UNIVERSAL ACADEMY

Icon of Success and Excellence

MOCK CET - 2015

DATE	SUBJECT	TIME
16.04.2015	PHYSICS	2.30 PM TO 3.40 PM

MAXIMUM MARKS	TOTAL DURATION	MAXIMUM TIME FOR ANSWERING
60	80 MINUTES	70 MINUTES

MENTION YOUR CET NUMBER					QUESTION BOOKLET DETAILS	
					VERSION CODE	SERIAL NUMBER
					C–1	

DOs:

1. Check whether the CET No. has been entered and shaded in the respective circles on the OMR answer sheet.
2. This Question Booklet is issued to you by the Invigilator after **1st Bell** i.e, after **2.30 p.m**
3. The Serial Number of this question booklet should be entered on the OMR answer sheet.
4. The Version Code of this question booklet should be entered on the OMR answer sheet and the respective circles should be shaded completely.
5. Compulsory sign at the bottom portion of the OMR answer sheet in the space provided.

DONTs:

1. **The timing and marks printed on the OMR answer sheet should not be damaged/mutilated/ spoiled.**
2. The **2nd Bell** rings at **2.35 p.m.** till then,
   - Do not remove the seal/staple present on the right hand side of this question booklet.
   - Do not look inside this question booklet.
   - Do not start answering on the OMR answer sheet.

IMPORTANT INSTRUCTIONS TO CANDIDATES

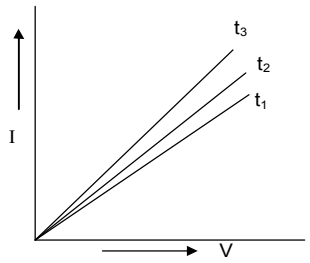
1. This question booklet contains 60 questions and each question will have one statement and four distraction (four different options / choices).
2. After the **2nd Bell** is rung at **2.35 p.m**. Remove the seal/staple present on the right hand side of this question booklet and start answering on the OMR answer sheet.
3. During the subsequent 70 minutes:
   - Read each question carefully.
   - Choose the correct answer from out of the four available distracters (options /choices) given under each question/statement.
   - Completely **darken / shade** the relevant circle with a **BLUE OR BLACK INK BALLPOINT PEN against the question number on the answer sheet.**

CORRECT METHOD OF SHADING THE CIRCLE ON THE ANSWER SHEET IS AS SHOWN BELOW:

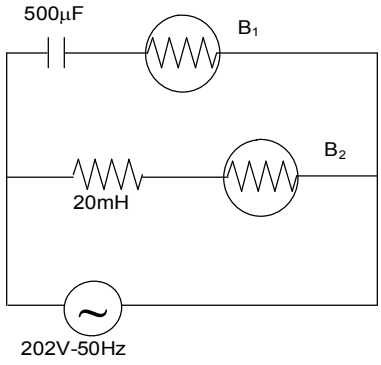
4. Please note that even a minute unintended ink dot on the answer sheet will also be recognized and recorded by the scanner. Therefore, avoid multiple markings of any kind on the OMR sheet.
5. Use the space provided on each page of the question booklet for Rough work. Do not use the OMR answer sheet for the same.
6. After the **last bell** is rung at **3.45 pm** stop writing on the OMR answer sheet and affix your LEFT HAND THUMB IMPRESSION on the OMR answer sheet as per the instructions.
7. Hand over the OMR answer sheet to the room invigilator as it is.
8. After separating and retaining the top sheet, (UA copy) the invigilator will return the bottom sheet replica (candidate's copy) to you to carry home for self – evaluation.
9. Preserve the replica of the OMR answer sheet for a minimum period of ONE week. For results, log on to the website www.uaes.in 5 days after the examination.

PHYSICS CET - 1

1. The resistance of a conducting wire is R. Resistance of another similar wire of twice the length and twice the diameter is
   a) R b) 2R c) R/2 d) 4R
2. I-V graph for a metal at temperatures t_1, t_2, t_3 are given. Temperature are related as



   a) $t_1 > t_2 > t_3$ b) $t_1 = t_2 = t_3$ c) $t_3 > t_2 > t_1$ d) $t_2 > t_1 > t_3$
3. A resistor is in the left gap and a (NTC) semiconductor is in the right gap of a matter bridge. Balancing length is noted (l). Both are heated so that change of resistance in them is the same. Now balancing length is
   a) Equal to l b) Greater than l
   c) Less than l d) Depends on temperature change
4. At the instant, when potentiometer is balanced, current
   a) Flows in primary circuit only
   b) Flows in secondary circuit only
   c) Flows both in primary and secondary circuits
   d) Does not flow in any circuit
5. A wire of resistance 5 ohms is stretched such that longitudinal strain is 200%. The new resistance in ohms is
   a) 10 b) 25 c) 30 d) 45
6. There is a current of 0.2A in a copper wire of area of cross section $10^{-6}m^2$. If the number of free electrons per unit volume is $8.4 \times 10^{28} m^{-3}$, then the drift speed of electron is about ($e = 1.6 \times 10^{-19}$C)
   a) $2 \times 10^{-5} ms^{-1}$ b) $1.5 \times 10^{-5} ms^{-1}$ c) $10^{-5} ms^{-1}$ d) $3 \times 10^{-5} ms^{-1}$
7. Two identical bulbs B1 and B2 are connected across 220V-50Hz ac source as shown.



   a) They glow with same brightness
   b) B_2 glows more brightly
   c) B_1 glows more brightly
   d) Only B_2 glows since capacitive reactance is infinite
8. To have large selectivity in a series LCR circuit
   a) L should be large, R should be small b) Both L and R should be large
   c) L should be small, R should be large d) Both L and R must be small
9. Force of attraction between two parallel current- carrying conductors is F Newton per meter. Current through each of them is doubled and reversed. New force in N/m between these conductor is

a) Force of attraction-4F b) Force of repulsion-4F
c) Force of attraction-F/4 d) Force of repulsion-F/4

10. An ammeter has a resistance of 0.1Ω. It can read upto 5A. To convert this into voltmeter to read 100V, the resistance to be used is
a) 19.9Ω in series b) 19.9Ω in parallel c) 199Ω in series d) 0.19Ω in parallel
11. A horizontal metal wire is to be prevented from falling under gravity and the wire carries current from North to South. Now external magnetic field should act towards
a) South b) North c) West d) East
12. The magnitude of magnetic force on a charge is zero when
a) Charge is at rest
b) Charge is moving parallel to the field
c) Charge is moving perpendicular to the field
d) Both when charge is at rest or moving parallel to the field
13. Light corresponding to transition $n = 4$ to $n = 2$ in H atom falls on an alkali metal with work function 1.9eV. maximum kinetic energy of photoelectron emitted will be (in eV)
a) 1.9 b) 1.65 c) 0.65 d) 2.55
14. In a photocell experiment, a convex lens is used to focus the light beam. Current strength is 'I'. if the lens is replaced by another lens of half the diameter but same focal length, photoelectric current will be
a) $I/2$ b) $I/4$ c) $I/8$ d) $I/16$
15. In a photo cell experiment, stopping potentials corresponding to 4000 $\mathring{A}$ and 5000 $\mathring{A}$ are obtained as 1.5V and 0.8V respectively. Work function of the metal is
a) 1.6eV b) 2eV c) 2.5eV d) 3eV
16. In Thomson's experiment, to confirm the existence of electron waves accelerating voltage is increased from the 1000V to 16000V. Radius 'R' of a particular ring in the diffraction pattern becomes
a) 16R b) R/16 c) R/4 d) 4R
17. The power factor of an Ac circuit having resistance ® and inductance (L) connected in series and an angular velocity ω is
a) R/ωL b) R/$(R^2 + \omega^2 L^2)^{1/2}$ c) $\omega L/R$ d) R/$(R^2 - \omega^2 L^2)^{1/2}$
18. The resistance of coil is 10Ω and its resistance is also 10Ω. What is the peak current in the circuit when applied emf is 220V?
a) $44\ A$ b) $22\sqrt{2}$ A c) $22\ A$ d) $(22/\sqrt{2})$A
19. We wish to make a Plano convex lens of focal length 16 cm from glass having refractive index 1.5. It is to be used in air. What should be the radius to curvature of the curved surface?
a) 8cm b) 12cm c) 16cm d) 24cm
20. In interference pattern, the width of the dark fringe is β_1, the width of the bright fringe is β_2. Then
a) $2\beta_1 = \beta_2$ b) $2\beta_2 = \beta_1$ c) $\beta_1 = \beta_2$ d) $\beta_1 + 3\beta_2 = 1$
21. In Somerfield's atomic model, corresponding to principal quantum number n = 3 there will be
a) 3 elliptical orbits b) 3 circular orbits
c) 1 circular and 2 elliptical orbits d) 1 elliptical and 2 circular orbits
22. Force acting on an electron in a Bohr orbit with quantum number n is proportional to
a) n^2 b) $1/n^2$ c) n^4 d) $1/n^4$
23. The ratio of energies of H atom in its first to second excited state is
a) 1:4 b) 4:1 c) 4:9 d) 9:4
24. Which is not true with respect to the Cathode rays?
a) A stream of electrons b) Charged particles
c) Move with speed same as that of light d) Can be deflected by magnetic fields
25. Radius of $_{13}Al^{27}$ nucleus (R_0 = 1.2 Fermi) in units of Fermi is
a) 1.2 b) 2.4 c) 3.6 d) 4
26. Activity of a radioactive sample reduces to $1/4^{th}$ of its original activity A_0 in 12 years. After another 12 years activity would become
a) $A_0/2$ b) $A_0/8$ c) $A_0/16$ d) $A_0/32$
27. In Raman spectrum spectral lines having frequencies greater than incident frequency are called

a) Rayleigh line b) Stoke lines c) Anti-Stokes lines d) Compton lines

28. Intensity of γ-rays from the given source is I_0. On passing through X meter of lead, it is reduced to $I_0/8$. Thickness of lead which will reduce it to ($I_0/2$) in meter is
    a) X/2 b) X/3 c) X/8 d) X/4
29. Acceptor level in case of p-type semiconductor lies
    a) Just below conduction band b) Just above valence band
    c) Much above conduction band d) Much below valence band
30. Phase angle between input and signals in a CE amplifier in degree is
    a) 0 b) 90 c) 180 d) 45
31. A constant force acts on two different masses independently producing acceleration a_1 and a_2. When the same force acts on their combined mass, the acceleration produced is
    a) $a_1 + a_2$ b) $a_1 a_2$ c) $\frac{a_1 a_2}{a_1 + a_2}$ d) $\sqrt{a_1^2 + a_2^2}$
32. Physical quantity which remains constant throughout the trajectory of a particle is
    a) Momentum b) Vertical component of velocity
    c) Horizontal component of velocity d) energy
33. A particle is projected with velocity 100m/s at 30^0. Time of flight is
    a) 5s b) 10s c) 15s d) 7.5s
34. A balloon starts rising from the ground with an acceleration $5m/s^2$. After 10s a stone is released from it. It reaches the ground after travelling a distance X in air under free fall. X is
    a) 375m b) 80m c) 500m d) 750m
35. Air is blown between two suspended balls. Then
    a) Positions of balls remain the same b) Balls move towards each other
    c) Balls move away from one another d) Balls starts spinning
36. Rise of the oil in the wick of a lamp is due to
    a) Viscosity b) Surface tension c) Elasticity d) Frictional force
37. A wave is represented by $Y = 0.5 \sin \pi\,(0.01X - 3t)$. X and Y are in m and t in sec. Speed of the wave is
    a) 30m/s b) 200m/s c) 150m/s d) 300m/s
38. Two sound waves of wavelengths 1m and 1.01m produce 34 beats in 10sec. Velocity of sound is
    a) 333m/s b) 300m/s c) 320m/s d) 343m/s
39. An open pipe emits a fundamental frequency n_0. One end is closed. The fundamental frequency emitted now is
    a) n_0 b) $\frac{n_0}{2}$ c) Greater than $\frac{n_0}{2}$ d) Less than $\frac{n_0}{2}$
40. Two spherical black bodies of radii r_1 and r_2 at temperature T_1 and T_2 respectively, radiate same power. Then $\frac{r_1}{r_2}$ must be equal to
    a) $\left(\frac{T_1}{T_2}\right)^2$ b) $\left(\frac{T_2}{T_1}\right)^2$ c) $\left(\frac{T_1}{T_2}\right)^4$ d) $\left(\frac{T_2}{T_1}\right)^4$
41. A gas is compressed adiabatically till its temperature is doubled. The ratio of initial volume to final volume is
    a) 2 b) Greater than 2 c) Less than 1 d) Between 1 and 2
42. Expansion of the Universe is accounted by
    a) Wien's law b) Stefan's law c) Doppler effect d) Kirchhoff's law
43. Lateral shift produced by a glass slab X. When the slab is immersed in a liquid, for the same incident ray lateral shift produced will be
    a) X b) Greater than X c) Less than X d) Zero
44. n_a, n_b, n_c are the refractive indices of three media A, B, C respectively for a particular wavelength, such that $n_a > n_b > n_c$. Total internal reflection is possible when light travels from
    a) C to A b) C to B c) B to A d) A to C
45. Two thin convex lenses each of focal length 0.5m are kept co-axially separated by a distance 0.5m. Focal length of the combination is
    a) 0.5m b) 1m c) 0.25m d) 1.5m

46. Light incident on an equilateral prism of refractive index $\sqrt{2}$ suffers minimum angle of deviation. Then angle of incidence and minimum angle of deviation are (in degree)
    a) 45,30 b) 30,45 c) 45,45 d) 30,30
47. A plano convex lens is made of glass of refractive index n and R is radius of curvature of curved surface. Its curved surface is silvered. It behaves as
    a) Convex mirror of focal length $\frac{R}{2n}$ b) Concave mirror of focal length $\frac{R}{2n}$
    c) Convex mirror of focal length $\frac{R}{2(n-1)}$ d) Concave mirror of focal length $\frac{R}{2(n-1)}$
48. When a thin transparent plate of refractive index 1.5 is introduced in the path of one of the interfering beams, 20 fringes shift. If the plate is replaced by another plate of refractive index 1.6 and half the thickness, the number of fringes that are displaced is
    a) 20 b) 12 c) 6 d) 18
49. Find the kinetic energy of the photoelectrons emitted when light of wavelength 4000Å is incident on a metal of work function 2eV (find approximately)
    a) 0.5 eV b) 1.1eV c) 2.5 eV d) 3 eV
50. A slit of width 0.1mm is illuminated normally by light of λ = 5000Å. Diffraction bands are observed on a screen 1m away from the slit. Third dark band is at a distance x form the central maximum. x is approximately
    a) 5mm b) 10mm c) 15mm d) 20mm
51. Prism spectrum and 1st order grating spectrum of a given light are under study. Then
    a) Prism spectrum will be more bright b) Grating spectrum will be more bright
    c) Both are equal bright d) Intensities of two spectra are unpredictable
52. Ordinary light incident on a glass slab at polaraising angle suffers a deviation of 22^0. angle of refraction in the glass slab in this case is (in degree)
    a) 22 b) 34 c) 56 d) 12
53. Plane polarised light is incident normally on a quarter wave plate with optical vibrations making angle 30^0 with its optic axis. The emerging light is passed through a rotating Nicol. Intensity from Nicol
    a) Does not alter b) Varies between maximum and zero
    c) Varies between maximum and minimum d) Will always be zero
54. The idea of quantum nature of radiation is used to explain
    a) Interference b) Diffraction
    c) Polarisation d) Photoelectron emission
55. Electric intensity due to an electric dipole varies with distance (r) as $E \propto r^n$ where n is
    a) 3 b) -3 c) 2 d) -2
56. A conducting sphere of radius R has surface charge density σ. The electric potential on its surface is
    a) $\frac{\sigma R}{\varepsilon_0}$ b) $\varepsilon_0 \sigma R$ c) $\frac{1}{\varepsilon_0}\frac{R}{\sigma}$ d) $\frac{1}{\varepsilon_0}\frac{\sigma}{R}$
57. A conducting sphere of radius R carrying +Q is connected to an uncharged conducting sphere of radius 2R. the charge that flows between them is
    a) $\frac{Q}{2}$ b) $\frac{Q}{3}$ c) $\frac{Q}{4}$ d) $\frac{2Q}{3}$
58. 'n' identical capacitors are grouped in series. n such capacitors are grouped in parallel. These two groups are connected in series. The effective capacitance of the combination is
    a) nC b) $\frac{n^2C}{(n^2+1)}$ c) $\frac{nC}{(n^2+1)}$ d) $\frac{(n^2+1)C}{n}$
59. Two air capacitors 5μF and 10μF, charged to 10V each are connected in parallel. The space between the 1st capacitor is filled with a material of dielectric constant 3. Potential difference across the capacitors becomes
    a) 10V b) 5V c) 3V d) 6V
60. Two capacitors (6μF 100V) and (4μF 100V) are connected in series. The capacitance and breakdown voltage of the combination will be
    a) 10μF 100V b) 2.4μF 100V c) 2.4μF 200V d) 10μF 200V