time from point of origin of transmitted signal results in

    (a)   Time shift

    (b)   Time reversal

    (c)   Time scaling

    (d)   Time reduction

86. Which of the following statements is/are correct ?

    1.   A continuous-time system is a system in which, continuous-time input signals are applied, resulting in continuous-time output signals.

    2.   A system is said to be linear if it follows the superposition theorem.

    3.   A system is said to be non-linear if it follows the superposition theorem.

    (a)   1 only

    (b)   1 and 2 only

    (c)   2 only

    (d)   1 and 3 only

87. A discrete time signal is said to be a unit sample sequence if

    (a) $\delta(n) = 1$ for $n = 0$
                $= 0$ for $n \neq 0$

    (b) $\delta(n) = 2$ for $n = 0$
                $= 0$ for $n \neq 0$

    (c) $\delta(n) = -1$ for $n = 0$
                $= 0$ for $n \neq 0$

    (d) $\delta(n) = -2$ for $n = 0$
                $= 0$ for $n \neq 0$

88. A signal is said to be

    1.   Deterministic if there is no uncertainty over the signal at any instant of time.

    2.   Deterministic if it is expressible through a mathematical equation.

    3.   Random or non-deterministic if there is uncertainty over the signal at the instant of time.

    4.   Random or non-deterministic if it is not expressible through a mathematical equation.

Which of the above statements are correct ?

    (a)   1, 2 and 3 only

    (b)   1, 2 and 4 only

    (c)   3 and 4 only

    (d)   1, 2, 3 and 4

89. Linear time-invariant systems that are designed to pass some frequencies essentially undistorted and significantly attenuate or eliminate others are

    (a)   Frequency-shaping filters

    (b)   Frequency-selective filters

    (c)   Time-shaping filters

    (d)   Time-selective filters

90. If the input signal x(t) and impulse response h(t) of a continuous-time system are described as

$$x(t) = e^{-3t} \cdot u(t) \text{ and } h(t) = u(t-1),$$

the output y(t) will be

    (a) $\dfrac{1}{3} [1 - e^{-3(t-1)}]$

    (b) $\dfrac{1}{3} [1 - e^{-3t}]$

    (c) $\dfrac{1}{3} [1 + e^{-3(t-1)}]$

    (d) $\dfrac{1}{3} [1 + e^{-3t}]$

91. Consider an LTI system whose response to the input

$$x(t) = [e^{-t} + e^{-3t}] \, u(t) \text{ is}$$

$$y(t) = [2e^{-t} - 2e^{-4t}] \, u(t).$$

The system's impulse response will be

(a) $\dfrac{3}{2} [e^{-2t} + e^{-4t}] \, u(t)$

(b) $\dfrac{3}{2} [e^{-2t} - e^{-4t}] \, u(t)$

(c) $\dfrac{1}{2} [e^{-2t} + e^{-4t}] \, u(t)$

(d) $\dfrac{1}{2} [e^{-2t} - e^{-4t}] \, u(t)$

92. Consider an LTI system with a system function

$$H(z) = \dfrac{1}{1 - \dfrac{1}{4} z^{-1}}.$$

Its difference equation will be

(a) $y(n) - \dfrac{1}{2} y(n-1) = x(n)$

(b) $y(n) - \dfrac{1}{4} y(n-1) = x(n)$

(c) $y(n) + \dfrac{1}{2} y(n-1) = x(n)$

(d) $y(n) - \dfrac{1}{4} y(n+1) = x(n)$

93. It is assumed that quantization error, e(n) is a sequence of random variables where

1. The statistics do not change with time.
2. It is a sequence of uncorrelated random variables.
3. It is uncorrelated with the quantizer input x(n).
4. The probability density function is uniformly distributed over the range of values of quantization error.

Which of the above statements are correct ?

(a) 1, 2 and 3 only

(b) 1, 2 and 4 only

(c) 3 and 4 only

(d) 1, 2, 3 and 4

94. For a given differential equation,

$$\dfrac{d^2 y(t)}{dt^2} + 4 \dfrac{dy(t)}{dt} + 5\, y(t) = 5\, x(t)$$

with $y(0^-) = 1$ and $\left. \dfrac{dy(t)}{dt} \right|_{0^-} = 2$

and input x(t) = u(t).

The output y(t) will be

(a) $2u(t) - 2e^{-2t} \sin t$

(b) $u(t) + 2e^{-2t} \sin t$

(c) $u(t) - e^{-t} \sin t$

(d) $2u(t) + e^{-t} \sin t$

95. The Nyquist rate for the signal

$$x(t) = \dfrac{1}{2\pi} \cos (4000 \, \pi t) \cos (1000 \, \pi t) \quad \text{will be}$$

(a) 5 kHz

(b) 10 kHz

(c) 15 kHz

(d) 20 kHz

96. Which of the following statements is/are correct ?

1. A system is said to be Finite Impulse Response (FIR), if the output samples of the system depend only on the present input and a finite number of past or previous input samples.

2. If the output of a system y(n) depends only on the present input and past inputs, but not on past outputs, then it is called a non-recursive system.

3. If the output of a system y(n) depends only on the present input and past inputs, but not on past outputs, then it is called a recursive system.

(a) 1 only

(b) 1 and 2 only

(c) 1 and 3 only

(d) 3 only

97. The value of the steady state error for first order system, $\dfrac{1}{sT + 1}$ with Unit Ramp Function will be

(a) $\dfrac{1}{T}$

(b) T

(c) $T\left(1 - e^{-\frac{t}{T}}\right)$

(d) $\dfrac{1}{T} e^{-\frac{t}{T}}$

98. If the number of zeros are less than the number of poles, i.e. Z < P, then the value of the transfer function becomes zero for s → ∞. Hence we say that there are zeros at infinity and the order of such zeros is

(a) P + Z

(b) P – Z

(c) Z – P

(d) Z

99. The method for determination of the stability of the feedback systems as a function of an adjustable gain parameter which does not provide detailed information concerning location of closed-loop poles as a function of gain K is called

(a) Root locus method

(b) Nyquist criterion method

(c) Bode plot method

(d) Routh-Hurwitz criterion method

100. Consider the sinusoidal transfer function in time-constant form

$$G(j\omega) = \frac{2\,(1 + j\omega)}{\left(1 + \dfrac{j\omega}{10}\right)^2}\ .$$

Asymptotic log magnitude characteristic of factor $(1 + j\omega)$ is straight line of

1. 0 dB for ω ≤ 1.

2. + 20 dB/decade for ω ≥ 1.

3. – 20 dB/decade for ω ≥ 1.

Which of the above relations is/are correct ?

(a) 1 only

(b) 1 and 2 only

(c) 1 and 3 only

(d) 2 only

101. A graphical technique for plotting the closed-loop poles of a rational system functions as a function of the value of gain for both continuous-time and a discrete-time system is

(a) Root locus method

(b) Nyquist criterion method

(c) Bode plot method

(d) Routh-Hurwitz criterion method

102. Which one of the following statements regarding 'Root locus' is *not* correct ?

(a) By addition of poles to left half, the root locus shifts towards right hand side and stability of system decreases.

(b) By addition of zero towards left, the root locus shifts towards left half, since root locus shifts towards left half, the relative stability of control system increases.

(c) By addition of zero towards left side, the root locus shifts towards left half, the relative stability remains same.

(d) By addition of poles to the left half, the system stability decreases, while by addition of zeros towards left half, the stability of system increases.

103. In time domain, the relative stability is measured by maximum overshoot and damping ratio. In frequency domain, the relative stability is measured by

(a) Steady state error

(b) Damping ratio

(c) Resonant peak

(d) Bandwidth

104. Consider a feedback system with the characteristic equation

$$1 + K \frac{1}{s(s+1)(s+2)} = 0 \text{ for root locus.}$$

The angles of asymptotes ϕ_A and the centroid of the asymptotes $- \sigma_A$ are respectively

(a) $60°, 120°, 180°$ and -1

(b) $45°, 90°, 300°$ and 0

(c) $60°, 180°, 300°$ and -1

(d) $45°, 90°, 180°$ and 0

105. Which one of the following statements regarding an effect of phase lead network is *not* correct ?

(a) The velocity constant is usually increased

(b) The slope of the magnitude curve is reduced at the gain crossover frequency, as a result relative stability improves

(c) Phase margin increased

(d) The bandwidth decreased

106. A lead compensator

1. Speeds up the transient response.

2. Increases the margin of stability of a system.

3. Helps to increase the system error constant though to a limited extent.

Which of the above statements are correct ?

(a) 1 and 2 only

(b) 1 and 3 only

(c) 2 and 3 only

(d) 1, 2 and 3

107. Which of the following statements are correct ?

1. The pair (AB) is controllable implies that the pair $(A^T B^T)$ is observable.

2. The pair (AB) is controllable implies that the pair $(A^T B^T)$ is unobservable.

3. The pair (AC) is observable implies that the pair $(A^T C^T)$ is controllable.

4. The pair (AC) is observable implies that the pair $(A^T C^T)$ is uncontrollable.

(a) 1 and 3 only

(b) 1 and 4 only

(c) 2 and 3 only

(d) 2 and 4 only

where : A, B and C are having their standard meanings.

108. Bounded-input bounded-output stability implies asymptotic stability for

1. Completely controllable system
2. Completely observable system
3. Uncontrollable system
4. Unobservable system

Which of the above statements are correct ?

(a) 1 and 4 only

(b) 1 and 2 only

(c) 2 and 3 only

(d) 3 and 4 only

109. The degree of humming level of the noise caused in the transformers may be reduced by

(a) Magnetostriction

(b) High flux density in core

(c) Tightening of core by clamps

(d) Quality of transformer oil

110. A transformer with a 10 : 1 ratio and rated at 50 kVA, 2400/240 V, 50 Hz is used to step down the voltage of a distribution system. The low tension voltage is to be kept constant at 240 V. If the transformer is fully loaded at 0·8 power factor (lag), the load impedance connected to low-tension side will be nearly

(a) 3·15 Ω

(b) 2·60 Ω

(c) 1·15 Ω

(d) 0·60 Ω

111. A DC shunt generator supplies a load of 7·5 kW at 200 V. If the armature resistance is 0·6 Ω and field resistance is 80 Ω, the induced emf will be

(a) 224 V

(b) 218 V

(c) 212 V

(d) 204 V

112. A 4-pole DC motor is lap-wound with 400 conductors. The pole shoe is 20 cm long and the average flux density over one-pole-pitch is 0·4 T, the armature diameter is 30 cm. When the motor is drawing 25 A and running at 1500 rpm, the torque developed will be nearly

(a) 30 Nm

(b) 40 Nm

(c) 50 Nm

(d) 60 Nm

113. In an unloaded shunt generator, when switch is closed, a small field current is produced which leads to generation of still larger voltages due to addition of

(a) Armature voltage

(b) Residual flux voltage

(c) Generated voltage

(d) Voltage drop

114. The generator efficiency of a shunt generator will be maximum when its variable loss is equal to

(a) Constant loss

(b) Stray loss

(c) Iron loss

(d) Friction and windage loss

115. Induction motor can be regarded as a generalized transformer due to certain similarities except rated

(a) Frequency

(b) Flux

(c) Speed

(d) Induced emf

116. A 3-phase, 400/200 V, Y – Y connected wound-rotor induction motor has $0 \cdot 06 \, \Omega$ rotor resistance and $0 \cdot 3 \, \Omega$ standstill reactance per phase. To make the starting torque equal to the maximum torque, the additional resistance required in the rotor circuit will be

(a) $0 \cdot 24 \, \Omega$/phase

(b) $0 \cdot 34 \, \Omega$/phase

(c) $0 \cdot 42 \, \Omega$/phase

(d) $0 \cdot 52 \, \Omega$/phase

117. Potier triangle method is helpful in obtaining the voltage regulation of synchronous machines by determining the armature

(a) Leakage reactance and its reaction mmf

(b) Leakage reactance and air-gap flux

(c) Resistance and its reaction mmf

(d) Resistance and air-gap flux

118. In a synchronous motor, the magnitude of stator back emf, E_b depends on

(a) Speed of the motor

(b) Load on the motor

(c) Both the speed and rotor flux

(d) Rotor excitation only

119. A stepper motor has a step angle of $2 \cdot 5°$. If the shaft is to make 25 revolutions, the number of steps required will be

(a) 1800

(b) 2200

(c) 2800

(d) 3600

120. In which of the following respects, the servomotors differ in application capabilities from large industrial motors ?

1. They produce high torque at all speeds including zero speed.

2. They are capable of holding a static position.

3. They do not overheat at standstill or lower speeds.

4. Due to low-inertia they are not able to reverse direction quickly.

(a) 1, 2, 3 and 4

(b) 1, 2 and 3 only

(c) 1, 2 and 4 only

(d) 3 and 4 only

121. Which of the following statements regarding steam boilers are correct ?

1. The boiler must be capable of quick starting and loading.
2. The boiler should have no joints exposed to flames.
3. The boiler must be capable of burning low ash content coal efficiently.

(a) 1 and 2 only
(b) 1 and 3 only
(c) 2 and 3 only
(d) 1, 2 and 3

122. Which of the following are the main parts of a power system ?

1. Generating stations
2. Transmission systems
3. Distribution networks

(a) 1 and 2 only
(b) 1 and 3 only
(c) 2 and 3 only
(d) 1, 2 and 3

123. Which of the following factors affect Corona ?

1. Atmospheric conditions, temperature, humidity, moisture, ice and fog
2. Current of conductor
3. Waveform
4. Condition of surface of conductors, smoothness and dust

(a) 1, 2 and 3 only
(b) 1, 3 and 4 only
(c) 1, 2 and 4 only
(d) 2, 3 and 4 only

124. Bundled conductors that are used to increase line voltage in EHV lines for raising critical corona voltage depend on

(a) Number of conductors in the group
(b) Voltage gradient
(c) Optimum spacing
(d) Communication interference

125. In a 275 kV transmission line with line constants $A = 0 \cdot 85 \angle 5°$ and $B = 200 \angle 75°$, if the voltage profile at each end is to be maintained at 275 kV, the power at Unity Power Factor (UPF) will be nearly

(a) 98 MW
(b) 118 MW
(c) 144 MW
(d) 184 MW

126. When the sinusoidal steady state current is called the symmetrical short circuit current, then the unidirectional transient component is called

(a) AC short circuit current
(b) DC short circuit current
(c) AC offset current
(d) DC offset current

127. Consider the following balanced line-to-neutral voltages with abc sequence :

$$V_P = \begin{bmatrix} V_{an} \\ V_{bn} \\ V_{cn} \end{bmatrix} = \begin{bmatrix} 277 \angle 0° \\ 277 \angle -120° \\ 277 \angle +120° \end{bmatrix} \text{ volts}$$

The values of V_0, V_1 and V_2 are respectively

(a) 0, $177 \angle 0°$ and $177 \angle 0°$
(b) $277 \angle 0°$, 0 and 0
(c) 0, $277 \angle 0°$ and 0
(d) $277 \angle 0°$, 0 and $177 \angle 0°$

128. In an HVDC transmission, the DC output voltage can be controlled to get inverter operation when the firing angle α is

(a) $\alpha = 0°$

(b) $0° < \alpha < 90°$

(c) $90° < \alpha < 180°$

(d) $0° < \alpha < 180°$

129. In an HVDC transmission mode, the link which has two circuits that are almost independent of each other is called

(a) Monopolar link

(b) Bipolar link

(c) Homopolar link

(d) Dualpolar link

130. In a photovoltaic system, there is a thermally generated small reverse saturation current which flows even in the absence of light, called

(a) Photon current

(b) Diode current

(c) Leakage current

(d) Dark current

131. In a power system, due to interconnection or grid formation and transmission line redundancy, the ability to serve all power demands without failure over long periods of time, is due to

(a) Power system quality

(b) Power system reliability

(c) Computers and microprocessors

(d) Reserve generating capacity

132. In wind power, the speed which is considered as the single most important parameter is

(a) Wind speed

(b) Peripheral speed

(c) Tip speed

(d) Blade speed

133. Commutation circuitry is an extra circuit used to turn off

(a) Line-commutated thyristors

(b) Phase-commutated thyristors

(c) Forced-commutated thyristors

(d) Reverse-commutated thyristors

134. TRIAC as a bidirectional triode thyristor is used to control the output voltage by varying conduction time or firing delay angle in

(a) AC-DC converters (Controlled rectifiers)

(b) AC-AC converters (AC voltage controllers)

(c) DC-DC converters (DC choppers)

(d) DC-AC converters (Inverters)

135. For large power output, multiphase rectifiers are used along with filters to reduce level of harmonics by increasing the fundamental frequency in

(a) Diode rectifier

(b) Bridge rectifier

(c) Star rectifier

(d) Delta rectifier

136. In a Bipolar Junction Transistor (BJT) due to current flow to small portion of the base, hot spots are produced causing localized excessive heating and damaging the transistor. This switching limit is called

(a) Forward-Biased Safe Operating Area (FBSOA)

(b) Reverse-Biased Safe Operating Area (RBSOA)

(c) Power Derating

(d) Second Breakdown (SB)

137. In a three-phase inverter with 180° conduction, there are six modes of operation in a cycle where duration of each mode is

(a) 90°

(b) 75°

(c) 60°

(d) 45°

138. In a closed-loop control of squirrel cage induction motor, the field oriented control strategy implemented is

(a) Scalar control

(b) Vector control

(c) Adaptive control

(d) Frequency control

139. In a DC motor drive, if the armature current is reversed by keeping field current positive producing a braking torque, then the drive is said to be operating in

(a) Motoring mode

(b) Regenerative braking mode

(c) Dynamic braking mode

(d) Plugging mode

140. If the induction motor drive is capable of bidirectional power flow where limited range of speed control is required for large power applications, then this arrangement is called

(a) Static conductance drive

(b) Static Scherbius drive

(c) Static compressive drive

(d) Static reluctance drive

141. In a DC-DC switched-mode converter, if the output voltage polarity is opposite to input voltage, then this inverting regulator is called

(a) Buck regulator

(b) Boost regulator

(c) Buck-Boost regulator

(d) Ćuk regulator

142. In a zero current switching resonant converter, the switching loss and noise are increased due to presence of capacitive coupling called

(a) Miller capacitor

(b) Series resonant capacitor

(c) Parallel resonant capacitor

(d) Switch capacitor

143. Which one of the following devices is *not* a switched-mode DC power supply ?

(a) Flyback forward converter

(b) Full bridge converter

(c) Push-pull converter

(d) Resonant converter

144. The ideal core should exhibit very high permeability in case of transformers and inductor core due to magnetic saturation caused by DC imbalance condition that can be minimized by

(a) Low permeability core only

(b) High permeability core only

(c) Low and high permeability combination core

(d) No permeability core

Directions : *Each of the next six (06) items consists of two statements, one labelled as 'Statement (I)' and the other labelled as 'Statement (II)'. You are to examine these two statements carefully and select the answers to these items using the codes given below :*

Codes :

(a) Both Statement (I) and Statement (II) are individually true and Statement (II) is the correct explanation of Statement (I).

(b) Both Statement (I) and Statement (II) are individually true, but Statement (II) is *not* the correct explanation of Statement (I).

(c) Statement (I) is true, but Statement (II) is false.

(d) Statement (I) is false, but Statement (II) is true.

145. *Statement (I) :*

In a substitutional semiconductor, atom is replaced by an occasional foreign atom. The imperfections may be deliberately controlled or created in transistor material.

Statement (II) :

The lattice vacancies created when certain atoms in a semiconductor are missing are known as Schottky defects.

146. *Statement (I) :*

A cache is a memory unit placed between the CPU and main memory M and is used to store instructions, data or both.

Statement (II) :

The cache's effect is to increase the average time required to access an instruction or data word, typically to just a single-clock cycle.

147. *Statement (I) :*

A buffer is not an area in RAM or on the hard drive designated to hold input and output on their way in or out of the system.

Statement (II) :

The process of placing items in a buffer so they can be retrieved by the appropriate device when needed is called spooling.

148. *Statement (I) :*

The power diodes are three-layer devices.

Statement (II) :

The impurity concentrations of power diodes vary layer to layer.

149. *Statement (I) :*

Registers are used for storage of small data in the microprocessor.

Statement (II) :

All registers are accessible to the user through instructions.

150. *Statement (I) :*

In a three-phase induction motor, the maximum torque is directly proportional to standstill reactance.

Statement (II) :

In a three-phase induction motor, the speed or the slip at which maximum torque occurs is determined by the rotor resistance.

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

(27 – A)

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

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