hi

1. Which of these is not correct as a basic property of electric charges?

(a) Total charges in an insulated system is invariable
(b) A charged body is electrically unstable
(c) A charged body has equal number of positive and negative charges
(d) Positively charged body is deficient of electrons

x+q1+q2 = 2 q1

2.Calculate the distance x between charges q1 and q2 shown, given the repulsive force between them as 1.2 x 10-4 N, take the permittivity of vacuum where they were as 8.842x 10 -12 F/M and charge on q1= 1.6x10-19c

) 1.96x10-12M (b) 9.1x104N (c) 16.8x10-4 N. (d) 4.3x108 N

3. Two charges separated by distance x are located in vacuum. One is a quarter in a magnitude of the other. In terms of two charges above Coulomb's law can correctly represented by:

(a) (b) (c) (d)

4. Find the ratio (Fe/Fg) of the Coulomb electrical force Fe, to the gravitational force, Fg, between two electrons separated by distance r

(a) (b) (c) (d)

5. Two identical balls, carrying equal charge each of mass 0.10g, are suspended freely by two threads of equal length repelled each other so that each thread make angle 300 with vertical line. At equilibrium, calculate the tension in one of the threads. (Acceleration of gravity pull g = 9.8 m/s2)

(a) 1.13x10-3 N (b) 6.3x10-6 N (c) 0.41 N (d) 5.1x10-12 N

6. When two identically charged bodies suspended freely by thread of equal length repel each other all of these forces are acting on one of then except:

(a) Tension (b) Gravitational pull (c) Coulomb attraction force (d) Repulsive force

D

E

A

C

B

+3mC

-5mC

7.

Two charges are separated as shown. Where a third positive charge must be placed if the force it experiences is to be zero?

(a) At D (b) At C (c) At E
(d) At B

8. For series of charges in a closed surface within a vacuum, given that Îo andYe are the electric permitivity and field flux, Gauss' law can be stated as

(a) (b) (c) (d)

9. One of the following is not a practical use of a capacitor:

(a) To establishment of electric field of a required pattern.

(b) As oscillatory device in circuit.

(c) Used in time-base circuit to initiate an event at a specific time.

(d) To produce and store charges when electric field is lacking.

10. 2mF and 3mF capacitors are both connected in parallel across a 100 V supply line. Calculate the charge on the plates of the capacitors:

(a) 1.5x10-6 C (b) 1.0x10-6 C (c) 5.0x10-4 C (d) 0.7x10-4 C

11. Capacitance of a parallel plate capacitor is in directly proportional to:

(a) The magnitude of the permittivity of the of the dielectric within the plates

(b) The magnitude of the surface area of the plates in the capacitor

(c) Separation of the plates in the capacitor

(d) The magnitude of the voltage applied

12. One plate of a parallel- plate air capacitor has a surface area of 0.2m2 and is separated from the second plate by 0.01m if the electric permittivity of the dielectric used is 8.85x10-12 F/M. Calculate the voltage that will develop 8.85x10-9c charge on its plate.

(a) 7.1x10-2 (b) 50V (c) 4.1V (d) 60.2V

13. A parallel plate air-capacitor has square plate whose area is 0.2m2 and plates separated by 1cm, is connected to 50V battery. Calculate the energy stored in the capacitor if the permittivity of the dielectric used is 8.85x10-12 F/M.

(a) 1.6x10-7 J (b) 2.21x10-7 J (c) 3.0X10-7J (d) 4.6X10-7J

14. Which of the following is not a characteristic of air-capacitor?

(a) It is stable

(b) It has high insulation strength

(c) It is simple to make

(d) It can be easily adapted as a variable capacitor

15. Which of the following is not a characteristic of an electrolytic capacitor?

(a) Its dielectric is of high insulation strength.

(b) It is cheap to make.

(c) Its dielectric is made of oxide deposit of aluminium borate.

(d) (a) and (c)

16. Two capacitors 0.2mF and 0.4mF are connected in series to a supply of 10V. Calculate the energy stored in the field within the dielectrics of the capacitors

(a) 6.7X10-5J (b) 14.2X10-5J (c) 26.3X10-5J (d) 9.8X10-5J

17. What area of the plate of parallel-plate capacitor gives 1mF, if the plate's separation is 0.001m and permittivity of the dielectric used is 8.85x10-12?

(a) 9.13x10-3m2 (b) 113 m2 C 6.6X10-3 (d) 21 m2

18. The inverse of constant of proportionality in ohm's law for metallic conductors can be called:

(a) Inductance (b) Conductance (c) Reactance (d) Remittance

19. One major difference between Ohm metallic conductors and semi conductors is:

(a) Temperature increase increases the conductivity of semiconductor

(b) Temperature increase makes valence electrons to fall to ground state in semiconductor

(c) Temperature increase reduces the speed of the conducting electrons in the semi conductor.

(d) Temperature increase ejects the valence electrons in metals.

20 Which of these figures best represent Temperature T/ Resistance R characteristics curve for a dry wood?

T

(0K)

T

(0K)

T

(0K)

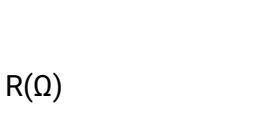
T

(0K)

(a)

(b)

(c)



(d)

R(Ω)

R(Ω)

R(Ω)

R(Ω)

Emf=1.5v

r =0.6 Ω

I

2 Ω Ω

2 Ω Ω

2 Ω Ω

2 Ω Ω

21.

Calculate the power dissipated by the effective resistance of the entire external resistor in the circuit shown

(a) 0.9 W (b) 0.6 W (c) 2.5 W (d) 19.8 W

x

9 Ω

5 Ω

3 Ω

6 Ω

12 Ω

7 Ω

2 Ω

y

22.

Obtain the equivalent resistance between points X and Y in the diagram shown.

(a). 11.6 Ω B 37 Ω C 18.6 Ω D 8.3 Ω

23. Conductivity of metal conductor does not depend on one of the following:

(a) Permeability (b) Temperature (c) Length (d) Cross section area

24. The diameter of a 5 m long constantan wire is 0.1mm. Calculate its conductivity if

Its resistance per unit length is 2 Ω/m.

(a) 1.5X106/ Ω m (b) 99x10-9/ Ω m (c) 6.4x107/ Ω m (d) 5.5x10-7/ Ω m

25. The initial resistance R of a conductor increases by 3 Ω when its initial temperature T was raised to twice its initial value. Calculate is initial resistance if the temperature co-efficient of resistance of the conductor is μ

(a) 3μt (b) (c) (d)

26. A wire conductor has initial resistivity of 1.003 Ωm, its resistivity changes to a new one when temperature is increased by 15 0K. If its resistance per unit length and radius are 1.02x107 W/m and 0.25 mm, calculate its temperature co-efficient or resistivity.

(a) 1.6x10-2/K (b) 8.6x10-6/K
(c) 7.0x10-2/K (d) 4.1x10-6/K

27. A 500-watt boiling ring was used to raise the temperature of 200g of a liquid by 250K within 2 seconds. What is the specific heat capacity of the liquid?

(a) 2.0x102 J/KgK (b) 6.3x10-3 J/KgK (c) 4.41x104 J/KgK (d) 1.333x105 J/KgK

28 500-watt power source connected to a conductor for 0.5 seconds energized a 9.1x10-3Kg electron for it to attain a velocity. Calculate the velocity of the electron.

(a) 5.31x1012m/s (b) 8.40x1021m/s C(c) 7.11x1029m/s (d) 2.34x1016m/s

29 One of the following cannot be a unit of electrical potential

(a) Joule per Coulomb (b) Volt (c) Watt per coulomb (d) Newton meter per Coulomb

30 Which of the following is the correct statement for Kirchoff's rule for current at a junction of circuit network?

(a) Algebraic sum of current at a junction is zero

(b) Algebraic sum of current flowing into a junction is equal to that, leaving that junction

(c) Algebraic sum of current at a junction is constant

(d) (a) and (b) are correct

31. A total of 1.92x 10-18J work is required to carry 1.6x10-19 charges across the two terminals of a cell within 1 minute. What is the maximum current in the circuit?

(a) 8.99x10-12 A (b) 2.67x10-21A (c) 7.12x10-14 A (d) 4.13x10-13A

32. Consider a charge e at a point in vacuum, absolute electrical potential at point x away from e can be correctly obtained using:

33. Three equal 2μF charges are located at the angles of an equilateral triangle whose sides are 7cm each in vacuum. Determine the absolute electric potential at the centre of the triangle (K = 9 x 109Nm2/C2)

(a) 6.09 x 105V (b) 9.66 x 103V (c) 444V
(d) 2.6 x 104V

E1 2v

I3

Loop1

Loop2

R1

1Ω

r2

1Ω

R2 1Ω

I1

I2

E2

2v

r1 1Ω

R3 2Ω

34.

With reference to the loop direction as shown, which of these equations is wrong about the circuit network?

(a) 2 = 2I1 + 3I2 (b) -2 = 3I3 - 3I2

(c) I1 = I2 + I3 (d) 2 = 2I1 - 3I3

35. A metre bridge has 3 Ω and 1 Ω resistors in its left and right gaps. When a wire of length 218cm was connected in parallel with the 3 Ω resistor the balance point is 54.6cm from the left. What is the resistance of the wire connected across the 3 Ω resistor?

(a) 3.5 λ Ω (b) 2.0 Ω (c) 5.5 Ω (d) 6.5 Ω

36. All of these are the uses of potentiometer with exception of:

(a) Comparison of emf of two cells

(b) Comparison of capacitance of two capacitors

(c) Measurement of internal resistance of a cell

(d) Measurement of small current

37. Which of the following is a necessary condition for working potentiometer?

(a) Positive terminals of the driver and test cells must be connected to a common point

(b) emf of driver cell must always be greater than of the test cell

(c) When galvanometer is balanced no current could flow in the potentiometer

(d) (a), (b), and (c) are correct

38. While determining the internal resistance r of a cell using potentiometer graph was plotted for the relation . If the slope was found to be

0.25 Ω/m and the balance point L1 from the left side is 34.2 cm calculate the internal resistance.

(a) 6.05 Ω (b) 8.55 Ω (c) 14.9 Ω (d) 50.33 Ω

39. In electromagnetism one of the following is not among the three entities that are mutually dependent:

(a) Current (b) Charges (c) Motion
(d) Magnetic field

Current I

Current I

Current I

N

S

40.

(I)

(II)

(III)

The field directions around current carrying solenoids are shown; which one is wrong?

(a) All (b) I and II (c) II and III
(d) II

41. The magnitude of the electromagnetic force produced when a current carrying conductor is in a magnetic field is not increased by:

(a) Thickness of the conductor

(b) Length of the conductor

(c) Magnetic field strength

(d) Magnitude of sine of the angle made by the conductor with the field.

42. What angle will the current carrying conductor laying in a magnetic field make for the electromagnetic force F it experience to be a minimum?

(a) 90o (b) 180o (c) 0o (d) -60o

43. Calculate the force on a power cable 2 km long carrying 200 A current in N30oE direction if earth's horizontal magnetic component is 10-5T

(a) 2N (b) 4N (c) 6N (d) 8N

.P

θ

I

dL

x

44.

Consider a conductor carrying current I, the appropriate expression for the small magnetic flux density dB created at point P by an elemental length dL of the conductor, according to Biot – Savart, is:

45. What is the magnetic flux density B at 2m from a straignt wire in vacuum carrying 3A current? (μo = 4n x 10-7 H/m)

(a) 5 x 10-7 T (b) 3 x 10-7 T (c) 6 x 10-7 T (d) 2 x 10-7 T

L

r

p

46.

Kin

A current carrying solenoid is wound N times in cylindrical form with radius r as shown. The magnetic flux density at point P is given by:

47. Electromagnetic induction is a process of converting:

(a) Electrical energy to potential energy

(b) Mechanical energy to electronic energy

(c) Kinetic energy to electrical energy

(d) Mechanical energy to light energy

P

Q

R

Ia 30 A

Ib 10 A

Ic 20 A

5 cm

3 cm

48.

Three current carrying wires shown are in vacuum. If is 0.25m long, calculate the net electromagnetic force on it
((μo = 4π x 10-7 H/m)

(a) 42 x 10-4N (b) 4.2 x 10-4N (c) 8.2 x 10-4N (d) 3 x 10-4N

49. Motion of the magnetic flux during induction can be achieved in any of the following ways:

(i) Dynamo effect (ii) Sliding effect (iii) Transformer effect.

(a) I only (b) II only (c) I and II only (d) I and III only

50. Using Faraday's law of induction of emf and self induced emf in a current carrying wire, obtain an expression for self inductance L in terms of flux ϕ and current I.

51. Use Faraday's law of induction of emf in a solenoid and mutually induced emf in a second nearby solenoid as a result of current changes in the first coil to obtain an expression for mutual inductance m in terms of flux ϕ and current I.

52. Major similarity between self inductance and mutual inductance is that:

(a) They are both measured in Teslas

(b) They are both produced when current change at the rate of 1A per second

(c) They both oppose the current producing them

(d) They are both measured in Henry

53. Static electricity is the study of the energy associated

with electrons:

(a) In translational motion

(b) In vibrational motion

(c) At rest

(d) In charged bodies

54. Current I flow changes with time t in a fully charged parallel plate capacitor when disconnected from the power source I/t characteristic curve for this case is:

IIa

(a)

t

(b)

t

I

I

t

(c)

I

t

(d)

55. According to its definition the unit of the emf of a cell can be

(a) Joule/Kelvin (b) Joule/coulomb (c) Joule/second (d) volt/second

56. A major difference between electric current and voltage (potential difference) is:

(a) Current is time rate of flow of charges while voltage is a measure of energy required to move a charge within a given place.

(b) Current can be measured in Coulomb/second voltage is Joule/Coulomb

(c) Current is point phenomenon while voltage is a gap phenomenon

(d) All above are correct.

(l)

I1

I1

I1

I2

I2

I2

I3

I3

I3

(II)

(III)

57

Which of the following is the correct calculation of the currents at the junctions in

I, II and III?

(a) $I1 = -I2 - I3$, $I3 = I1 + I2$ and $I3 = I2 - I1$

(b) $I3 = I2 - I1$, $I3 = I1 + I2$ and $I1 = I2 - I3$

(c) $I2 = I1 - I3$, $I2 = I1 + I3$ and $I3 = I1 - I2$

(d) $I3 = I1 - I2$, $I1 = I3 + I2$ and $I2 = I3 + I1$

58. The volume control in a radiowave receiver is an example of:

(a) Air capacitor (b) Potentiometer (c) Resistor (d) Inductor ϕ

59. Which of these is/are sample(s) unit (s) of capacitance of a capacitor?

(a) Picofarad (b) Coulomb/volt (c) Joule/metre (d) a and b are correct

60. Which of the following statement is wrong about self induced/back emf?

(a) It reduces the efficiency of the current that produced it.

(b) It is induced as a result of variation in magnetic field caused by varying electric current.

(c) It opposes the applied emf

(d) All above are wrong about self induced/back emf.

Q61. Ferromagnetic materials are materials which can be permanently magnetized.

(A) When the material is doped with positive materials

(B) When the material is doped with negative materials

(C) When an internal magnetic field is applied to the material.

(D) When an external magnetic field is applied to the material.

Q62. If the temperature of a ferromagnetic material is raised past the Curie temperature, the material abruptly loses its permanent magnetisation and becomes

(A) Paramagnetic (B) Electromagnetic
(C) Diamagnetic (D) Curiemagnetic

Q63. Which of the following statements is correct about Paramagnetic Materials?

(A) Paramagnetic materials are attracted toward magnets, but do not become permanently magnetised. (B) Paramagnetic materials are attracted toward magnets, and become permanently magnetised. (C) Paramagnetic materials are repelled from magnets, and do not become permanently magnetised. (D) None

Q64. Which of the following statement is correct about Diamagnetic materials?

(A) Diamagnetic materials are repelled by magnets, but do not become permanently magnetised.
(B) Paramagnetic materials are attracted toward magnets, and become permanently magnetised. (C) Diamagnetic materials are attracted toward magnets, but do not become permanently magnetised (D) None

Q65. Which of the following statement is incorrect about Remanent Magnetism?

(A) Remanent Magnetism is the magnetisation remaining after the removal of an externally applied field (B) Remanent Magnetism is exhibited by ferromagnetic materials. (C) If the external field is reduced more, the remanent magnetisation will be removed (D) Remanent Magnetism is not exhibited by ferromagnetic materials.

Q66. Which of the following statement is correct about hysteresis?

(A) As the external magnetic field is increased, the induced magnetization also decreases.
(B) The induced magnetisation is eventually lost
(C) As the external magnetic field is increased, the induced magnetization also increases.
(D) All

Q67. The lack of retraceability is known as

(A) Magnetisation (B) Hysteresis (C) Remanence (D) Coercive force

Q68. Given that B is the resultant flux density, Bo is the flux density when the toroid is empty and BM is the additional flux density set up by the material of the core. A material with B < Bo is known as

(A) Paramagnetic material (B) Electromagnetic material (C) Diamagnetic material
(D) ferromagnetic material

Q69. Given that B is the resultant flux density, Bo is the flux density when the toroid is empty and BM is the additional flux density set up by the material of the core. The correct relation is given by?

(A) B o = BM + B (B) B + Bo = BM

(C) B = Bo = BM

(D) B = Bo + BM

Q70. These materials and their alloys are termed ferromagnetic materials except

(A) Iron (B) cobalt (C) nickel (D) None

Q71. Given that B is the resultant flux density, Bo is the flux density when the toroid is empty and BM is the additional flux density set up by the material of the core. A material with B > Bo is known as

(A) Paramagnetic material (B) Electromagnetic material
(C) Diamagnetic material (D) ferromagnetic material

Q72. Given that B is the resultant flux density, Bo is the flux density when the toroid is empty and BM is the additional flux density set up by the material of the core. A material with B>> Bo is known as

(A) Paramagnetic material (B) Electromagnetic material
(C) Diamagnetic material (D) ferromagnetic material

Q73. Given that B is the resultant flux density, Bo is the flux density when the toroid is empty and BM is the additional flux density set up by the material of the core. The ratio B/Bo is known as

(A) Magnetic susceptibility (B) Absolute permeability
(C) Relative permeability (D) Unity permeability

Q74. Given that B is the resultant flux density, Bo is the flux density when the toroid is empty and BM is the additional flux density set up by the material of the core. The ratio BM /Bo is known as

(A) Magnetic susceptibility (B) Absolute permeability
(C) Relative permeability (D) Unity permeability

Q75. From the Absolute permeability, μ, can be defined as

(A) μo /μr (B) μr /μo (C) μ/μr (D) μr μo

Q76.

From the curve, Points c and f represent

(A) Current (B) Permanent magnetism (C) hysteresis loss (D) maximum

Q77. From the curve, Point b represents

(A) Saturation (B) Coercivity (C) Remanence (D) Magnetic susceptibility

Q78. From the curve, ac is a measure of the

(A) Saturation (B) Coercivity (C) Remanence (D) Magnetic susceptibility

Q79. From the curve, ac is a measure of the

(A) Saturation (B) Coercivity (C) Remanence (D) Magnetic susceptibility

Q80. The curve between points "a" and "b" in figure1 is called

(A) The magnetisation curve. (B) The remanent magnetisation curve (C) the external magnetization field (D) The coercive magnetisation curve

Q81. In hysteresis, if the external mmagnetic field is reduced the material retains a certain permanent magnetisation termed the remanent magnetisation.

(A) The induced magnetisation also is increased.

(B) The induced magnetisation also is reduced, but it does not follow the original curve. (C) The induced magnetisation also is reduced, and it will follow the original curve. (D) The induced magnetisation will reach saturation.

Q82. Which of the following statement is incorrect about the current in hysteresis loop?

(A) current is increased from a to b (B) current is increased from e to f (C) current is reduced to zero from b to c (D) current is increased from f to b

Q83. Which of the following statement is incorrect about the current in hysteresis loop?

(A) current is increased from a to b (B) current is increased from c to e (C) current is reduced from c to e (D) current is increased from f to b

Q84. Which of the following does not correctly describe a conductive solid metal?

(A) It contains a large population of mobile, or free, electrons. (B) The electrons are bound to the metal lattice but not to any individual atom. (C) The electrons move about randomly due to thermal energy (D) Thermal energy, on the average, causes the current within the metal to flow when external field is not applied.

Q85. The correct unit of electric current is?

(A) Coulomb per second (B) Coulomb-second

(C) Volt per coulomb (D) Volt - coulomb

Q86. Which of the following does not correctly describe the Current density?

(A) Current density is a measure of the density of an electric current. (B) It is defined as a vector whose magnitude is the electric current per cross-sectional area. (C) Current density is measured in amperes per meter. (D) Current density is measured in Coulomb per second per square meter.

Q87. Which of the following does not correctly describe semiconductor?

(A) A semiconductor allows an electric current to flow very strongly in one direction

(B) A semiconductor allows an electric current to flow very weakly in the opposite direction

(C) The direction in which a semiconductor allows the forward current to flow depends on whether it is a p- type semiconductor or an n-type semiconductor.

(D)The direction in which a semiconductor allows the forward current to flow does not depend on whether it is a p-type semiconductor or an n-type semiconductor.

Q88. Which of the following does not correctly describe semiconductor?

(A) The amounts of current which flow in each direction depend mainly on the amount of the voltage applied. (B) The forward resistance is relatively low. (C) The amounts of current which flow in each direction depend mainly on the forward and the reverse resistance. (D)The amounts of current which flow in each direction depend partly on the amount of the voltage applied but mainly on the forward and the reverse resistance.

Q89. Which of the following does not correctly describe semiconductor?

(A) The forward resistance is relatively low (B) The reverse resistance is always very high (C) like a conductor, the flow of current through a semiconductor is not the same amount of current whichever way the voltage is applied.
(D) The amounts of current which flow in each direction depend partly on the amount of the voltage applied but mainly on the forward and the reverse resistance.

Q90. Which of the following statement is not true?

(A) Conductors allow electrons to pass through them easily because of their low resistance.
(B) Insulators do not allow electrons to pass through them because of their high resistance

(C) Insulators do not allow electrons to pass through them because their atoms hold the electrons strongly.
(D) None

Q91. Which of the following does not correctly describe the conventional current?

(A) Electric charge moves from the positive side of the power source to the negative.

(B) A flow of positive charge gives the same electric current as an opposite flow of negative charge.

(C) The opposite flows of opposite charges contribute to a single electric current.

(D) None

Q92. Which of the following statement is not true?

(A) In solid metals such as wires, the positive charge carriers are immobile.

(B) In solid metals such as wires, the positive charge carriers are mobile.

(C) Because the electron carries negative charge, the electron motion in a metal is in the direction opposite to that of conventional (or electric) current.

(D) In solid metals such as wires, only the negatively charged electrons flow.

Q93 Which of the following does not have a mobile charge carrier?

(A) Metals (B) Insulators (C) Semiconductors (D) None

Q94. Which of the following does not have a charge carrier?

(A) Metals (B) Insulators (C) Semiconductors (D) None

Q95. Which of the following does not have a charge carrier?

(A) Gases (B) Insulators (C) Electrolytes (D) None

Q96. The units of conductance G of a device is?

(A) Mho (B) Siemens (C) Ohms (D) None

Q97. From the usual symbols, the unit of conductivity σ of a device is?

(A) Ω-1 m (B) Ω m-1 (C) Ω m (D) Ω-1m-1

Q98. From the usual symbols, the unit of conductivity σ of a device is?

(A) Ω-1 S (B) S m-1
(C) S m (D) S Ω

Q99. From the usual symbols, the units of conductance G of a device is?

(A) S (B) S m-1
(C) S m (D) S Ω

Q100. The electrons, with number density n, carry a charge of magnitude e, and moves with an average drift velocity vd , through a given length of a conductor, with cross section area, A, when a field E is applied across its ends. What is the current passing through the length?

(A) e σ nA vd (B) σE (C) e nA vd (D) e A vd

Q101. The electrons, with number density n, carry a charge of magnitude e, and moves with an average drift velocity vd , through a given length of a conductor, with cross section area, A, when a field E is applied across its ends. Which of the following expressions is not correct about the current density? Given that conductivity of the conductor is σ.

(A) e σ n vd (B) σ l / RA
(C) e n vd (D) σE

Q102. The moving coil galvanometer that has a coil of N turns each of area A and carrying I, experiences a torque T when its plane is in the field B. Which equation best described the torque T experience when the plane is parallel to the field?

(A) T = NIAB (B) T = NABθ (C) T = NIBθ
(D) T = NIAθ

Q103. The moving coil galvanometer that has a coil of N turns each of area A and carrying I, experiences a torque T when its plane is in the field B. Which equation best defined the current sensitivity S, when other parameters have their usual meanings?

(A) S = θ/I (B) S = θ/Q (C) S = Q/θ (D) S =

BAN/cR

Q104. The moving coil galvanometer that has a coil of N turns each of area A and carrying I, experiences a torque T when its plane is in the field B. Which equation does not defined the voltage sensitivity Sv, when other parameters have their usual meanings?

(A) Sv = θ/IR (B) Sv = S/R (C) Sv = BAN/cR (D) Sv = R/θ

Q105. The moving coil galvanometer that has a coil of N turns each of area A and carrying I, experiences a torque T when its plane is in the field B. Which equation best defined the charge sensitivity Sq, when other parameters have their usual meanings?

(A) Sq = θ/IR (B) Sq = θ/I (C) Sq = BAN/cR (D) Sq = θ/Q

Q106. Dead-beat movement occurs when

(A) the galvanometer is free (B) the galvanometer is critically damped

(C) the galvanometer is steady (D) the galvanometer is electromagnetic

Q107. Which of the following statement is not true of the ballistic galvanometer?

(A) the kinetic energy is used to the rotate the coil
(B) the kinetic energy is converted to the potential energy stored in the system (C) the potential energy stored in the system provides the restoring torque (D) the kinetic energy of the system is used to heat the coil

Q108. Which of the following statement is not true of the dynamo?

(A) Dynamo can be shunt-wound (B) Dynamo can be series-wound (C) Dynamo can be compound-wound (D) Dynamo can be slip-ring-wound

Q109. Which of the following statement is not true?

(A) Alternating current is one in which magnitude and

direction vary periodically (B) Direct current is one in which magnitude and direction vary periodically (C) Electromotive force is one in which magnitude and direction can vary periodically (D) Alternating current gives the value of magnetic fields that vary in magnitude and direction periodically

Q110. Which of the following statement is not true of Rectification?

(A) Rectification is the process by which one converts a.c to d.c (B) Rectification is the process by which one converts d.c to a.c (C) Rectifier impedes the flow of current in one direction more than in the reverse direction (D)When a sinusoidal waveform is input to a rectifier, a half-wave output is produced.

Q111. An external magnetic field can be supplied by any of the following except

(A) An electromagnet (B) solenoid (C) Another permanent magnet (D) None

Q112. An electric heater is labeled 240V ac, 1000W. What is the peak current in the heater when connected to a 240V ac supply.

(A) 4.17A (B) 5.89A (C) 2.95A (D) 8.34A

Q113. Calculate the electromotive force induced in a copper rod of length 6cm rotating at 2 rev/sec in a uniform magnetic field B of 0.02 Tesla.

(A) 4.52 x 10-4 volts (B) 3.50 x 10-4 volts (C) 2.0 x 10-4 volts (D) 6.0 x 10-4 volts

Q114. Calculate the peak value of the emf induced in a circular coil of 1000 turns of radius 4cm rotating at 1800 rpm about an axis in its own plane at right angles to a magnetic field of flux density 0.03T.

(A) 30.62 volts (B) 20.26 volts (C) 25.02 volts (D)

28.43 volts.

Q115. A domestic ac source has a peak value of 325v. What is the rms current in a 100w light bulb?

(A) 0.31A (B) 0.44A (C) 0.22A (D) 0.62A

Q116. A 2kΩvariable resistor is connected across a 10v supply. What is the potential difference between the sliding contact and the negative side of the supply when the slider is 2/3 way long?

(A) 3.3v (B) 6.7v (C) 1.6v (D) 8.4v

Q117. An ac source is connected across a resistor. What is the average power produced in the resistor over one cycle if the peak current in the resistor of resistance R is Io

(A)

Q118. A flat circular coil with 40 loops of wire has a diameter of 32 cm. What current must flow in its wire to produce a field of 3 X10-4Wb/m2 at its Centre?

(A) 1.29A (B) 1.09A (C) 1.19A (D) 1.9A

Q119. An air core solenoid with 2000 loops is 60cm long and has a diameter of 2 cm . If a current of 5A is sent through it, what will be the flux density within it?

(A) 0.21T (B) 0.12T (C) 1.02T (D) 0.021T

Q120. A long wire carries a current of 20A along the axis of a long solenoid. The field due to the solenoid is 4mT. Find the resultant field at a point 3mm from the solenoid axis.

(A) 2.33MT (B) 1.33MT (C) 3.33MT (D) 5.33MT

Q121. Two long parallel wires X and Y are 10cm apart and carry currents 6A and 4A respectively. Find the force on a 1m

length of wire Y if the currents are in the same direction.

(A) 48μN attractive force. (B) 4.8N attractive force.
(C) 48μN repulsive force (D) 4.8N repulsive force

Q122. A copper bar 30cm long is perpendicular to a field of flux density 0.8Wb/m2 and moves at right angles to the field with a speed of 0.5m/s.Determine the emf induced in the bar.

(A) 0.0012V (B) 0.012V (C) 0.12V (D) 1.2V

Q123. Three long, straight, parallel wires X,Y and Z carry currents +30A,-10A and +20A respectively, Where XY is 3cm apart and YZ is 5cm apart and +/ – indicates their directions. Find the force on a 25cm length of wire Y.

(A) 3.3mN (B) 2.3mN (C) 1.3mN (D) 0.3mN

Q124. A 50-loop circular coil has a radius of 3cm. it is oriented so that the field lines of a magnetic field are normal to the coil. If the magnetic field is varied so that B increases from 0.10T to 0.35T in a time of 2milliseconds.find the average induced emf in the coil.

(A) 170.7V (B) 17.7V (C) 1.77V (D) 0.177V

Q125. A coil of 50 loops is pulled in 0.02s from between the poles of a magnet, where its area intercepts a flux of 3X10-4Wb, to a place where the intercepted flux is 0.1X10-4Wb. What is the average emf induced in the coil?

(A) 0.75V (B) 7.5V (C) 75.0V (D) 750V

Q126. The net charge on an n-type semiconductor is

(A) Positive (B) negative (C) Zero (D) Minus

Q127. An example of trivalent element used for doping of

semiconductor is

(A) Phosphoric (B) Silicon (C) Germanium (D) Boron

Q128. The Resistivity of a semiconductor with increasing temperature

(A) Increases (B) Remain constant (C) Decreases (D) Doubles

Q129. A domestic ac source has a peak value of 325v. What is the rms current in a 100w light bulb?

(A) 0.31A (B) 0.44A (C) 0.22A (D) 0.62A

Q130. Which of these cannot be utilized with a variable resistor

(A) Volume control (B) Dimmers on light switches (C) Thermostat (D) None of the above

Q131. A 2kπ variable resistor is connected across a 10v supply. What is the potential difference between the sliding contact and the negative side of the supply when the slider is 2/3 way long?

(A) 3.3v (B) 6.7v (C) 1.6v (D) 8.4v

Q132. Which of these is the impedance for an inductor – Resistor circuit in series?

Q133. An ac source is connected across a resistor. What is the average power produced in the resistor over one cycle if the peak current in the resistor of resistance R is Io

(A)

Q134. An electric heater is labeled 240V ac, 1000W. What is the peak current in the heater when connected to a 240V ac supply.

(A) 4.17A (B) 5.89A (C) 2.95A (D) 8.34A

Q135. The device used in converting mechanical power into electrical power is called

(A) Dynamo (B) Lever (C) Armature (D) Motor

Q136. Calculate the electromotive force induced in a copper rod of length 6cm rotating at 2 rev/sec in a uniform magnetic field B of 0.02 Tesla.

(A) 4.52 x 10-4 volts (B) 3.50 x 10-4 volts (C) 2.0 x 10-4 volts (D) 6.0 x 10-4 volts

Q137. Calculate the peak value of the emf induced in a circular coil of 1000 turns of radius 4cm rotating at 1800 rpm about an axis in its own plane at right angles to a magnetic field of flux density 0.03T.

(A) 30.62 volts (B) 20.26 volts (C) 25.02 volts (D) 28.43 volts.

Q138. Which of the following is suitable for measuring the quantity of charge?

(A) Ballistic Galvanometer (B) Powerful Galvanometer (C) Holistic Galvanometer (D) Meter Bridge

Q139. A particular component of the direct current generator that maintains the direction of the generated emf in the circuit is the

(A) Commutator (B) Slip ring (C) Armature
(D) Rectangular coil

Q140. What is the product of the slope of the graph below and the rate of distance covered across the magnetic flux (ø)

ø

(weber)

x(m)

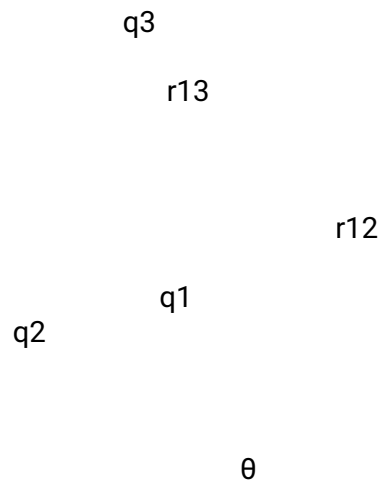
(A) Flux density (B) Potential Difference

(C) Induced Electromotive force (D) Energy

Q141. Calculate the resultant force on q1 in the figure below if

q1 = -1.0 x 10-6C, q2 = + 3.0 x 10-6C

q3 = - 2.0 x 10-6C, r12 = 15cm, r13 = 10cm θ = 30o



(A) 2.64N (B) 1.47N (C) 2.18N (D) 3.05N

Q142. The figure below shows a charge q1 + 1.0 x 10-6C 5cm from a charge q2 + 2.0 x 10-6C. At what point on the line joining the two charges is the electric field zero

(A) 1.77 x 10-2m (B) 2.07 x 10-2m (C) 3.5 x 10-2m (D) 4.1 x 10-2m

Q143. The direction of magnetic field can determined using

(A) The right hand grip rule (B) just the electron (C) Maxwellian rule (D) Faraday's direction

Q144. The speed of electromagnetic radiation in free space is

(A) (B) (C) (D)

Q145. The potential difference applied to the armature of a motor is 12 volts. If the current and resistance of the armature are 0.4 A and 5 ohms respectively. Calculate the back emf in the winding.

(A) 10 volts (B) 12 volts (C) 15 volts (D) 5 volts.

Q146. In an a.c generator the magnitude of the emf generated increases with

i) Increase in the strength of the magnet

ii) Decrease in the rate of change of the flux

iii) Increase in the number of turns of the coil

iv) Increase in area of the coil

Which of the state is correct.

(A) i, ii, and iii (B) i, iii and iv (C) ii, iii and iv (D) i and iii

Q147. The induced emf generated in an alternator is such in a direction as to oppose the motion producing it. This statement is

(A) Right hand grip rule (B) Faraday's law
(C) Fleming's law (D) Lenz's law

Q148. What is the value of B in air at a point 5 cm from a long straight wire carrying a current of 15A?

(A) 6X10-2T (B) 6X10-4T (C) 6X10-1T (D) 6X10-5T

Q149. A proton enters a magnetic field of flux density 1.5Wb/m2 with a velocity of 2X107 m/s at an angle of 30o with the field. What is the force on the proton?

(A) 2.4 X10-14 N (B) 2.4 X10-13 N (C) 2.4 X10-12 N (D) 2.4 X10-11 N

Q150. Which of the following represents electric potential V between A and B in free space

Q151. The negative sign in Faraday's law of electromagnetic induction indicates

(A) Induced emf (B) direction of induced current (C) Current (D) Faraday's direction

Q152. A flat circular coil with 40 loops of wire has a diameter of 32 cm. What current must flow in its wire to produce a field of 3 X10-4Wb/m2 at its Centre?

(A) 1.29A (B) 1.09A (C) 1.19A (D) 1.9A

Q153. An air core solenoid with 2000 loops is 60cm long and has a diameter of 2 cm . If a current of 5A is sent through it, what will be the flux density within it?

(A) 0.21T (B) 0.12T (C) 1.02T (D) 0.021T

Q154. A long wire carries a current of 20A along the axis of a long solenoid. The field due to the solenoid is 4mT. Find the resultant field at a point 3mm from the solenoid axis.

(A) 2.33MT (B) 1.33MT (C) 3.33MT (D) 5.33MT

Q155. Two long parallel wires X and Y are 10cm apart and carry currents 6A and 4A respectively. Find the force on a 1m length of wire Y if the currents are in the same direction.

(A) 48μN attractive force. (B) 4.8N attractive force. (C) 48μN repulsive force (D) 4.8N repulsive force

Q156. A copper bar 30cm long is perpendicular to a field of flux density 0.8Wb/m2 and moves at right angles to the field with a speed of 0.5m/s.Determine the emf induced in the bar.

(A) 0.0012V (B) 0.012V (C) 0.12V (D) 1.2V

Q157. Three long, straight, parallel wires X,Y and Z carry currents +30A,-10A and +20A respectively, Where XY is 3cm apart and YZ is 5cm apart and +/ – indicates their directions. Find the force on a 25cm length of wire Y.

(A) 3.3mN (B) 2.3mN (C) 1.3mN (D) 0.3mN

Q158. A 50-loop circular coil has a radius of 3cm. it is oriented so that the field lines of a magnetic field are normal to the coil. If the magnetic field is varied so that B increases from 0.10T to 0.35T in a time of 2milliseconds.find the average induced emf in the coil.

(A) 170.7V (B) 17.7V (C) 1.77V (D) 0.177V

Q159. A coil of 50 loops is pulled in 0.02s from between the poles of a magnet, where its area intercepts a flux of 3X10-4Wb, to a place where the intercepted flux is 0.1X10-4Wb. What is the average emf induced in the coil?

(A) 0.75V (B) 7.5V (C) 75.0V (D) 750V

Q160. Two long parallel wires X and Y are 10cm apart and carry currents 6A and 4A respectively. Find the force on a 1m length of wire Y if the currents are in the opposite direction.

(A) 48μN attractive force. (B) 4.8N attractive force. (C) 48μN repulsive force (D) 4.8N repulsive force

Q161. What is the value of B in air at a point 5 cm from a long straight wire carrying a current of 15A?

(A) 6X10-2T (B) 6X10-4T (C) 6X10-1T (D) 6X10-5T

Q162. A flat circular coil with 40 loops of wire has a diameter of 32 cm. What current must flow in its wire to produce a field of 3 X10-4Wb/m2 at its Centre?

(A) 1.29A (B) 1.09A (C) 1.19A (D) 1.9A

Q163. An air core solenoid with 2000 loops is 60cm long and has a diameter of 2 cm . If a current of 5A is sent through it, what will be the flux density within it?

(A) 0.21T (B) 0.12T (C) 1.02T (D) 0.021T

Q164. Which of the following is correct?

(A) 1Wb=1NmA (B) 1Wb=1Vs (C) 1Wb=1Nm-1A-1 (D) 1Wb=1NAm-1

Q165. Two long parallel wires X and Y are 10cm apart and carry currents 6A and 4A respectively. Find the force on a 1m length of wire Y if the currents are in the same direction.

(A) 48μN attractive force. (B) 4.8N attractive force.
(C) 48μN repulsive force (D) None

Q166. Two long parallel wires X and Y are 10cm apart and carry currents 6A and 4A respectively. Find the force on a 1m length of wire Y if the currents are in the opposite direction.

(A) 48μN attractive force. (B) 4.8N attractive force.
(C) 48μN repulsive force (D) None

Q167. We can define the unit of magnetic flux density as

(A) tesla (B) weber (C) NA-1 (D) Nm-2

Q168. A 50-loop circular coil has a radius of 3cm. it is oriented so that the field lines of a magnetic field are normal to the coil. If the magnetic field is varied so that B increases from 0.10T to 0.35T in a time of 2milliseconds.find the average induced emf in the coil.

(A) 170.7V (B) 17.7V (C) 1.77V (D) 0.177V

Q169. A coil of 50 loops is pulled in 0.02s from between the poles of a magnet, where its area intercepts a flux of 3X10-4Wb, to a place where the intercepted flux is 0.1X10-4Wb. What is the average emf induced in the coil?

(A) 0.75V (B) 7.5V (C) 75.0V (D) 750V

Q170. A copper bar 30cm long is perpendicular to a field of flux density 0.8Wb/m2 and moves at right angles to the field with a speed of 0.5m/s.Determine the emf induced in the bar.

(A) 0.0012V (B) 0.012V (C) 0.12V (D) 1.2V

Q171. The drift velocity Vd can be expressed as

(A) Vd=I/ne (B) Vd= J/ne (C) Vd = I/nA (D) Vd= J/nA

where I is the current, J is current density, n is number density, e is electronic charge, and A is cross sectional area.

Q172. The negative sign in Faraday's law of electromagnetic induction indicates

(A) Induced emf (B) direction of induced current (C) Current (D) Faraday's direction

Q173. The hall coefficient for a material having number density n of majority charge-carriers, each carrying a charge e, is given as

(A) RH=1/ne (B) RH= J/ne (C) RH=ne (D) None

Q174. The direction of magnetic field can be determined using

(A) The right hand grip rule (B) just the electron (C) Maxwellian rule (D) Faraday's direction

Q175. Which of the following is suitable for measuring the quantity of charge?

(A) Ballistic Galvanometer (B) Powerful Galvanometer (C) Holistic Galvanometer (D) Meter Bridge

Q176. A 5 W resistance is in a series circuit with a 0.2 H pure inductance and a 40 nF pure capacitance. The combination is placed across a 30v, 1780 Hz power supply. Find the current in the circuit.

(A) 178A (B) 224A (C) 5A (D) 6A

Q177. A 5 W resistance is in a series circuit with a 0.2 H pure inductance and a 40 nF pure capacitance. The combination is placed across a 30V, 1780 Hz power supply. Find the phase angle between source voltage and current.

(A) 0o (B) 30o (C) 90o (D) 270o

Q178. A 5 W resistance is in a series circuit with a 0.2 H pure inductance and a 40 nF pure capacitance. The combination is placed across a 30v, 1780 Hz power supply. Find the power loss in the circuit.

(A) 0W (B) 60W (C) 120W (D) 180W

Q179. A 5 W resistance is in a series circuit with a 0.2 H pure inductance and a 40 nF pure capacitance. The combination is placed across a 30v, 1780 Hz power supply. Find the voltmeter reading across elements of the circuit.

(A) 30V, 13.44V,13.44V (B) 30kV, 13.44kV,13.44V

(C) 30V, 13.44kV,13.44kV (D) 30kV, 13.44kV,13.44kV

Q180. A series circuit connected across a 200V, 60Hz line consists of a capacitor of capacitive reactance 30 W, a non inductive resistor of 44 W, and a coil of inductive reactance 90 W, having a resistance 36 W. Determine the current in the circuit.

(A) 100A (B) 20A (C) 10A (D) 2A

Q181. . A series circuit connected across a 200V, 60Hz line consists of a capacitor of capacitive reactance 30 W, a non inductive resistor of 44 W, and a coil of inductive reactance 90 W, having a resistance 36 W. Determine the impedance of the circuit.

(A) 100W (B) 20W (C) 10W (D) 2W

Q182. A series circuit connected across a 200V, 60Hz line consists of a capacitor of capacitive reactance 30 W, a non inductive resistor of 44 W, and a coil of inductive reactance 90 W, having a resistance 36 W. Determine the potential difference across the non inductive resistor of 44 W.

(A) 100V (B) 60V (C) 88V (D) 97V

Q183. A series circuit connected across a 200V, 60Hz line consists of a capacitor of capacitive reactance 30 W, a non inductive resistor of 44 W, and a coil of inductive reactance 90 W, having a resistance 36 W. Determine the potential difference across the capacitor

(A) 100V (B) 60V (C) 88V (D) 97V

Q184. A series circuit connected across a 200V, 60Hz line consists of a capacitor of capacitive reactance 30 W, a non inductive resistor of 44 W, and a coil of inductive reactance 90 W, having a resistance 36 W. Determine the potential difference across the coil

(A) 194V (B) 60V (C) 180V (D) 97V

Q185. A series circuit connected across a 200V, 60Hz line consists of a capacitor of capacitive reactance 30 W, a non inductive resistor of 44 W, and a coil of inductive reactance 90 W, having a resistance 36 W. Determine the current across the non inductive resistor.

(A) 100A (B) 20A (C) 10A (D) 2A

Q186. A series circuit connected across a 200V, 60Hz line consists of a capacitor of capacitive reactance 30 W, a non inductive resistor of 44 W, and a coil of inductive reactance 90 W, having a resistance 36 W. Determine the impedance of the coil

(A) 194W (B) 60W (C) 180W (D) 97W

Q187. An ac generator produces an output voltage ξ = 170 sin 377tV, where t is in seconds. What is the frequency of the ac voltage?

(A) 60MHz (B) 60kHz
(C) 60Hz (D) 60mHz

Q188. How fast must a 1000 loop coil, each with 20cm2 area) turn in the earth's magnetic field of 0.07 G to generate a voltage that has a maximum value, an amplitude, of 0.50 V? Given 1G=1x10-4 T

(A) 576Hz (B) 765Hz
(C) 569Hz (D) 596Hz

Q189. When turning at 1500 rev/min, a certain generator produces 100 V. what must be its angular speed if it to produce 120 V?

(A) 1000 rev/min (B) 1200 rev/min (C) 1500 rev/min
(D) 1800 rev/min

Q190. A certain generator has armature resistance 0.08W and develops an induced emf of 120 V when driven at its rated speed. What is it terminal voltage when 50 A is being drawn from it?

(A) 4V (B) 16V (C) 116V (D) 40V

Q191. Some generators, called shunt generator, use electromagnet in place of permanent magnets, with the field coils for the electromagnets activated by the induced voltage. The magnet coil is in parallel with the armature coil, it shunt the armature. A certain shunt generator has armature resistance 0.06 W and shunt resistance 100 W. What power is developed in the armature when it delivers 40kW at 250 V to an external circuit?

(A) 16kW (B) 25 kW (C) 16.5 kW (D) 42.2kW

Q192. Some generators, called shunt generator, use electromagnet in place of permanent magnets, with the field coils for the electromagnets activated by the induced voltage. The magnet coil is in parallel with the armature coil, it shunt the armature. A certain shunt generator has armature resistance 0.06 W and shunt resistance 100 W. What current is supplied to the external circuit when it delivers 40kW at 250 V to an external circuit?

(A) 160A (B) 250 A
(C) 165 A (D) 422A

Q193. Some generators, called shunt generator, use electromagnet in place of permanent magnets, with the field coils for the electromagnets activated by the induced voltage. The magnet coil is in parallel with the armature coil, it shunt the armature. A certain shunt generator has armature resistance 0.06 W and shunt resistance 100 W. What is the field current, when it delivers 40kW at 250V to an external circuit?

(A) 1.60A (B) 2.50 A

(C) 1.65 A (D) 4.22A

Q194. Some generators, called shunt generator, use electromagnet in place of permanent magnets, with the field coils for the electromagnets activated by the induced voltage. The magnet coil is in parallel with the armature coil, it shunt the armature. A certain shunt generator has armature resistance 0.06 W and shunt resistance 100 W. What is the total induced emf, when it delivers 40kW at 250V to an external circuit?

(A) 260V (B) 250 V
(C) 265 V (D) 422V

Q195. A certain 0.25 hp motor has a resistance of 0.50W. Assume the motor to be 100% efficient, with input = output and 1hp = 746W. How much current does it draw on 110Vs when its output is 0.25hp?

(A) 1.695 A (B) 2.695 A
(C) 3.695 A (D) 1.165 A

Q196. A certain 0.25 hp motor has a resistance of 0.50W. Assume the motor to be 100% efficient, with input = output and 1hp = 746W. What is its back emf on 110V when its output is 0.25hp?

(A) 109 V (B) 209 V (C) 309 V (D) 0.8 V

Q197. Determine the separate effects on the induced emf of a generator if the flux per is doubled.

(A) Same (B) Doubled (C) Three times (D) Four Time

Q198. Determine the separate effects on the induced emf of a generator if the speed of the armature is doubled.

(A) Same (B) Doubled (C) Three times (D) Four Time

Q199. The emf induced in the armature of a shunt generator is 596 V. The armature resistance is 0.1W. Compute the terminal voltage when the armature current is 460 A. The field resistance is 110 W.

(A) 550 V (B) 5 V (C) 455V (D) 250V

Q200. The emf induced in the armature of a shunt generator is 596 V. The armature resistance is 0.1W and the armature current is 460 A.

If the field resistance is 110 W, determine the field current.

(A) 550 A (B) 5 A (C) 455A (D) 250 A

Q201. The emf induced in the armature of a shunt generator is 596 V. The armature resistance is 0.1W and the armature current is 460 A. If the field resistance is 110 W, determine the current delivered to the external circuit.

(A) 550 A (B) 5 A (C) 455 A (D) 250 A

Q202. The emf induced in the armature of a shunt generator is 596 V. The armature resistance is 0.1W and the armature current is 460 A. If the field resistance is 110 W, determine the power delivered to the external circuit.

(A) 550 KW (B) 5 KW (C) 455KW (D) 250 KW

Q203. A generator has an armature with 500 loops, which cut a flux of 8mWb during each rotation. Compute the back emf it develops when run as a motor at 1500 rpm

(A) 100V (B) 100V (C) 100V (D) 100V

Q204. A shunt has a field resistance of 200Ω and an armature resistance of 0.5 Ω and is connected to 120V mains. The motor draws a current of 4.6 A when running at full speed. What current will be drawn by the motor if the speed is reduced to 90 percent of full speed by application of a load?

(A) 20.2A (B) 22.2A (C) 25.2A (D) 28.2A

Q205. A shunt motor develops 80N.m torque when the flux density in the air gap is 1Wb/m2 and the armature current is 15A. What is the torque when the flux density is 1.3 Wb/m2 and the armature current is 18A?

(A) 145 N.m (B) 125 N.m (C) 165 N.m (D) 155 N.m

Q206. A shunt motor has armature resistance 0.20Ω and field resistance 150 Ω and draws 30 A when connected to a 120V supply line. Determine the field current.

(A) 0.80A. (B) 114.2A (C) 3.33A (D) 29.2 A

Q207. A shunt motor has armature resistance 0.20Ω and field resistance 150 Ω and draws 30 A when connected to a 120V supply line. Determine the armature current.

(A) 0.80A. (B) 114.2A (C) 3.33A (D) 29.2 A

Q208. A shunt motor has armature resistance 0.20Ω and field resistance 150 Ω and draws 30 A when connected to a 120V supply line. Determine the back emf developed within the armature.

(A) 0.80V. (B) 114.2V (C) 3.33V (D) 29.2 V

Q209. A shunt motor has armature resistance 0.20Ω and field resistance 150 Ω and draws 30 A when connected to a 120V supply line. Determine the mechanical power developed within the armature.

(A) 0.80KW. (B) 114.2KW (C) 3.33KW (D) 29.2 KW

Q210. A shunt motor has armature resistance 0.20Ω and field resistance 150 Ω and draws 30 A when connected to a 120V supply line. Determine the electrical efficiency of the machine.

(A) 92.5%. (B) 94.2% (C) 96.2% (D) 99.2 %

Q211. A shunt motor has a speed of 900 rpm when it is connected to 120V mains and delivering 12hp. The total losses are 1048W. Compute the power input.

(A) 10kW (B) 83.3 kW (C) 93 kW (D) 900W

Q212. A shunt motor has a speed of 900 rpm when it is connected to 120V mains and delivering 12hp. The total losses are 1048W. Compute the line current.

(A) 10A (B) 83.3A (C) 93 A (D) 12A

Q214. A shunt motor has a speed of 900 rpm when it is connected to 120V mains and delivering 12hp. The total losses are 1048W. Compute the motor torque.

(A) 10 N.m (B) 83.3 N.m (C) 93 N.m (D) 900 N.m

Q215. A shunt is connected to a 110V line. When the armature generates a back emf of 104V, the armature current is 15A. Compute the armature resistance. Ans

(A) 0.1Ω (B) 0.8 Ω
(C) 0.9 Ω (D) 0.4 Ω

Q216 A sh.unt dynamo has an armature resistance of 0.12 Ω. If it is connected across 220V main and is running as a motor, what is the induced, back emf when the armature current is 50 A?

(A) 214 V (B) 226V
(C) 220V (D) 260V

Q217. A sh.unt dynamo has an armature resistance of 0.12 Ω If it is connected across 220V main and this machine is running as a generator, what is the induced emf when the armature is delivering 50 A at 220V to the shunt field and external circuit?

(A) 214 V (B) 226V
(C) 220V (D) 260V

Q218. A shunt motor with armature resistance 0.08Ω is connected to 120V mains. With 50A in the armature what is the back emf?

(A) 116V (B) 5.8V (C) 130V (D) 58V

Q219. A shunt motor with armature resistance 0.08Ω is connected to 120V mains. With 50A in the armature what are the back emf and the mechanical power developed within the armature?

(A) 116kW (B) 5.8kW
(C) 130kW (D) 58kW

Q220. The active length of each armature conductor of a motor is 30cm and the conductors are in a field of 0.40 Wb/m2. A current of 15A flows in each conductor. Determine the force acting on each conductor

(A) 1.8N (B) 0.8N (C) 2.8N (D) 3.8N

Q221. A 120V generator is run by a windmill that has blades 2m long. The wind moving at 12m/s is slowed to 7m/s after passing the windmill. The density of air is 1.29kg/m3. If the system has no losses, what is the largest current generator can produce? Take into account of how much energy the wind loses per second.

(A) 770A (B) 77A (C) 7.7A (D) 0.77A

Q222. A 75 kW, 230 V shunt generator has a generated emf o 243.5 V. If the field current is 12.5A as rated output what is the armature resistance?

(A) 0.04 Ω (B) 0.4 Ω (C) 4 Ω (D) 40 Ω

Q223. A steady current of 2A in a coil of 400 turns cause a flux of 10-4 Wb to link the loops of the coil. Compute the inductance of the coil if the current is stopped in 0.08s.

(A) 0.5H (B) 0.02H
(C) 0.04H (D) 0.4H

Q224. A steady current of 2A in a coil of 400 turns cause a flux of 10-4 Wb to link the loops of the coil. Compute the energy stored in the coil if the current is stooped in 0.08s..

(A) 0.5J (B) 0.02J (C) 0.04J
(D) 0.4J

Q225. A steady current of 2A in a coil of 400 turns cause a flux of 10-4 Wb to link the loops of the coil. Compute the average back emf induced in the coil if the current is stooped in 0.08s.

(A) 0.5V (B) 0.02V (C) 0.04V (D) 0.4V

Q226. In a shunt motor, the permanent magnet is replaced by an electromagnet activated by a field coil that shunt the armature. The shunt motor shown has armature resistance 0.05 W and is connected to 120 V mains. What is the armature current at the starting instant, i.e., before the armature develops any back emf?

(A) 2400A (B) 240A (C) 24A (D) 2.4A

Q227. In a shunt motor, the permanent magnet is replaced by an electromagnet activated by a field coil that shunt the armature. The shunt motor shown has armature resistance 0.05 W and is connected to 120 V mains. What starting rheostat resistance R, in series with the armature, will limit the starting current to 60 A?

(A) 1.95W (B) 19.5W (C) 2.95W (D) 29.5W

Q228. In a shunt motor, the permanent magnet is replaced by an electromagnet activated by a field coil that shunt the armature. The shunt motor shown has armature resistance 0.05 W and is connected to 120 V mains. With no starting resistance, what back emf is generated when the armature current is 20 A?

(A) 119V (B) 121V (C) 120V (D) 125V

Q229. In a shunt motor, the permanent magnet is replaced by an electromagnet activated by a field coil that shunt the armature. The shunt motor shown has armature resistance 0.05 W and is connected to 120 V mains. If this machine were running as a generator, what would be the total induced emf developed by the armature when the armature is delivering 20 A at 120 V to the shunt field and external circuit?

(A) 119V (B) 121V (C) 120V (D) 125V

Q230. A dynamo, generator, delivers 30 A at 120 V to an external

circuit when operating at 1200 rpm. What torque is required to drive the generator at this speed if the total power losses are 400 W?

(A) 3..18N .m (B) 3.38N .m (C) 31.8N .m (D) 33.8N .m

Q231. A motor armature develops a torque of 100 N.m When it draws 40A from the line. Determine the torque developed if the armature current is increased to 70 A and the magnetic field strength is reduced to 80 percents of its initial value.

(A) 110N (B) 120N (C) 130N (D) 140N

Q232. A motor has back emf 110V and armature current 90 A when running 1500rpm. Determine the power.

(A) 9.9W (B) 99W (C) 990W (D) 9900W

Q233. A motor has back emf 110V and armature current 90 A when running 1500rpm. Determine the torque develop within the armature.

(A) 6.3N.m (B) 1.6N.m (C) 16.3N.m (D) 63.0N.m

Q234. The shunt motor has armature resistance 0.25Ω and field resistance 150W. It is connected across 120 V mains and its generating a back emf of 115 V. compute the armature current of the motor.

(A) 20A (B) 8A (C) 2.8A (D) 80.8A

Q235. The shunt motor has armature resistance 0.25Ω and field resistance 150W. It is connected across 120 V mains and its generating a back emf of 115 V. compute the field current of the motor.

(A) 20A (B) 0.8A (C) 2A (D) 80A

Q236. The shunt motor has armature resistance 0.25Ω and field resistance 150W. It is connected across 120 V mains and its generating a back emf of 115 V. compute the total currents taken by the motor.

(A) 20.8A (B) 80.2A (C) 12.8A (D) 8.08A

Q237. The shunt motor has armature resistance 0.25Ω and field resistance 150W. It is connected across 120 V mains and its generating a back emf of 115 V. compute the total power taken by the motor, when only heat losses in the armature and field are considered.

(A) 2496W (B) 2400W
(C) 2800W (D) 1500W

Q238. The shunt motor has armature resistance 0.25Ω and field resistance 150W. It is connected across 120 V mains and its generating a back emf of 115 V. compute the power lost in heat in the armature.

(A) 100W (B) 96W (C) 10W (D) 9.6W

Q239. The shunt motor has armature resistance 0.25Ω and field resistance 150W. It is connected across 120 V mains and its generating a back emf of 115 V. compute the power lost in heat in field circuits

(A) 100W (B) 96W (C) 10W (D) 9.6W

Q240. The shunt motor has armature resistance 0.25Ω and field resistance 150W. It is connected across 120 V mains and its generating a back emf of 115 V. compute the total power lost. When only heat losses in the armature and field are considered.

(A) 101W (B) 196W (C) 110W (D) 19.6W

Q241. The shunt motor has armature resistance 0.25Ω and field resistance 150W. It is connected across 120 V mains and its generating a back emf of 115 V. compute the total power taken by the motor, when only heat losses in the armature and field are considered.

(A) 2496W (B) 2400W
(C) 2800W (D) 2300W

Q242. The shunt motor has armature resistance 0.25Ω and field resistance 150W. It is connected across 120 V mains and its generating a back emf of 115 V. compute the electrical

efficiency of this machine, when only heat losses in the armature and field are considered.

(A) 92.1% (B) 82.1%
(C) 72.1% (D) 62.1%

Q243. When a long iron-core solenoid connected across a 6V battery, the current rises to 0.63 of its maximum value after a time of 0.75 s. The experiment is then repeated with the iron core removed. Now the time required to reach 0.63 of the maximum is 0.0025s. Calculate the relative permeability of the iron if the maximum current is 0.5A

(A) 300 (B) 0.03 (C)
630 (D) 0.63

Q244. When a long iron-core solenoid connected across a 6V battery, the current rises to 0.63 of its maximum value after a time of 0.75 s. The experiment is then repeated with the iron core removed. Now the time required to reach 0.63 of the maximum is 0.0025s. Calculate the inductance L for the air core solenoid if the maximum current is 0.5A

(A) 300 H (B) 0.03H (C)
630 H (D) 0.63 H

Q245. A charged capacitor is connected across a 10kW resistor and allowed to discharge. The potential difference across the capacitor drops to 0.37 of its original value after a time of 7s. What is the capacitance of the capacitor?

(A) 200mF (B) 500mF
(C) 700mF (D) 900mF

Q246. A series circuit consisting of an uncharged 2mF capacitor and a 10 MW resistor is connected across a 100 V power source. What is the current in the circuit after one time constant.

(A) 3.7mA (B) 126mA (C)1mA
(D) 180mA

Q247. A series circuit consisting of an uncharged 2mF capacitor and a 10 MW resistor is connected across a 100 V power source.

What is the charge on the capacitor after one time constant.

(A) 3.7mC (B) 126mC (C)1mC (D) 180mC

Q248. A series circuit consisting of an uncharged 2mF capacitor and a 10 MW resistor is connected across a 100 V power source. What is the current in the circuit when the capacitor has acquired 90 percent of its final charges?

(A) 3.7mA (B) 126mA (C) 1mA (D) 180mA

Q249. A series circuit consisting of an uncharged 2mF capacitor and a 10 MW resistor is connected across a 100 V power source. What is the charge on the capacitor when the capacitor has acquired 90 percent of its final charges?

(A) 3.7mC (B) 126mC (C)1mC (D) 180mC

Q250. The iron core of a solenoid has a length of 40 cm and a cross section of 5.0cm2, and is wound with 10 turns of wire per cm of length. Compute the inductance of the solenoid, assuming the relative permeability of the iron to be constant at 500.

(A) 1.26 mH (B) 12.6 mH (C) 126 mH (D) 1260 mH

Q251. A step-up transformer is used on a 120V line to furnish 1800V. The primary has 100 turns. How many turns are on the secondary?

(A) 1200turns (B) 1400turns (C) 1500turns (D) 1800turns

Q252. A coil of 0.48 H carries a current of 5 A. Compute the energy stored in it. Ans.

(A) 60J (B) 6J (C) 0.6J (D) 66.6J

Q253. Two neighboring coils, A and B, have 300 and 600 turns respectively. A current of 1.5 A in A causes 1.2x10-4 Wb to pass through A and 0.9x10-4 Wb to pass through B. Determine the self-inductance of A.

(A) 2.4 mH (B) 24 mH (C) 36 mH (D) 0.27V

Q254. Two neighboring coils, A and B, have 300 and 600 turns respectively. A current of 1.5 A in A causes 1.2x10-4 Wb to pass through A and 0.9x10-4 Wb to pass through B. Determine the mutual inductance of A and B.

(A) 2.4 (B) 24 mH (C) 36 mH (D) 0.27V

Q255. Two neighboring coils, A and B, have 300 and 600 turns respectively. A current of 1.5 A in A causes 1.2x10-4 Wb to pass through A and 0.9x10-4 Wb to pass through B. Determine the average induced emf in B when the current in A is interrupted in 0.2 s.

(A) 2.4 (B) 24 mH (C) 36 mH (D) 0.27V

Q256. A coil of inductance 0.2 H and 1.0W resistance is connected to a 90 V source. At what rate will the current in the coil grow at the instant the coil is connected to the source?

(A) 45.0 A/s (B) 15.0 A/s (C) 450 A/s (D) 150 A/s

Q257. A coil of inductance 0.2 H and 1.0W resistance is connected to a 90 V source. At what rate will the current in the coil grow at the instant the current reaches two- third of its maximum value?

(A) 45.0 A/s (B) 15.0 A/s (C) 450 A/s (D) 150 A/s

Q258. The mutual inductance between the primary and secondary of a transformer is 0.3H. Compute the induced emf in the secondary when the primary current changes at the rate of 4 A/s.

(A) 1.12 V (B) 1.02 V (C) 1.20 V (D) 10.2 V

Q259. A steady current of 2.5A creates a flux of 1.4x10-4 Wb in a coil of 500 turns. What is the inductance of the coil?

(A) 12.8 mH (B) 2.18 mH (C)

28 mH (D) 21.8 mH

Q260. A 2mF capacitor sis charged through a 30 MW resistor by a 45 V battery. Find the time constant

(A) 30s (B) 60s (C) 90s (D) 120s

Q261. A 2mF capacitor sis charged through a 30 MW resistor by a 45 V battery. Find the charge on the capacitor both 83 s after the charging process starts.

(A) 37mC (B) 67mC (C) 97mC (D) 127mC

Q262. . A 2mF capacitor sis charged through a 30 MW resistor by a 45 V battery. Find the current through the resistor, both 83 s after the charging process starts.

(A) 376nA (B) 676nA (C) 976nA (D) 1276nA

Q263 When the current in a certain coil is changing at a rate of 3 A/s, it is found that an emf of 7mV is induced in a nearby coil. What is the mutual inductance of the combination?

(A) 12.33mH (B) 2.33mH (C) 22.33mH (D) 42.33mH

Q264. A capacitor is in series with a resistance of 30 W and is connected to a 220 V ac line. The reactance of the capacitor is 40 W. Determine the impedance of the circuit.

(A) 60 W. (B) 50 W. (C) 40 W. (D) 30 W.

Q265. A capacitor is in series with a resistance of 30 W and is connected to a 220 V ac line. The reactance of the capacitor is 40 W. Determine the current in the circuit

(A) 5.5A (B) 4.4A (C) 3.5A (D) 2.5A

Q266. A capacitor is in series with a resistance of 30 W and is connected to a 220 V ac line. The reactance of the capacitor is 40 W. Determine the phase angle between the current and the supply voltage.

(A) -83o (B) -53o (C) -33o (D) -63o

Q267. A coil having inductance 0.14H and resistance 12 W is connected

across a 110V, 25Hz line. Compute the inductance of the coil.

(A) 22.0W (B) 25.1W (C) 27.2W (D) 29.3W

Q268. A coil having inductance 0.14H and resistance 12 W is connected across a 110V, 25Hz line. Compute the current in the coil.

(A) 5.5A (B) 4.4A (C) 3.5A (D) 2.5A

Q269. A coil having inductance 0.14H and resistance 12 W is connected across a 110V, 25Hz line. Compute the impedance of the circuit.

(A) 22.0W (B) 25.1W (C) 27.2W (D) 29.3W

Q270. A coil having inductance 0.14H and resistance 12 W is connected across a 110V, 25Hz line. Compute the phase angle between the current and the supply voltage.

(A) 18.3o (B) 61.3o (C) 33o (D) 63o

Q271. A coil having inductance 0.14H and resistance 12 W is connected across a 110V, 25Hz line. Compute the power loss in the coil.

(A) 48W (B) 23W (C) 248W (D) 230W

Q272. A 120V ac voltage source is connected across a pure 0.70 H inductor. Find the current through the inductor if the frequency of the source is 60Hz.

(A) 2.5A (B) 0.25A (C) 4.55A (D) 0.455A

Q273. A 120V ac voltage source is connected across a pure 0.70 H inductor. Find the current through the inductor if the frequency of the source is 60kHz.

(A) 2.5mA (B) 0.25mA (C) 4.55mA (D) 0.455mA

Q274. A 120V ac voltage source is connected across a pure 0.70 H inductor. Find the inductance of the inductor if the frequency of the source is 60Hz.

(A) 2.64x105Ω (B) 2.64x104Ω (C) 2.64x103Ω (D) 2.64x102Ω

Q275. A 120V ac voltage source is connected across a pure 0.70 H inductor. Find the inductance of the inductor if the

frequency of the source is 60kHz.

(A) 2.64x105Ω (B) 2.64x104Ω (C) 2.64x103Ω (D) 2.64x102Ω

Q276. A 120V ac voltage source is connected across a pure 0.70 H inductor. What is the power loss in the inductor?

(A) 0W (B) 10W (C) 0.5W (D) 5W

Q277. A coil has inductances of 1.5H and a resistance of 0.6W. If the coil is suddenly connected across a 12 V battery, find the time required for the current to rise to 0.63 of its final value.

(A) 2.5s (B) 25s (C) 3.5s (D) 35s

Q278. A coil has inductances of 1.5H and a resistance of 0.6W. If the coil is suddenly connected across a 12 V battery. What will be final current through the coil?

(A) 0.2A (B) 2A (C) 20A (D) 200A

Q279. A voltage v=(60V) sin 120pt is applied across a 20 W resistor. What will an ac ammeter in series with the resistor read?

(A) 21.2A (B) 22A (C) 2.12A (D) 60A

Q280. A voltage v=(60V) sin 120pt is applied across a 20 W resistor. What will voltage across the resistor be?

(A) 14.4V (B) 42.4V (C) 32.4V (D) 22.4V

Q281. A 40 W resistor is connected across a 15V variable-frequency electronic oscillator. Find the current through the resistor when the frequency is 100Hz.

(A) 375A (B) 37.5A (C) 3.75A (D) 0.375A

Q282. A 40 W resistor is connected across a 15V variable-frequency electronic oscillator. Find the current through the resistor

when the frequency is 100 kHz.

(A) 375A (B) 37.5A (C) 3.75A (D) 0.375A

Q283. A 2mH inductor is connected across a 15V variable-frequency electronic oscillator. Find the current through the inductor when the frequency is 100Hz.

(A) 11.9A (B) 11.9mA (C) 1.19A (D) 1.19mA

Q284. A 2mH inductor is connected across a 15V variable-frequency electronic oscillator. Find the current through the inductor when the frequency is 100 kHz.

(A) 11.9A (B) 11.9mA (C) 1.19A (D) 1.19mA

Q285. A 0.3 mF capacitor is connected across a 15V variable-frequency electronic oscillator. Find the current through the capacitor when the frequency is 100Hz.

(A) 2.83A (B) 2.83mA (C) 28.3A (D) 28.3mA

Q286. A 0.3 mF capacitor is connected across a 15V variable-frequency electronic oscillator. Find the current through the capacitor when the frequency is 100 kHz.

(A) 2.83A (B) 2.83mA (C) 28.3A (D) 28.3mA

Q287. A voltmeter reads 80 V when it is connected across the terminals of a sinusoidal power source with f=1000Hz. Write the equation for the instantaneous voltage provided by the source.

(A) V= (133 V) sin 1000pt for t in seconds

(B) V= (133 V) sin 2000pt for t in seconds

(C) V= (80 V) sin 1000pt for t in seconds

(D) V= (80 V) sin 2000pt for t in seconds

Q288. An ac current in a 10 W resistance produces heat at the rate 360W. Determine the effective values of the current.

(A) 6A (B) 60V (C) 6mA (D) 60mV

Q289. An ac current in a 10 W resistance produces heat at the rate 360W. Determine the effective values of the voltage.

(A) 6A (B) 60V (C) 6mA (D) 60mV

Q290. A coil has resistance 20 W and inductance 0.35H. Compute its reactance and its impedance to an alternating current of 25 cycles/s.

(A) 55 W (B) 58.5 W (C) 5.5 W (D) 5.85 W

Q291. A coil has resistance 20 W and inductance 0.35H. Compute its reactance and its impedance to an alternating current of 25 cycles/s.

(A) 55 W (B) 58.5 W (C) 5.5 W (D) 5.85 W

Q292. Calculate the resonant frequency of a circuit of negligible resistance containing an inductance of 40mH and a capacitance of 600pf.

(A) 32.5 kHz. (B) 325kHz. (C) 32.5Hz. (D) 325Hz.

Q293. A transformer used on a 120V line delivers 2A at 900V. what current is drawn from the line? Assume 100 percent efficiency.

(A) 4A (B) 40A (C) 1.5A (D) 15A

Q294. A step-down transformer operates on a 2.5 KV line and supplies a load with 80 A. the ratio of the primary winding to the secondary winding is 20:1 Assuming 100 efficiency, determine the secondary voltage V2, the primary current 1I, and the power output P2.

(A) 125V, 40A (B) 12.5V, 4A (C) 125V, 4A (D) 1.25V, 4A

Q295. A step-down transformer operates on a 2.5 KV line and supplies a load with 80 A. the ratio of the primary winding to the secondary winding is 20:1 Assuming 100 efficiency, determine the

secondary voltage V2, the primary current 1I, and the power output P2.

(A) 1kW (B) 10kW (C) 1W (D) 10W

Q296. A series circuit consisting of a 100W noninductive resistor, a coil of 0.10 H inductance and negligible resistance, and a 20 mF capacitor is connected across a 110 V, 60 Hz power source Find the impedance of the circuit.

(A) 37.7Ω (B) 138Ω
(C) 132.7Ω (D) 137.7Ω

Q297. A series circuit consisting of a 100W noninductive resistor, a coil of 0.10 H inductance and negligible resistance, and a 20 mF capacitor is connected across a 110 V, 60 Hz power source; find the current.

(A) 7A (B) 9A (C) 0.79A (D) 0.97A

Q298. A series circuit consisting of a 100W noninductive resistor, a coil of 0.10 H inductance and negligible resistance, and a 20 mF capacitor is connected across a 110 V, 60 Hz power source Find the phase angle between the current and the source voltage

(A) 55o (B) -55o (C) -43.5o
(D) -73.5o

Q299. A series circuit consisting of a 100W noninductive resistor, a coil of 0.10 H inductance and negligible resistance, and a 20 mF capacitor is connected across a 110 V, 60 Hz power source Find the voltmeter readings across the noninductive resistor.

(A) 79V (B) 105V (C) 30V (D) 138V

Q300. A series circuit consisting of a 100W noninductive resistor, a coil of 0.10 H inductance and negligible resistance, and a 20 mF capacitor is connected across a 110 V, 60 Hz power source Find the voltmeter readings across the inductor.

(A) 79V (B) 105V (C) 30V (D) 138V

Q301A series circuit consisting of a 100W noninductive resistor, a coil of 0.10 H inductance and negligible resistance, and a 20 mF capacitor is connected across a 110 V, 60 Hz power source Find the voltmeter readings across the capacitor.

(A) 79V (B) 105V (C) 30V (D) 138V

SOLUTIONS

1. C
2. A
3. C
4. A
5. A
6. C
7. B
8. B
9. D
10. C
11. C

12. B
13. B
14. B
15. B
16. A
17. B
18. B
19. A
20. D
21. B
22. A
23. A
24. C
25. B
26. C
27. A
28. D
29. C
30. D
31. B
32. D
33. B
34. D
35. B
36. B

37. D

38. B

39. B

40. C

41. A

42. C

43. A

44. C

45. B

46. B

47. C

48. D

49. D

50. B

51. B

52. D

53. C

54. C

55. B

56. D

57. A

58. B

59. D

60. D

61. D

62. A

63. A

64. A

65. D

66. C

67. B

68. C

69. D

70. D

71. A

72. D

73. C

74. A

75. D

76. B

77. A

78. C

79. B

80. A

81. B

82. B

83. C

84. D

85. A

86. C

87. D

88. A

89. C

90. D

91. D

92. B

93. B

94. D

95. D

96. B

97. D

98. B

99. A

100. C

101. A

102. A

103. A

104. D

105. D

106. B

107. D

108. D

109. B

110. B

111. D

112. B

113. A

114. D

115. B

116. B

117. B

118. D

119. D

120. B

121. A

122. B

123. D

127. D

124. B

125. A

126. B

127. D

128. C

129. B

130. D

131. B

132. C

133. B

134. B

135. A

136. A

137. D

138. A

139. A

140. C

141. A

142. B

143. A

144. A

145. A

146. B

147. D

148. D

149. C

150. C

151. B

152. D

153. D

154. B

155. A

156. B

157. D

158. B

159. A

160. C

161. D

162. D

163. D

164. B

165. A

166. C

167. A

168. B

169. A

170. C

171. B

172. B

173. A

174. A

175. A

176. D

177. A

178. D

179. C

180.D

181.A

182.C

183.B

184.A

185.D

186.D

187. C

188. C

189. D

191.D

192. A

193. B

194.A

195. A

196. A

197. B

198. B

199.A

200. B

201.C

202. D

203. B

204.D

205.B

206.A

207. D

208. B

209.C

210.A

211. A

212. B

214.C

215. D

216 A

217.B

218. A

219.B

221.B

222. A

223. B

224. C

225.A

226. A

227. A

228. A

229.B

230. C

231.D

232.D

233.D

234.A

235. B

236. A

237. A

238. A

239 .B

240. B

241. D

242.A

243. A

244. B

245.C

246. A

247. B

248. C

249. D

250. C

251. C

252. B

253.B

254. C

255.D

256. C

257. D

258.C

259. C

260.B

261. B

262.A

263 B

264.B

265.B

266. B

267.A

268.B

269. B

270.B

271 D

272. D

273.D

274. D

275. A

276. A

277. A

278.C

279.C

280. B

281.D

282. D

283.A

284.B

285B

286 A

287.B

288.A

289.B

290.A

291. A

292.A

293.D

294.C

295.B

296.B

297.C

298.C

299.A

300.C

301B