Paper Code No- M25

SET C

Question Booklet No. **625513**

Jan I 2018

ENTRANCE EXAMINATION-2018

M.Sc (PHYSICS)

ROLL NO. | M | 2 | 5 | 4 | 0 | 0 | 3 | 1 |

Signature of Invigilator

Time: 1 Hour 45 Minutes

Total Marks: 100

Instructions to Candidates

1. Do not write your name or put any other mark of identification anywhere in the OMR Response Sheet. **IF ANY MARK OF IDENTIFICATIONS IS DISCOVERED ANYWHERE IN OMR RESPONSE SHEET, the OMR sheet will be cancelled, and will not be evaluated.**
2. This Question Booklet contains the cover page and a total of **100 Multiple Choice Questions of 1mark each.**
3. Space for rough work has been provided at the beginning and end. Available space on each page may also be used for rough work.
4. There is negative marking in Multiple Choice Questions. For each wrong answer, 0.25 marks will be deducted.
5. USE OF CALCULATOR IS NOT PERMITTED.
6. USE/POSSESSION OF ELECTRONIC GADGETS LIKE MOBILE PHONE, iPhone, iPad, pager ETC. is strictly **PROHIBITED.**
7. Candidate should check the serial order of questions at the beginning of the test. If any question is found missing in the serial order, it should be immediately brought to the notice of the Invigilator. No pages should be torn out from this question booklet.
8. Answers must be marked in the OMR response sheet which is provided separately. OMR Response sheet must be handed over to the invigilator before you leave the seat.
9. The OMR response sheet should not be folded or wrinkled. The folded or wrinkled OMR/response Sheet will not be evaluated.
10. Write your Roll Number in the appropriate space (above) and on the OMR Response Sheet. Any other details, if asked for, should be written only in the space provided.
11. There are four options to each question marked A, B, C and D. Select one of the most appropriate option and fill up the corresponding oval/circle in the OMR Response Sheet provided to you. The correct procedure for filling up the OMR Response Sheet is mentioned below.
12. **Use Black or Blue Ball Pen** only for filling the ovals/circles in OMR Response Sheet. Darken the selected oval/circle completely. If the correct answer is 'B', the corresponding oval/circle should be completely filled and darkened as shown below

CORRECT METHOD
(A) (●) (C) (D)

WRONG METHOD							
(A) (X) (C) (D)	(A) (✓) (C) (D)	(A) (B) (C) (D)	(A) (●) (C) (D)	(●) (C) (D)	(A) (●) (C) (D)		

1. For analyticity of function of a complex variable, Cauchy Riemann conditions are
   (A) Necessary but not sufficient
   (B) Sufficient but not necessary
   (C) Necessary as well as sufficient
   (D) Neither necessary nor sufficient

2. A Carnot engine operates with an efficiency of 25 percent. The source temperature is now increased by 20 percent. To achieve an efficiency of 30 percent, the sink temperature should be
   (A) Kept same
   (B) Decreased by 6 percent
   (C) Increased by 12 percent
   (D) Halved

3. Let A and B be Boolean variables. The value of (A + 1) (B + 1) is
   (A) Always A
   (B) Always B
   (C) Zero
   (D) 1

4. Let A and B be Boolean variables. De Morgan laws are valid for them
   (A) Only when A = 1
   (B) Only when A = B
   (C) Always
   (D) Only when A is not equal to B

5. For Boolean variables, A and B; A is known to be different from B. Which statement is incorrect
   (A) A + B = 1
   (B) A B = 0
   (C) A B = B A
   (D) A B= 1

6. Schrodinger equation is
   (A) Linear for all potentials
   (B) Linear only if V = zero
   (C) Linear only for Coulomb potential
   (D) Non linear

7. An electron is confined in a one dimensional box. Ground state energy according to quantum theory is 1 e V. The length of the box is about
   (A) 0.3 nm
   (B) 0.6 nm
   (C) 0.9 nm
   (D) 1.2 nm

8. In the ground state, the average value of momentum of a particle, confined in a box (of length l) is
   (A) Equal to h / l
   (B) 2 h / l
   (C) Equal to h / (2 l)
   (D) Zero

9. Given that ; at X = 1 , Y = 0 , solve the differential equation ; X dY / dX = 1 .
   (A) X = exp (Y)
   (B) X = exp (- Y)
   (C) Y = exp (X)
   (D) None of the above

10. Ratio of electrostatic to gravitational force between an electron and a proton, 1 nm apart, is denoted by a. Then log a (to base 10), is about
   (A) 37
   (B) 39
   (C) 42
   (D) 45

11. Speed of red light and blue light are same
   (A) In glass but not in vacuum
   (B) Neither in glass nor in vacuum
   (C) Both in glass and vacuum
   (D) In vacuum but not in glass

12. A glass prism is dipped in water. Its dispersive power would
   (A) Remain same
   (B) Increase
   (C) Decrease
   (D) May increase or decrease, depending on angle of prism

13. Focal length of a normal eye is about
   (A) 1 nm
   (B) 10 nm
   (C) 100 nm
   (D) None of the above

14. To increase the angular magnification of a simple microscope, one should increase
   (A) Focal length of the lens
   (B) Power of the lens
   (C) Aperture of the lens
   (D) Object size

15. A point object is placed at a distance of 40 cm , from a convex mirror of focal length 40 cm. The image will be formed at
   (A) Infinity
   (B) Pole
   (C) Focus
   (D) 20 cm behind the mirror

16. Rays of different colour, after going through a convex lens, do not exactly converge at a single point. This phenomenon is called
   (A) Spherical aberration
   (B) Chromatic aberration
   (C) Coma
   (D) None of the above

17. Equation of a light wave (in vacuum), is written as y = A Sin (k x - w t). Here, y stands for
(A) Displacement of ether particles
(B) Pressure in the medium
(C) Density in the medium
(D) Electric field

18. Inverse square law for intensity of light is valid for
(A) Point source only
(B) Line source only
(C) Plane source only
(D) All sources

19. Young double slit arrangement is immersed in water.
(A) Fringe width will remain same
(B) Fringe width will decrease
(C) Fringe width will increase
(D) There will be no fringes

20. The frequency of source of light in Young double slit arrangement, is increased, without changing its intensity.
(A) Fringes will become less bright
(B) Fringes will become brighter
(C) Consecutive fringes will come closer
(D) Central bright fringe will become dim

21. The wavelength span of visible light, in air is an interval of 300 nm (i.e. 400 nm to 700 nm). In glass, the corresponding interval will be
(A) 200 nm
(B) 250 nm
(C) 270 nm
(D) 280 nm

22. Find the minimum thickness of a film (held in air), which will strongly reflect, light of wavelength 589 nm. The refractive index of the film is 1.25.
(A) 114 nm
(B) 118 nm
(C) 123 nm
(D) 130 nm

23. Phenomenon of beats may take place for
(A) Longitudinal waves only
(B) Transverse waves only
(C) Either type of waves
(D) Only ultra sonic waves

24. A sound source and a listener move away from each other; each with a speed of 10 m / s, with respect to the ground. The listener detects a frequency of 1950 Hz. Speed of sound is 340 m /s. The original frequency of the source is
(A) 2070 Hz
(B) 2090 Hz
(C) 2110 Hz
(D) 2130 Hz

25. Total energy of a relativistic electron is 2 M e V. Its momentum is about
(A) 1.7 M e V/ c
(B) 1.9 M e V/ c
(C) 1.5 M e V/ c
(D) 1.4 M e V/ c

26. A microphone of cross sectional area of 0.8 sq cm is placed in front of a small speaker, emitting 3 watt of sound output. If the distance between the speaker and the microphone is 2 meter, calculate the energy falling on the microphone, in 5 sec.
(A) 200 erg
(B) 210 erg
(C) 240 erg
(D) 255 erg

27. Sound level at a location is increased by 30 d B. By what factor, is the pressure amplitude increased?
(A) 30
(B) 300
(C) 600
(D) 1000

28. Two sound waves of equal frequency (of 1 K Hz), start from the same point, initial phases being same. The waves meet again, one travelling a distance 83 cm longer than the other. Their interference is observed to be destructive. Calculate approximately, the velocity of sound.
(A) 330 m / s
(B) 315 m / s
(C) 310 m / s
(D) 305 m / s

29. Excess pressure inside soap bubble A is twice the excess pressure inside another soap bubble B. The ratio of volumes of Bubble A and B is
(A) 0.25
(B) 0.125
(C) 0.1
(D) 0.05

30. Rain drops acquire uniform velocity, due to
(A) Negligible weight
(B) Surface tension
(C) Viscosity of air
(D) Wind movement

31. An eigen function of operator (x A), where A is d / dx ; is
(A) Sin x
(B) Cos x
(C) Exp x
(D) None of the above

32. Tangent galvanometer is governed by the equation; I = K tan a. In a particular measurement, it is found that a = 46 degree, with a possible error of 0.5 degree. The corresponding value of I is known to be 1 m A; with a possible error of 0.1 m A. calculate approximately the expected error in the calculated value of the parameter K.
(A) 12 percent
(B) 10 percent
(C) 8 percent
(D) 6 percent

33. A ball of wood is pushed down, in a bucket of water and then released. It will move up with
(A) Uniform acceleration
(B) Acceleration of decreasing magnitude
(C) Acceleration of increasing magnitude
(D) Uniform velocity

34. In air, a solid spherical ball falls to the ground, with a terminal velocity of 20 m / s. If allowed to fall in vacuum,
(A) Terminal velocity will be 20 m / s
(B) Terminal velocity will be less than 20 m / s
(C) Terminal velocity will be greater than 20 m / s.
(D) The ball will keep accelerating. It will not attain terminal velocity.

35. An air bubble of diameter 2 mm rises steadily, with a uniform velocity of 0.35 cm / s, through a liquid of relative density 1.75. Neglect the downward gravity pull on the bubble. Calculate approximately the velocity of the liquid.
(A) 11 poise
(B) 9 poise
(C) 7 poise
(D) 6 poise

36. A capillary tube of radius 0.2 mm is dipped vertically in water. Surface tension of water is 0.075 N /m. Find the height to which, water rises in the tube.
(A) 60 mm
(B) 75 mm
(C) 85 mm
(D) 90 mm

37. Let p be the momentum operator in quantum theory and let A be its square. Let X be the position operator. The commutator of X and A is
(A) Proportional to A
(B) Proportional to X
(C) Proportional to p
(D) Proportional to (p X)

38. A one dimensional quantum mechanical wave function is zero on negative x axis. On positive x axis, the wave function is given by (A x) exp (- k x) ; where k is 1 (in SI) . Find A, to normalize the wave function.
(A) 0.5
(B) 1
(C) 1.5
(D) 2

39. Electric potential due to a large uniform plane charge is 2 volt, at a point P, 10 meter away from the charge. Find the electric potential 20 meter away, from the surface.
(A) 2 V
(B) 1 V
(C) 0.5 V
(D) 0.25 V

40. The following is not a unit of electric flux
(A) V m
(B) J m / C
(C) W m / A
(D) C / e V

41. Electric field is absent in a region of space. Then it necessarily follows that
(A) V in the region would be non uniform.
(B) Displacement current, in the region, will be zero.
(C) V would fluctuate with time
(D) V would increase with time

42. Consider the function f (x) = k x + Cos x. The constant k is nonzero. The function f(x) is
(A) An even function
(B) An odd function
(C) Neither even nor odd
(D) May be even or odd , depending on the value of k

43. Let f (t) = Sin t. Let F (t) be cube of f (t). Fourier series of F (t) is
(A) Cos t - Sin 3t
(B) 0.5 Sin t + 1.5 Sin 3t
(C) Sin t - 2 Sin 3t
(D) 0.75 Sin t - 0.25 Sin 3 t

44. 5 gm of ice (at zero C) is mixed with 30 gm of water at 30 C. When equilibrium is achieved, the temperature is
(A) 14 C
(B) 17 C
(C) 20 C
(D) 23 C

45. Half life of a radioactive substance is one year. Its mean life is about
(A) 13 months
(B) 74 weeks
(C) 20 months
(D) 2 years

46. A moving coil galvanometer has a resistance of 800 ohm. Its range is 50 micro ampere. If used as a voltmeter, it may measure a maximum voltage of
(A) 80 m V
(B) 60 m V
(C) 40 m V
(D) 20 m V

47. A prism is made of transparent material of refractive index 1.41 (for blue light). The angle of prism is 60 degree. When blue light is incident on the prism, the angle of minimum deviation is about
(A) 40 degree
(B) 37 degree
(C) 34 degree
(D) 30 degree

48. A neutron is confined in ground state, in a one dimensional box of size L = 1 nm. Near the middle of the box, calculate approximately, the quantum mechanical probability of locating the neutron in a region of size a = 1 pm.
(A) 0.2 %
(B) 0.3 %
(C) 0.4 %
(D) Zero

49. At locations x = 0.5 m, x = 1 m and x = 2 m (on the x axis), are placed three positively charged point particles, each with a charge of 4 nano coul. The electric potential at the origin is assumed to be zero. Approximately calculate, the electric potential at a point P with coordinates (1 m, 1 m, 1 m).
(A) - 30 V
(B) - 55 V
(C) - 65 V
(D) Zero

50. The force on a block of mass m = 0. 2 kg, allowed to move on x axis, is given by ; F = - k x + b . Values of k and b in S I are respectively, 5 and 3. The block will
(A) Move with uniform acceleration
(B) Have non periodic motion
(C) Move periodically with time period of 1.3 sec
(D) Move periodically with time period of 2.6 sec

51. Two balls A and B of masses 10 g and 20 g respectively, move on x axis, towards each other, with equal speeds . They collide and stick together. What percentage of kinetic energy is lost?
(A) 80 %
(B) 83 %
(C) 86 %
(D) 89 %

52. Vectors i, j, k are usual unit vectors along coordinate axes. Magnetic field in a region of space is known to be; B = a x i + b y j + w z k. The constants b, w are given; b = 0.4 S I, w = -0.9 S I. Coordinates x, y, z are expressed in meters. Calculate the value of a, in S I.
(A) 0.5
(B) 0.7
(C) 0.9
(D) Zero

53. A free electron is described by the quantum mechanical wave function A exp (i k x - i w t) . The constant potential energy of the electron is known to be 0.5 me V. If its total energy is 1 me V, approximately calculate the value of k.
(A) 0.22 / nm
(B) 0.18 / nm
(C) 0.15 / nm
(D) 0.12 / nm

54. Electric field in a region is known to be A (x i + y j + z k); at the location (x, y, z); i, j, k are the usual unit vectors along coordinate axes. The constant A is 10 milli V / m. In terms of the magnitude of electronic charge e, calculate approximately, the total charge enclosed by a sphere of radius 2 cm, placed in this region.
(A) 56 e
(B) 59 e
(C) 62 e
(D) 65 e

55. The emf generated in a circular loop of radius 5 cm, is found to be uniformly increasing with time, at the rate of 1 m V / minute. The magnetic field at the center of the loop is also increasing with time. At t = 0, its value is 0.4 S I and that of emf is zero. Calculate approximately, the magnitude of magnetic field at t = 2 minute.
(A) 10 S I
(B) 16 S I
(C) 21 S I
(D) 25 S I

56. Power of a semi convex lens A, made of glass of refractive index 1.5, is 0.25 dioptre. With another transparent material of refractive index 1.55, another semi convex lens B, is to be designed. Power of B is greater than that of A by 5 %. Calculate approximately the radius of curvature of lens B.
(A) 150 cm
(B) 180 cm
(C) 210 cm
(D) 240 cm

57. Intensity of light at the central maximum of a single slit diffraction pattern is 5 units. As viewed from the slit, the width of central maximum is 2 milli degree. Approximately locate the angular position of a point, where the observed intensity is 3 units.
(A) 0.1 milli degree
(B) 0.3 milli degree
(C) 0.5 milli degree
(D) 0.7 milli degree

58. The temperature of a metal sample is raised from 47 C to 57 C. Its electrical conductivity will
(A) Rise by about 3 %
(B) Rise by about 10 %
(C) Fall by about 3 %
(D) Not change

59. A certain amount of water is heated from 37 C to 47 C. The heat needed is 4000 J. The entropy change in the process is
(A) About 10 J / Kelvin
(B) About 13 J / Kevin
(C) About 19 J / Kelvin
(D) Zero

60. Resistance R of a semiconductor sample is measured at various values of temperature (recorded in Kelvin). The band gap of the semiconducting material is known to be 1 e V. A graph is now plotted with ln R on y axis and 1 / T on x axis. The expected magnitude of the slope of the graph is
(A) About 2000 kelvin
(B) About 4000 kelvin
(C) About 6000 kelvin
(D) About 8000 kelvin

61. Let a, b,c be mutually perpendicular vectors. Then (a x b) . (b x c) has magnitude equal to
(A) That of a
(B) That of b
(C) That of c
(D) Zero

62. Let e be charge of electron and q be the charge of proton. The magnitude of (e q)/ (2 h c), using S I units, is
(A) 0.7 e V
(B) 0.07 eV
(C) 0.007 e V
(D) None of the above

63. Define "sound year" in a manner similar to "light year". Consider velocity of sound in air at zero Celsius. The number of sound years equal to one light year, is about
(A) One thousand
(B) Ten thousand
(C) One million
(D) Ten million

64. A rectangular plot of land is measured. The sides are found to be of lengths 125 and 62 meters respectively. The expected error in each measurement is one percent. The expected error in area of the plot is
(A) 100 square meter
(B) 125 square meter
(C) 135 square meter
(D) 155 square meter

65. A tiny golden spherical ball of radius r is priced at Rs 3000. Another spherical ball of gold (of same quality),of radius 2r ; may be reasonably priced at Rs
(A) 12000
(B) 24000
(C) 36000
(D) 48000

66. The error made in measurement of diameter of a circle is two percent. The expected error in the calculated circumference is about
(A) 3.14 percent
(B) 6.28 percent
(C) 2 percent
(D) None of the above

67. The following is not a unit of electric field
(A) N/ coul
(B) Volt/ meter
(C) J / (coul meter)
(D) (ohm meter)/ coul

68. The potential energy function of a particle is U(x) = a f + b x ; where a and b are positive constants and f is square of x . The graph of U as a function of x is
(A) A parabola
(B) Straight line
(C) Circle
(D) None of the above

69. Bernoulli theorem is based on
(A) Conservation of charge
(B) Conservation of energy
(C) Hooke' s law
(D) None of the above

70. A wooden cube of volume 125 ml , floats on the surface of water. The relative density of wood is known to be 0.6. The volume of wood outside water is about
(A) 10 ml
(B) 20 ml
(C) 40 ml
(D) 50 ml

71. A particle of mass 10 gm executes S H M, with equation of motion as x = a + b Sin (w t) ; where a = 0.5 meter , b = 0.8 meter, w = 3.14 rad/ sec , t is in sec , x is in meter. Maximum kinetic energy of the particle is about
(A) 10 mJ
(B) 20 mJ
(C) 30 mJ
(D) 40 mJ

72. Angular momentum conservation is linked to
(A) Homogeneity of space
(B) Isotropy of space
(C) Time reversal invariance
(D) None of the above

73. A planet has mass equal to that of the Earth , but the value of g on its surface is 4.9 SI. Assume that the planet has approximately spherical shape. Its average density is about
(A) 10 percent of Earth 's density
(B) 25 percent of Earth's density
(C) 35 percent of Earh's density
(D) 50 percent of Earth' s density

74. The eccentricity of a planet's elliptical orbit is 0.05 . The length of minor axis of the orbit is x percent less than that of major axis. Approximate value of x is
(A) 0.03
(B) 0.06
(C) 0.09
(D) 0.12

75. Kepler's second law of planetary motion is linked to
(A) Charge conservation
(B) Mass conservation
(C) Angular momentum conservation
(D) None of the above

76. Sin x is often approximated as x. Let the exact value of Sin x be 0.5. The error made in using the above approximation is about
(A) 5 percent
(B) 3 percent
(C) 2 percent
(D) 1 percent

77. A car travels on a straight road for 100 km, at uniform velocity of 30 km/h. The car then halts for 10 minutes. It then travels a further distance of 20 km, at a uniform velocity of 50 km/h. Find the average velocity during the whole journey, in km/h.
(A) 11
(B) 21
(C) 31
(D) 41

78. A car is started at 8 am. It then travels for an hour at uniformly decreasing acceleration. At 8: 15, car's speed is 30 km/h. At 8:30, its speed is 50 km/h. The total distance travelled by the car is about
(A) 30 km
(B) 50 km
(C) 70 km
(D) None of the above

79. A block is accelerating down an inclined plane. The plane makes an angle of thirty degree, with the horizontal. The downward acceleration of the block has magnitude of 0.4 g . Calculate the coefficient of friction, between the block and the incline.
(A) 0.11
(B) 0.21
(C) 0.31
(D) 0.41

80. A simple pendulum has amplitude of ten degree. The approximate angular displacement , of the pendulum bob (from its mean position), where its speed is 75 percent of maximum speed ; is
(A) 2 degree
(B) 3 degree
(C) 5 degree
(D) 7 degree

81. A metal sample is heated from 50 degree C to 70 degree C. Its thermal conductivity will
(A) Not change
(B) Increase by 10 percent
(C) Decrease by 10 percent
(D) None of the above

82. A sound wave of frequency 500 Hz and a speed of 350 m/s is travelling in air. Approximately how far apart are two points of the medium, differing in phase by 60 degree?
(A) 10 cm
(B) 12 cm
(C) 15 cm
(D) 18 cm

83. A string fixed at both ends is 8 meter long and has a mass of 120 gm.It is subjected to a tension of 100 N and set vibrating. What is the approximate speed of a wave, travelling along the string, with the longest possible wavelength?
(A) 80 m/s
(B) 100 m/s
(C) 120 m/s
(D) 140 m/s

84. A 15 cm violin string is vibrating in its n=1 mode. The speed of waves in this wire is 250 m/s and the speed of sound in air is 350 m/s. What is the wavelength of the emitted sound wave?
(A) 12 cm
(B) 22 cm
(C) 32 cm
(D) 42 cm

85. Spherical sound waves are emitted in all directions uniformly, by appoint source radiating 25 watt. What is the intensity (in SI), at 2.5 meter from the source?
(A) 0.32
(B) 0.42
(C) 0.52
(D) 0.62

86. A siren emits sound of 1125 Hz. Find the approximate frequency heard by an observer, moving towards the siren, with a velocity of 30 m/s. Assume a temperature of 20 C.
(A) 1150 Hz
(B) 1170 Hz
(C) 1200 Hz
(D) 1220 Hz

87. Particles of air vibrate, as a sound wave of frequency 1000 Hz passes by. Temperature of air is 20 C. If the maximum particle velocity is half of the wave velocity, calculate approximately, the amplitude of particle vibration.
(A) 32 mm
(B) 42 mm
(C) 52 mm
(D) 62 mm

88. Muons have life time of 2 micro sec. Muons travelling with a relativistic speed v are found to survive (without decaying), during a journey of 100 km. approximately what is the minimum value of v?
(A) 1 percent less than c
(B) 0.1 percent less than c
(C) 0.02 percent less than c
(D) None of the above

89. A rocket is moving away from Earth, at a speed of 0.8 c. A missile is fired from the rocket, parallel to rocket's motion. The velocity of the missile, measured by an observer on Earth, is 0.95 c. Using relativity, find the velocity of the missile, with respect to the rocket observer.
(A) 0.6 c
(B) 0.7 c
(C) 0.8 c
(D) None of the above

90. The momentum of a relativistic proton is 1580 MeV/ c. Calculate its speed.
(A) 0.74 c
(B) 0.80 c
(C) 0.86 c
(D) 0.93 c

91. Proper mass of photon is
(A) Same as that of electron
(B) Same as that of muon
(C) Same as that of pion
(D) Zero

92. Consider a relativistic electron with velocity v, such that the velocity difference (c - v) is only 1.6 cm/sec. Calculate approximately, the kinetic energy of the electron.
(A) 50 K eV
(B) 50 M eV
(C) 50 G eV
(D) 50 T e V

(A) 2.2 gm
(B) 2.4 gm
(C) 2.6 gm
(D) 2.8 gm

94. For an electron moving with a speed of 0.6 c, find approximately, the percentage error made, if its kinetic energy is calculated, using non relativistic formula
(A) 40
(B) 43
(C) 45
(D) 48

95. An ac circuit carries a current, given by $I = A \sin(\omega t) + B \cos(\omega t)$, where A= 1 amp, B= 2 amp, ω = 314 rad/s , t is in sec. Find the rms value of current, approximately
(A) 0.3 amp
(B) 0.4 amp
(C) 0.5 amp
(D) 0.6 amp

96. Average value of the function $f = t + 3$, in the interval t = 2 to t = 3, is
(A) 4.5
(B) 5.5
(C) 6.5
(D) Zero

97. In an L R C circuit, the S I values of L, R and C are each one unit. The circuit is subjected to sinusoidal voltage, of frequency 50 Hz, with peak voltage of 250 volt. Calculate approximately the rms value of current in the circuit
(A) 0.35 amp
(B) 0.45 amp
(C) 0.55 amp
(D) 0.65 amp

98. Consider an L C circuit subject to sinusoidal voltage of frequency f. Let S I values of L, C be one unit each and assume f = 50 Hz. For one percent increase in f, the impedance in the circuit will
(A) Not change
(B) Decrease by nearly 1 percent
(C) Decrease by about 2 percent
(D) Increase by about 1 percent

99. Two phasors : A Sin (w t + a) and B Cos (w t) are added and the sum is K Sin (w t). Let A=1, a = 30 degree. Calculate K.
(A) 0.87
(B) 0.92
(C) 0.95
(D) 0.98

(A) About 6.28 I
(B) Zero
(C) 2 I
(D) - 2 I

93. Low energy electron and positron annihilate each other and two gamma rays are emitted. Calculate the gamma ray wavelength.
(A) 2.2 pm
(B) 2.4 pm
(C) 2.6 pm
(D) 2.8 pm

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(C) 45
(D) 48

95. An ac circuit carries a current, given by I = A Sin(w t) + B Cos (w t) ; where A= 1 amp, B= 2 amp, w = 314 rad/ s , t is in sec. Find the rms value of current, approximately.
(A) 0.3 amp
(B) 0.4 amp
(C) 0.5 amp
(D) 0.6 amp

96. Average value of the function f = t + 3 ; in the interval t =2 to t = 3 , is
(A) 4.5
(B) 5.5
(C) 6.5
(D) Zero

97. In an L R C circuit, the S I values of L, R and C are each one unit. The circuit is subjected to sinusoidal voltage, of frequency 50 Hz, with peak voltage of 250 volt. Calculate approximately the rms value of current in the circuit.
(A) 0.35 amp
(B) 0.45 amp
(C) 0.55 amp
(D) 0.65 amp

98. Consider an L C circuit subject to sinusoidal voltage of frequency f. Let S I values of L, C be one unit each and assume f = 60 Hz. For one percent increase in f , the impedance in the circuit will
(A) Not change
(B) Decrease by nearly 1 percent
(C) Decrease by about 2 percent
(D) Increase by about 1 percent

99. Two phasors ; A Sin (w t + a) and B Cos (w t) are added and the sum is K Sin (w t). Let A=1, a = 30 degree. Calculate K.
(A) 0.87
(B) 0.92
(C) 0.95
(D) 0.98

100. The function f = (Sin Z)/ Z is integrated (in anti clockwise sense), along the unit circle, around the origin, in complex plane. The value of the integral is
(A) About 6.28 i
(B) Zero
(C) 2 i
(D) - 2 i