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# JIPMER MBBS PHYSICS

## Model Paper

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| 1. The quantity having the dimensions $[M^{-1}L^{-3}T^3A^2]$ is | 2. The specific charge of a portion is $906 \times 10^7$ c/kg. The specific charge of alpha particle will be                   |
| 1) Resistance   | 1) $9.6 \times 10^7$ c/kg  |
| 2) Resistivity  | 2) $19.2 \times 10^7$ C/kg   |
| 3) <b>Electrical conductivity</b>                               | 3) <b><math>4.8 \times 10^7</math> c/kg</b>  |
| 4) Electrical force   | 4) $2.4 \times 10^7$ c/kg  |
|   | 3. Activity of radioactive sample decreases to (1/3) or its original value in 3 days. Then, in 9 days its activity will become |

1) (1/27) of the original value

2) (1/9) of the original value

3) (1/18) of the original value

4) (1/3) of the original value

4. A tuning fork A produces 4 beats/s with another tuning fork B of frequency 320Hz. On filling e of the prongs of A, 4 beat/s are again heard when sounded with same fork B. Then, the frequency of the fork A before filling is

1) 328Hz

2) 316 Hz

3) 324 Hz

4) 320 Hz

5. If there were no gravity, which of the following will not be therefore a fluid?

1) Viscosity

2) Surface tension

3) Pressure

4) Archimedes upward thrust

6. A choke is preferred to a resistance for limiting current in AC circuit because

1) Choke is cheap

2) There is no wastage of power

3) Choke is compact in size

4) Choke is good absorber of heat

7. Velocity-time curve projected vertically upwards is

1) Parabola

2) Ellipse

3) Hyperbola

4) Straight line

8. If  $r_1$  and  $r_2$  are the radii of the atomic nuclei of mass number 64 and 125 respectively, then the ratio ( $r_1/r_2$ ) is

1)  $\sqrt{64/125}$

2) 1/4

3) 4/5

4) 1/3

9. The ionization energy  $\text{Li}^{2+}$  is equal to

1)  $9hcR$

2)  $6hcR$

3)  $2hcR$

4)  $hcR$

10. The current of 5A is passing through a metallic wire of cross-sectional area  $4 \times 10^{-6} \text{ m}^2$ . If the density of charge carriers of the wire is  $5 \times 10^{26} \text{ m}^{-3}$ , then the drift velocity of electrons will be

1)  $1 \times 10^2 \text{ m/s}$

2)  $1.56 \times 10^{-2} \text{ m/s}$

3)  $1.56 \times 10^{-3} \text{ m/s}$

4)  $1 \times 10^{-2} \text{ m/s}$

11. The numerical ratio displacement to the distance covered is always

- 1) Less than one
- 2) Equal to one
- 3) **Equal to or less than one**
- 4) Equal to or greater than one

12. In Yang's double slit experiment with sodium vapour lamp of wave length 589 nm and the slits 0.589 mm apart, the half angular width of the central maximum is

- 1)  $\sin^{-1}(0.01)$
- 2)  $\sin^{-1}(0.0001)$
- 3)  **$\sin^{-1}(0.001)$**
- 4)  $\sin^{-1}(0.1)$

13. The principle of LASER action involves

- 1) Application of particular frequency emitted by the system
- 2) Population inversion
- 3) Stimulated emission
- 4) **All the above**

14. A train is moving towards east and a car is north, both with same speed. The observed direction of car to the passenger in the train is

- 1) East-north direction
- 2) **West-north direction**
- 3) South-east direction
- 4) None of the above

15. Which of the following is unipolar transistor?

- 1) p-n-p transistor
- 2) n-p-n transistor
- 3) **field effect transistor**
- 4) point contact transistor

16. A solid sphere and a hollow sphere of the same material and of a same size can be distinguished without weighing

- 1) By determine their moments of inertia about their coaxial axes
- 2) **By rolling them simultaneously on an inclined plane**
- 3) By rotating them about a common axis of rotation
- 4) By applying equal torque on them

17. point masses 1,2,3 and 4 kg are lying at the points (0,0,0), (2,0,0),(3,0,0) and (-2,-2,0) respectively. The moment of inertia of this stem about X-axis will be

- 1)  $43\text{kg}\cdot\text{m}^2$
- 2)  $34\text{kg}\cdot\text{m}^2$
- 3)  $27\text{kg}\cdot\text{m}^2$
- 4)  $72\text{kg}\cdot\text{m}^2$

18. The radius of gyration of a body about an axis at a distance 6 cm from its centre of mass is 10 cm. Then, its radius of gyration about a parallel axis through centre of mass will be

- 1) 80 cm
- 2) **8 cm**
- 3) 0.8cm
- 4) 80 m

19. A galvanometer can be changed in to an ammeter by using

- 1) Low resistance shunt in series
- 2) **Low resistance shunt in parallel**
- 3) High resistance shunt in series
- 4) High resistance shunt in parallel

20. The cylindrical tube of a spray pump has a cross-section of  $8\text{cm}^2$ , one end of which has 40 fine holes each of area  $10^{-8}\text{m}^2$ .if the liquid flows inside the tube with a speed of  $0.15\text{m}\text{min}^{-1}$ , the speed with which the liquid is ejected through the holes is

- 1) 50m/s

- 2) 5 m/s
- 3) 0.05 m/s
- 4) 0.5 m/s

21. A vessel of height  $2d$  is half filled with a liquid of refractive index  $\sqrt{2}$  and the other half with a liquid of refractive index  $n$  (the given liquids are immiscible). Then, the apparent depth of the inner surface of the bottom of the vessel (neglecting the thickness of the bottom of the vessel) will be

- 1)  $N/d (n+\sqrt{2})$
- 2)  $d (n + \sqrt{2}) / n\sqrt{2}$
- 3)  $\sqrt{2} n / d (n+\sqrt{2})$
- 4)  $nd / d+\sqrt{2} n$

22. A shell of mass 20 kg at rest explodes into two fragments whose masses are in the ratio 2:3. The smaller fragment moves with a velocity of 6 m/s. The kinetic energy of larger fragment is

- 1) 96 J
- 2) 216 J
- 3) 144 J
- 4) 360 J

23. An electric bulb has a rated power of 50 W at 100 V. If it is used on an AC source 200 V, 50 Hz, a choke has to be used in series with it. This choke should have an inductance of

- 1) 0.1 Mh
- 2) 1 mh
- 3) 0.1 H
- 4) 1.1 H

24. Three noncurrent co-planar forces 1 N, 2 N and 3 N acting along different directions on a body

- 1) Can keep the body in equilibrium if 2 N and 3 N act at right angle

- 2) Can keep the body in equilibrium if 1 N and 2 N act at right angle

3) Cannot keep the body in equilibrium

- 4) Can keep the body in equilibrium if 1 N and 3 N act at right angle

25. A certain vector in the xy-plane has an x-component of 4 m and y-component of 10 m. It is then rotated in the xy-plane so that its x-component is doubled. Then, its new y-component is (approximately)

- 1) 20m
- 2) 7.2 m
- 3) 5.0m
- 4) 4.5 m

26. A police party is moving in a jeep at a constant speed  $v$ . They saw a thief at a distance  $x$  on a motor cycle which is at rest. The moment the police saw the thief, the thief started at constant acceleration  $a$ . Which of the following relations is true if the police is able to catch the thief?

- 1)  $v^2 < ax$
- 2)  $v^2 < 2ax$
- 3)  $v^2 > 2ax$
- 4)  $v^2 = ax$

27. If two soap bubbles of different radii are connected by a tube, then

- 1) Air flows from bigger bubble to the smaller bubble till sizes become equal
- 2) Air flows from bigger bubble to the smaller bubble till sizes become interchanged
- 3) Air flows from smaller bubble to bigger
- 4) There is no flow of air

28. The thermo emf of a hypothetical thermocouple varies with the temperature of hot junction as  $E = + \frac{2}{700}$  in volts, where the ratio is 700

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°C. If the cold junction is kept at 0 °C, then the neutral temperature is

- 1) 700 °C
- 2) 1400 °C
- 3) **390 °C**
- 4) No neutral temperature is possible for this thermo couple

29. A launching vehicle carrying an artificial satellite of mass  $m$  is set for launch on the surface of the earth of mass  $M$  and radius  $R$ . If the satellite is intended to move in a circular orbit of radius  $7R$ , the minimum energy required to be spent by the launching vehicle on the satellite is

(Gravitational constant =  $G$ )

- 1)  $GMm / R$
- 2)  **$-13 GMm / 14R$**
- 3)  $GMm / 7R$
- 4)  $-GMm / 14 R$

30. The two lenses of an achromatic double should have

- 1) Equal powers
- 2) Equal dispersive powers
- 3) Equal ratio of their power and dispersive power
- 4) **Sum of the product of their powers and dispersive power is equal to zero**

31. A soap bubble of radius  $r$  is blown up to form a bubble of radius  $2r$  under isothermal conditions. If  $T$  is the surface tension of soap solution, the energy spent in the blowing

- 1)  $3\pi Tr^2$
- 2)  $6\pi Tr^2$
- 3)  $12\pi Tr^2$
- 4)  **$24\pi Tr^2$**

32. A current of 1.6 A is passed through a solution of  $CuSO_4$ . How many  $Cu^{++}$  ions are liberated in one minute? (Electronic charge =  $1.6 \times 10^{-19} C$ )

- 1)  **$3 \times 10^{20}$**
- 2)  $3 \times 10^{10}$
- 3)  $6 \times 10^{20}$
- 4)  $6 \times 10^{10}$

33. A magnetic field exerts on force on

- 1) A magnet
- 2) An unmagnetized iron bar
- 3) A moving charge
- 4) **Stationary charge**

34. In an L-C-R circuit inductance is changed from  $L$  to  $L/2$ . To keep the same resonance frequency,  $C$  should be changed to

- 1)  **$2C$**
- 2)  $C/2$
- 3)  $4C$
- 4)  $C/4$

35. The sound waves after being converted into electrical waves are not transmitted as such because

- 1) They travel with the speed of sound
- 2) The frequency is not constant
- 3) **They are heavily absorbed by the atmosphere**
- 4) The height of antenna has to be increased several times

36. The tip of needle does not give a sharp image on a screen. This is due to

- 1) Polarization
  - 2) Interference
  - 3) **Diffraction**
  - 4) None of the above
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37. An engine moving towards a wall with a velocity 50 m/s emits note of 1.2 kHz. Speed of sound in air is 350 m/s. the frequency of the note after reflection from the wall as heard by the driver of the engine is

- 1) 2.4 kHz
- 2) 0.24 kHz
- 3) **1.6 kHz**
- 4) 1.2 kHz

38. A car of mass 1000 kg moves on a circular track of radius 40 m. If the coefficient of friction is 1.28. The maximum velocity with which the car can move is

- 1) **22.4 m/s**
- 2) 112 m/s
- 3)  $0.64 \times 40 / 1000 \times 100$  m/s
- 4) 1000 m/s

39. The escape velocity for the earth is 11.2 km/s. The mass of another planet 100 times mass of earth and its radius of 4 times radius of earth. The escape velocity for the planet is

- 1) 280 km/s
- 2) **56.0 km/s**
- 3) 112 km/s
- 4) 56 km/s

40. Light travels faster in air than that in glass. This is accordance with

- 1) **Wave theory of light**
- 2) Corpuscular theory of light
- 3) Neither (a) nor (b)
- 4) Both (a) and (b)

41. The speed of air flow on the upper and lower surface of wing of an aero plane are  $v_1$  and  $v_2$  respectively. If  $A$  is the cross section area of the wing and is the density of air, then the upward lift is

- 1)  $1/2 A(v_2 - v_1)$

- 2)  $1/2 A(v_1 + v_2)$
- 3)  **$1/2 A(v_1^2 - v_2^2)$**
- 4)  $1/2 A(v_1^2 - v_2^2)$

42. A body is thrown with a velocity of 9.8 m/s making an angle of  $30^\circ$  with the horizontal. It will hit the ground after a time

- 1) 15 s
- 2) **1 s**
- 3) 3 s
- 4) 2 s

43. A radioactive element  ${}_{90}\text{X}^{238}$  decays into  ${}_{83}\text{Y}^{222}$ . The number of  $\alpha$ -particles emitted are

- 1) **1**
- 2) 2
- 3) 4
- 4) 6

44. Minimum excitation potential of Bohr's first orbit in hydrogen atom is

- 1) 3.6 eV
- 2) **10.2 eV**
- 3) 13.6 eV
- 4) 3.4 eV

45. A gas expands  $0.25 \text{ m}^3$  at constant pressure  $10^3 \text{ N/m}^2$ , the work done is

- 1) 250 N
- 2) 250 W
- 3) **250 J**
- 4) 2.5 erg

46. The work done in increasing the size of a soap film for  $10 \text{ cm} \times 6 \text{ cm}$  to  $10 \text{ cm} \times 11 \text{ cm}$  is  $3 \times 10^{-4} \text{ J}$ . The surface tension of the film is

- 1)  $1.0 \times 10^{-2} \text{ N/m}$
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- 2)  $6.0 \times 10^{-2}$  N/m  
3)  $3.0 \times 10^{-2}$  N/m  
4)  $1.5 \times 10^{-2}$  N/m

47. A luminous object is placed at a distance of 30 cm from the convex lense of focal length 20 cm. On the other side of the sides of the lense, at what distance from the lens a convex mirror of radius of curvature 10 cm be placed in order to have an upright image of the object confident with it

- 1) 30 cm  
2) 60 cm  
3) **50 cm**  
4) 12 cm

48. A battery of emf 10 v and internal resistance of 0.5 ohm is connected across a variable resistance R. the maximum value of R is given by

- 1) **0.5Ω**  
2) 1.00Ω  
3) 2.0Ω  
4) 0.25Ω

49. For a gas  $\gamma = 0.67$ . This is made up of molecules which are

- 1) **Mono atomic**  
2) Poly atomic  
3) Mixture of diatomic and poly atomic molecules  
4) Diatomic

50. A point source of light is placed 4 m below the surface of water of refractive index  $\frac{5}{3}$ . The minimum diameter of a disc which should be placed over the source on the surface of water to cut-off all light coming out of water is

- 1) **6m**  
2) 3m  
3) 4m

4) 2m

51. A moving body of mass m and velocity 3 km/h collides with a rest body of mass 2 m and stick to it. Now the combined mass starts to move. What will be the combined velocity?

- 1) 4km/h  
2) **1km/h**  
3) 2km/h  
4) 3km/h

52. Ionization potential of hydrogen atoms is 13.6 eV. Hydrogen atom on the ground state rarely excited by monochromatic radiation of photons 1.21 eV. The special line emitted by a hydrogen atom according to Bohr's theory will be

- 1) One  
2) Two  
3) **Three**  
4) Four

53. The internal resistance of a primary cell is 4 Ω. It generates a current of 0.2 A in an external resistance of 21Ω. The rate at which chemical energy to consumed in providing current is

- 1) **1J/s**  
2) 5J/s  
3) 0.42J/s  
4) 0.8j/s

54. The binding energy per nucleons is maximum

- 1)  ${}_{92}^{235}\text{U}$   
2)  ${}_{56}^{141}\text{Ba}$   
3)  **${}_{26}^{56}\text{Fe}$**   
4)  ${}_{4}^2\text{He}$

55. The working principle of Ball point pen is

- 1) Bernoulli's theorem
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2) **Surface tension**

3) Gravity

4) Viscosity

2) 33.3A

3) 5A

4) 10A

56. Progressive waves are represented by the equation

$$Y_1 = a \sin(\omega t - kx)$$

$$\text{And } Y_2 = b \cos(\omega t - kx)$$

The phase difference between waves is

1)  $0^\circ$

2)  $45^\circ$

3)  **$90^\circ$**

4)  $180^\circ$

57. Two simple pendulums of length 0.5 m and 20 m respectively are given small linear displacement in one direction at the same time. They will again be in the phase when the pendulum of shorter length has completed x oscillations, where k is

1) 1

2) 3

3) **2**

4) 5

58. A balloon contains 500m<sup>3</sup> of helium at 27°C and 1 atmosphere pressures. The volume of helium at -3°C temperature and 0.5 atmosphere pressure will be

1) 1000m<sup>3</sup>

2) **900m<sup>3</sup>**

3) 700m<sup>3</sup>

4) 500m<sup>3</sup>

59. 220 V, 50 Hz, AC source is connected to an inductance of 0.2 H and a resistance of 20Ω in series. What is the current in the circuit?

1) **3.33A**

60. In 0.2 sec, the current in a coil increases from 2.0 A to 3.0 A. If inductance of coil is 60mH, then induced current in external resistance of 3Ω will be

1) 1A

2) 0.5A

3) 0.2A

4) **0.1A**

61. A ball is released from certain height which loses 50% of its kinetic energy on striking the ground, it will attain a height again

1) 1/4 th of initial height

2) **1/2 th of initial height**

3) 3/4 th of initial height

4) None of the above

62. If applied torque on a system is zero, i.e., =0, then for the system

1) W=0

2) **α=0**

3) J=0

4) F=0

63. A steel wire of 1 m long and 1mm<sup>2</sup> cross section area is hanged from rigid end when weight of 1 kg is hang from it, then change in length will be

(Young's coefficient for wire  $Y = 2 \times 10^{11} \text{ N/m}^2$ )

1) 0.5 mm

2) 0.25 mm

3) **0.05 mm**

4) 5 mm

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64. When plate voltage in diode valve is increased from 100V to 150 V. Then ,plate increases from 7.5mA to 12 mA,then dynamic plate resistance will be

- 1) 10k $\Omega$
- 2) 11k $\Omega$
- 3) 15k $\Omega$
- 4) **11.1k $\Omega$**

65. If the sun rays are incidenting at 60° angle and intensity is I.If the sunrays are made by incident at 30° angle,then what will be the intensity?

- 1) 1/ $\sqrt{3}$
- 2)  **$\sqrt{3} I$**
- 3) 3I
- 4) I /3

66. The reason of current flow in p-n junction in forward bias is

- 1) Drifting of charge carries
- 2) Drifting of minority charge carries
- 3) **Diffusion of charge carries**
- 4) All the above

67. A charged particle is accelerated by a potential of 200V.If velocity is  $8.4 \times 10^8$  m/s, then value of e/m for that particle is

- 1)  $14.6 \times 10^{16}$
- 2)  $14.5 \times 10^{12}$
- 3)  **$1.76 \times 10^{12}$**
- 4)  $1.45 \times 10^{15}$

68. When an open organ is dipped in water up to half of its height,then its frequency will become

- 1) Half
- 2) Double
- 3) **Remain same**
- 4) Four time

69.A sound source producing waves of frequency 300 Hz and wave length 1 m observer is stationary, while source is going away with the velocity 30 m/s, then apparent frequency heard by the observer is

- 1) 270 Hz
- 2) **273 H z**
- 3) 383 Hz
- 4) 300 Hz

70. A particle moves towards east for 2 s with velocity 15 m/s and move towards north for 8 s with velocity 5 m /s. Then average velocity of the particle is

- 1) 1m/s
- 2) **5m/s**
- 3) 7m/s
- 4) 10m/s

71. If we increase kinetic energy of a body 300%,then percent increases in its momentum is

- 1) 50%
- 2) 300%
- 3) **100%**
- 4) 150%

72. Change in acceleration due to gravity is same up to a height h from each other the earth surface and below depth x,then relation between x and h is (h and  $x \ll R_e$ )

- 1)  $X=h$
- 2)  **$X=2h$**
- 3)  $X= h/2$
- 4)  $X=h^2$

73. A mass of 1 kg is suspended from a spring of force constant 400 N, executing SHM total energy of the body is 2J, then maximum acceleration of the spring will be

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- 1)  $4\text{m/s}^2$
- 2)  $40\text{m/s}^2$
- 3)  $200\text{m/s}^2$
- 4)  $400\text{m/s}^2$

74. Two capacitors of capacities  $C_1$  and  $C_2$  are charged up to the potential  $V_1$  and  $V_2$ , then on connected them in parallel is

- 1)  $C_1=C_2$
- 2)  $C_1V_1=C_2V_2$
- 3)  $V_1=V_2$
- 4)  $C_1/V_1 = C_2/V_2$

75. Vibrations of rope tied by two rigid ends shown by equation  $Y=\cos 2x \sin 2t$ , then minimum length of the rope will be

- 1) 1m
- 2)  $1/2$  m
- 3) 5m
- 4) 2 m

76. If  $V=ry$ , then electric field at a point will be proportional to

- 1)  $r$
- 2)  $r^{-1}$
- 3)  $r^{-2}$
- 4)  $r^2$

77. Electric field at point 230 cm away from the centre of di electric sphere is 100 V/m, radius of sphere is 10 cm, then the value of electric field at a distance 3 cm from the centre is

- 1) 120v/ m
- 2) 125v/ m
- 3) 120 v/m
- 4) 0

78. 50g ice at  $0^\circ\text{C}$  in insulator vessel, 50g water as  $100^\circ\text{C}$  is mixed in it, then final temperature of the mixture is (neglect the heat loss)

- 1)  $10^\circ\text{C}$
- 2)  $0^\circ < T_m < 20^\circ\text{C}$
- 3)  $20^\circ\text{C}$
- 4) Above  $20^\circ\text{C}$

79. Real power consumption in a circuit is least when it contains

- 1) High R, low L
- 2) High R, high L
- 3) low R, high L
- 4) High R, low c

80. The angle between two linear transmembrane domains is defined by following vectors  $a=i+j-k$  and  $b=i-j+k$

- 1)  $\cos^{-1}(1/3)$
- 2)  $\cos^{-1}(-1/3)$
- 3)  $\sin^{-1}(-1/3)$
- 4)  $\sin^{-1}(1/3)$

81. The distance x (in ) covered by molecule starting from point A at time  $t=0$  and stopping at another point B in given by the equation

$X=t^2(2-t/3)$ . The distance between A and B (in ) is closed to

- 1) 10.7
- 2) 20.7
- 3) 40.7
- 4) 50.7

82. One end of the mass less spring of constant 100 N/m and natural length 0.5 m is fixed and the other end is connected to a particle of mass 0.5 kg lying on a friction less horizontal table. The spring remains

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horizontal. If the mass is made to rotate angular velocity of  $2\text{rad/s}$ , then elongation of spring is

- 1)  $0.1\text{m}$
- 2)  $10\text{cm}$
- 3)  **$1\text{cm}$**
- 4)  $0.01\text{cm}$

83. A block slides down on an incline of angle  $30^\circ$  with an acceleration  $g/4$ , find the kinetic friction coefficient.

- 1)  $1/2\sqrt{2}$
- 2)  $0.6$
- 3)  **$1/2\sqrt{2}$**
- 4)  $1/\sqrt{2}$

84. Two long straight wires, each carrying an electric current of  $5\text{A}$ , are kept parallel to each other at a separation of  $2.5\text{cm}$ . Find the magnitude of the magnetic force exerted by  $10\text{cm}$  of a wire.

- 1)  $40 \times 10^{-4}\text{N}$
- 2)  $35 \times 10^{-6}\text{N}$
- 3)  **$20 \times 10^{-5}\text{N}$**
- 4)  $20 \times 10^{-9}\text{N}$

85. A wire of resistance  $10\Omega$  is bent to form a complete circle. Find its resistance between two diametrically opposite point.

- 1)  $5\Omega$
- 2)  **$2.5\Omega$**
- 3)  $1.25\Omega$
- 4)  $10/3\Omega$

86. Three equal charges, each having a magnitude of  $2.0 \times 10^{-6}\text{C}$ , are placed at the three corners of a right angled triangle of sides  $3\text{cm}$ ,  $4\text{cm}$  and  $5\text{cm}$ . The force on the charge at the right angled corner is

- 1)  $50\text{N}$
- 2)  $26\text{N}$
- 3)  $29\text{N}$
- 4)  **$45.9\text{N}$**

87. A diatomic gas does  $200\text{J}$  of work when it is expanded isobarically. Find the heat given to the gas in the process.

- 1)  $500\text{J}$
- 2)  **$700\text{J}$**
- 3)  $600\text{J}$
- 4)  $900\text{J}$

88. A uniform ring of mass  $m$  and radius  $a$  is placed directly above a uniform sphere of mass  $m$  and of equal to radius. The center of the ring is at a distance  $\sqrt{a}$  from the center of the sphere. The gravitational force exerted by the sphere on the ring is

- 1)  **$3GMm/8a^2$**
- 2)  $2GMm/3a^2$
- 3)  $7GMm/\sqrt{2}a^2$
- 4)  $3GMm/a^2$

89. A projectile is fired with a velocity  $u$  at angle with the ground surface.

During the motion at any time it is making an angle with the ground surface. The Speed of particle at this time will be

- 1)  **$U \cos \sec$**
- 2)  $U \cos .\tan$
- 3)  $U \cos \sin$
- 4)  $U \sin \sin$

90. The ammeter shown in figure consists of a  $480\Omega$  coil connected in parallel to a  $20\Omega$  shunt. The reading of ammeter is

- 1)  **$0.125\text{A}$**
- 2)  $1.67\text{A}$
- 3)  $0.13\text{A}$
- 4)  $0.67\text{A}$

91. An inductor, a resistor and a battery are connected in series. After a long time, the circuit is short circuited and then the battery is disconnected. Find the Current in the circuit at  $1\text{ms}$  after short circuiting

- 1)  $4.5 \times 10^5$
  - 2)  $3.2 \times 10^{-5}$
  - 3)  $9.8 \times 10^{-5}$
  - 4)  **$6.7 \times 10^{-4}$**
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92. Two charges of + 10 C and 20 c are separated by a distance 2cm. The net potential due to the pair at the middle point of the line joining the two charges, is

- 1) 27MV
- 2) 18 MV
- 3) 20 MV
- 4) 23 MV

93. The earth receives solar radiation at a rate of  $8.2 \text{ J cm}^{-2} \text{ min}^{-1}$ . If the sun radiates as the black bodies, the temperature at the surface of the sun will be ( the angle subtended by sun on the earth is suppose 0.53 and Stefan constant is  $= 5.67 \times 10^{-8} \text{ W m}^{-2} \text{ K}^4$ )

- 1) 5800k
- 2) 6700k
- 3) 8000k
- 4) 7800k

94. The rms speed of oxygen molecules of the gas at temperature 300 k, is

- 1) 483
- 2) 504
- 3) 377
- 4) 346

95. What is the change in the volume of 1.0L kerosene, when it is subjected to an extra pressure of  $20 \times 10^5 \text{ Nm}^{-2}$  from the following data? Density of kerosene  $= 800 \text{ kg m}^{-3}$  and speed of sound in kerosene  $= 1330 \text{ ms}^{-1}$

- 1)  $0.97 \text{ cm}^{-3}$
- 2)  $0.66 \text{ cm}^{-3}$
- 3)  $0.15 \text{ cm}^{-3}$
- 4)  $0.59 \text{ cm}^{-3}$

96. A 4kg block is suspended from the ceiling of an elevator through a spring having a linear mass density of  $19.2 \times 10^{-3} \text{ kg m}^{-3}$ . Find the speed with respect to spring with which a wave pulse can proceed on the spring if the elevator accelerates up at the rate  $2.0 \text{ ms}^{-2}$ . Take  $g = 10 \text{ ms}^{-2}$

- 1) 30 m/s
- 2) 42 m/s

- 3) 46 m/s
- 4) 50m/s

97. The lower end of capillary tube is immersed in mercury. The level of mercury in the tube is found to be 2cm below the outer level. If the same tube is immersed in water, up to what height will the water rise in the capillary?

- 1) 5.9
- 2) 4.9
- 3) 2.9
- 4) 1.9

98. For an adiabatic expansion of a mono atomic perfect gas, the volume increases by 24%. What is the percentage decrease in pressure?

- 1) 24%
- 2) 40%
- 3) 48%
- 4) 71%

99. A body weighing 8g when placed in one pan and 18g when placed on the other pan, are empty, then the true weight of the body is

- 1) 13g
- 2) 9g
- 3) 22g
- 4) 12g

100. Universal time is based on

- 1. Rotational effect of the earth about its axis
  - 2. Vibrations of cesium atom
  - 3. Orbital motion of the earth around the sun
  - 4. Oscillation of quartz crystal
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