

## Pre-GUJCET Exam : 2018

<b>Test Booklet No.</b>	<b>0</b>	<b>0</b>	<b>1</b>
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This booklet contains  pages.

**DO NOT open this Test Booklet until you are asked to do so.**

**Important instructions:**

1. The **PHYSICS** test is consist of **40** questions. Each question carries 1 mark .For each correct response the candidate will get **1** mark. For each incorrect response,  $\frac{1}{4}$  mark will be deducted. The maximum marks are **40**.
2. The Test is of **1 hour** duration.
3. Use Black Ball point Pen only for writing on OMR answer sheet marking ● responses.
4. Rough work is to be done on the space provided for purpose in the Test booklet only.
5. **On completion of the test, the candidate must handover the Answer sheet to the invigilator in the Room/Hall . The candidates are allowed to take away this test booklet with them.**
6. The CODE for this booklet is **001**. Make sure that the **CODE** printed on the answer sheet is the same as that on this booklet. In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the test booklet and answer sheet.
7. The candidate should ensure that the answer sheet is nit folded. Do not make any stray marks on the answer sheet.
8. Do not write your seat No. anywhere else, except in the specified space in the test booklet/answer sheet.
9. Use of white fluid for correction is not permission on the answer sheet.
10. Each candidate must show , on demand his/her admission card to the invigilator
11. No candidate, without special permission of the superintendent or in invigilator, should leave his/her seat.
12. Use of manual calculator is permissible.
13. The candidate should not leave the examination Hall without handing over their answer sheet to the invigilator on duty and must sign the attendance sheet be deemed not to have handed over the answer sheet and dealt with as a unfair case.
14. The candidates are governed by all rules and regulations of the board with regard to their conduct in the regulation of the board .
15. No part of the Test Booklet and answer sheet shall be detached under any circumstance .
16. The candidates will write the correct Test Booklet code as given in the Test Booklet/Answer sheet in the attendance sheet.

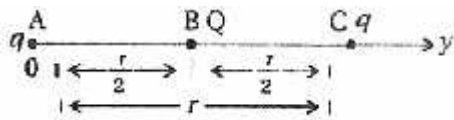
Candidate's Name : .....

Exam. Seat No. (in figures) ..... (in words) .....

Name of Exam. Centre : .....

Candidate's Sign..... Block Supt. Sign.....

- (1) Three charges  $q$ ,  $Q$  and  $q$  are placed on Y-axis,  $q$  remains in equilibrium when  $\frac{Q}{q} = \dots\dots\dots$

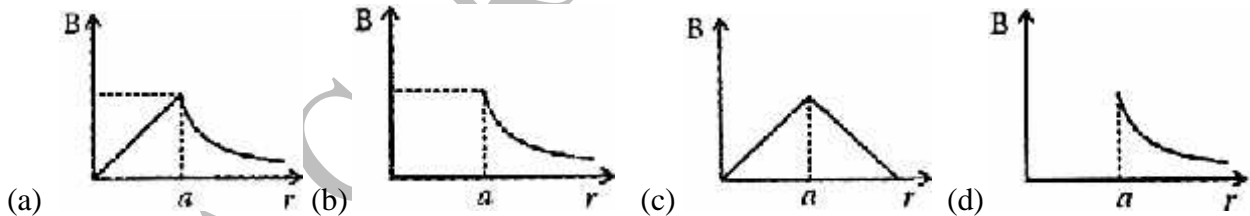


- (a) 0.25                      (b) -0.25                      (c) 0.5                      (d) -0.5
- (2) An electron is moving towards X-axis. An electric field is along y-direction. Then path of electron is  
 (a) Elliptical                      (b) Parabola                      (c) Circular                      (d) None of these
- (3) Electric flux going in and coming out of the closed surface respectively  $8 \times 10^3$  and  $4 \times 10^3$  unit. So, electric charge in a closed surface is.....  
 (a)  $4 \times 10^3 C$                       (b)  $-4 \times 10^3 C$                       (c)  $-4 \times 10^3 \epsilon_0 C$                       (d)  $\frac{-4 \times 10^3 C}{\epsilon_0}$
- (4) A parallel plate capacitor has a capacitance of  $C$ . If the distance between the plates of capacitors becomes half and if a dielectric medium is introduced between the plate, its new capacitance will be  $3C$ . What is dielectric constant of a medium?  
 (a) 1                      (b) 1.5                      (c) 2                      (d) 3
- (5) Potentials of points P and Q are 10 V and -4V respectively. Work done in taking 100 electrons from P to Q.....  
 (a)  $22.4 \times 10^{-16} J$                       (b)  $2.24 \times 10^{-16} J$                       (c)  $-9.6 \times 10^{-17} J$                       (d)  $9.6 \times 10^{-17} J$
- (6) A hollow metal sphere of radius 10 cm is charged so that the potential of 80 V produced at its surface. What will be the potential at the centre of this hollow sphere?  
 (a) 80V                      (b) 800V                      (c) 8 V                      (d) zero

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**(Space for Rough Work)**

- (7) Which is the dimensional formula for conductance from the given below?  
 (a)  $M^1L^2T^{-3}A^{-2}$       (b)  $M^{-1}L^{-2}T^3A^2$       (c)  $M^1L^3T^{-3}A^{-2}$       (d)  $M^{-1}L^{-3}T^3A^2$
- (8) emf of connected is 2.2 V. When  $5\Omega$  resistor is connected across the battery, its terminal voltage is 1.8 V. Internal resistance of battery =..... $\Omega$ .  
 (a)  $\frac{10}{9}$       (b)  $\frac{9}{10}$       (c)  $\frac{9}{5}$       (d)  $\frac{5}{9}$
- (9) The resistance of a wire is 5 ohm at  $50^\circ C$  and 6 ohm at  $100^\circ C$ . The resistance of the wire at  $0^\circ C$  will be...  
 (a) 3 ohm      (b) 2 ohm      (c) 1 ohm      (d) 4 ohm
- (10) An electric kettle has two filament, first filament can boll some water in 10 minutes and the other filament boils some water in 15 minutes. When both the coils are joined parallel, water will boil in..... minutes.  
 (a) 5      (b) 6      (c) 8      (d) 25
- (11) The magnetic field due to a straight conductor of uniform cross section of radius  $a$  and carrying a steady current is represented by




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(Space for Rough Work)

- (12) A strong magnetic field is applied on a stationary electron, then \_\_\_\_\_
- (a) The electron moves in the direction of the field.  
(b) The electron moves in an opposite direction.  
(c) The electron remains stationary.  
(d) The electron starts spinning.
- (13) A circular coil of radius 4 cm and of 20 turns carries a current of 3 Amperes. It is placed in a magnetic field at intensity of  $0.5 \text{ weber/m}^2$ . What is the magnetic dipole moment of the coil?
- (a)  $0.15 \text{ Ampere -m}^2$  (b)  $0.3 \text{ Ampere -m}^2$   
(c)  $0.45 \text{ Ampere -m}^2$  (d)  $0.6 \text{ Ampere -m}^2$
- (14) What is the value of gyromagnetic ratio?
- (a)  $8.8 \times 10^{11} \frac{\text{C}}{\text{kg}}$  (b)  $8.8 \times 10^{10} \frac{\text{C}}{\text{kg}}$  (c)  $8.8 \times 10^{11} \frac{\text{C}}{\text{kg}}$  (d)  $8.8 \times 10^9 \frac{\text{C}}{\text{kg}}$
- (15) A thin convex lens made from crown glass  $\left(\mu = \frac{3}{2}\right)$  has focallength  $f$ . When it is measured in two different liquids having refractive indices  $\frac{4}{3}$  and  $\frac{5}{3}$ , it has the focal lengths  $f_1$  and  $f_2$  respectively. The correct relation between the focal lengths is:
- (a)  $f_2 > f$  and  $f_1$  becomes negative (b)  $f_1$  and  $f_2$  both become negative  
(c)  $f_1 = f_2 < f$  (d)  $f_1 > f$  and  $f_2$  becomes negative

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(Space for Rough Work)

- (16) To increase magnification of telescope \_\_\_\_\_
- (a)  $f_0$  should be greater and  $f_e$  smaller      (b) Both  $f_0$  and  $f_e$  should be greater
- (c) Both  $f_0$  and  $f_e$  should be smaller      (d)  $f_0$  should be smaller and  $f_e$  greater
- (17) An image of a linear object due to a convex mirror is  $\frac{1}{4}$ <sup>th</sup> of the height of the object. If focal length of the mirror is 12 cm. Find the distance between the object and the image. The linear object is kept perpendicular to the axis of the mirror.
- (a) 22.5 cm      (b) 37.5 cm      (c) 30 cm      (d) 45 cm
- (18) An electron with rest mass  $m_0$  moves with a speed of  $0.8c$ . Its mass when it moves with this speed is \_\_\_\_\_
- (a)  $m_0$       (b)  $\frac{m_0}{6}$       (c)  $\frac{5m_0}{6}$       (d)  $\frac{3m_0}{5}$
- (19) The kinetic energy of photo electron emitted from a metal are  $k_1$  and  $k_2$  when it is irradiated with lights of wave length  $\lambda_1$  and  $\lambda_2$  respectively The work function of the metal is
- (a)  $\frac{k_1\lambda_1 - k_2\lambda_2}{\lambda_2 - \lambda_1}$       (b)  $\frac{k_1\lambda_2 - k_2\lambda_1}{\lambda_2 - \lambda_1}$       (c)  $\frac{k_1\lambda_1 + k_2\lambda_2}{\lambda_2 + \lambda_1}$       (d)  $\frac{k_1\lambda_2 + k_2\lambda_1}{\lambda_2 + \lambda_1}$
- (20) If kinetic energy of free electron is made double, change in de-Broglie wavelength will be \_\_\_\_\_
- (a)  $\sqrt{2}$       (b)  $\frac{1}{\sqrt{2}}$       (c) 2      (d)  $\frac{1}{2}$

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(Space for Rough Work)

- (21) The flux linked with coil at any instant 't' is given by  $\phi(t) = (10t^2 - 50t + 100)$  Wb. Then induced emf E at  $t = 3$  s is.....volt.
- (a) 10                      (b) -10                      (c) 20                      (d) -30
- (22) The instantaneous value of current in an a.c. circuit is  $I = 2 \sin\left(100\pi t + \frac{\pi}{3}\right)$  A. The current will be maximum for the first time at .....
- (a)  $t = \frac{1}{100}$  s              (b)  $t = \frac{1}{200}$  s              (c)  $t = \frac{1}{400}$  s              (d)  $t = \frac{1}{600}$  s
- (23) A coil has self inductance  $L = 0.04$  H and resistance  $R = 12 \Omega$ . When it is connected to 220 V, 50 Hz supply, what will be current flowing through the coil?
- (a) 12.7 A                      (b) 14.7 A                      (c) 11.7 A                      (d) 10.7 A
- (24) A L-C-R circuit connected to an A.C. source of frequency  $f$ . If current in phase leads by  $45^\circ$  then voltage, the capacitance of capacitor.....
- (a)  $\frac{1}{2\pi f(2\pi fL - R)}$       (b)  $\frac{1}{2\pi f(2\pi fL + R)}$       (c)  $\frac{1}{\pi f(2\pi fL - R)}$       (d)  $\frac{1}{\pi f(2\pi fL + R)}$
- (25) A transformer has 140 turns in the primary and 280 turns in the secondary. If current in primary is 4A, then the current in secondary will be.....
- (a) 4A                      (b) 2A                      (c) 6A                      (d) 10A
- (26) The direction of electromagnetic wave is in the direction of
- (a)  $\begin{matrix} \vec{E} \\ \vec{B} \end{matrix}$                       (b)  $\vec{E} \times \vec{B}$                       (c)  $\vec{B} \times \vec{E}$                       (d)  $\vec{B}$

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(Space for Rough Work)

- (27) In Fraunhofer diffraction width of slit is 0.5 mm and wavelength of light used is 500 nm. Diffraction angle for first order maximum will be.....  
(a)  $1.5 \times 10^{-4}$  radian (b)  $1.5 \times 10^{-3}$  radian (c)  $1 \times 10^{-3}$  radian (d)  $3 \times 10^{-3}$  radian
- (28) In Young's experiment, the point where path difference is  $\frac{\lambda}{6}$  ( $\lambda$  wave length of light) intensity of light =.....  
(a)  $\frac{3}{4}I_0$  (b)  $\frac{1}{\sqrt{2}}I_0$  (c)  $\frac{\sqrt{3}}{2}I_0$  (d)  $\frac{1}{2}I_0$
- (29) Maximum and minimum intensities due to super position of waves having intensities I and 4I will be.....  
(a) 5I and 3I (b) 9I and I (c) 5I and I (d) 9I and 3I
- (30) Energy required by electron in  $\text{Li}^{+2}$  to make transition from  $n = 1$  to  $n = 3$  will be ....  
(a) 12.1 eV (b) 36.3 eV (c) 108.8 eV (d) 122.4 eV
- (31) The ratio of areas of the electron orbits for the first excited state and the ground state for the hydrogen atom is .....  
(a) 16 : 1 (b) 2 : 1 (c) 4 : 1 (d) 8 : 1
- (32) 1g of radioactive element reduces to  $\frac{1}{3}$ g in 2 days. How much mass would be left out after 6 days?  
(a)  $\frac{1}{6}$ g (b)  $\frac{1}{9}$ g (c)  $\frac{1}{12}$ g (d)  $\frac{1}{27}$ g

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(Space for Rough Work)

- (33) The decay constants of two elements  $X_1$  and  $X_2$  are  $10\lambda$  and  $\lambda$ , respectively. If initially they have equal number of nuclei, after what time would the ratio of the numbers of nuclei of  $X_1$  and  $X_2$  be  $e^{\frac{1}{9}}$ ?
- (a)  $\frac{1}{10}$                       (b)  $\frac{1}{11}$                       (c)  $\frac{11}{10}$                       (d)  $\frac{1}{9}$
- (34) The half lives of an element for  $\alpha$ -decay and  $\beta$ -decay are respectively 4 Yr and 12 yr. What will be its activity in percentage of the initial activity after 12 yr?
- (a) 6.25                      (b) 12.5                      (c) 25                      (d) 50
- (35) N-P-N transistor are preferred to P-N-P transistor because they have .....
- (a) as low cost  
 (b) low dissipation of energy  
 (c) capable of handling larger power  
 (d) electrons have high mobility then holes and hence high mobility of energy.
- (36) Light of  $6000\text{\AA}$  wavelength is incident on a semiconductor electron hole pairs are produced. What is the band gap energy? ( $h = 6.62 \times 10^{-34} \text{ Js}$ )
- (a)  $2.07 \times 10^{-19} \text{ J}$                       (b)  $2.07 \text{ J}$                       (c)  $3.31 \times 10^{-19} \text{ J}$                       (d)  $3.07 \times 10^{-19} \text{ J}$
- (37) For a CB transistor circuit collector current is 5.488 mA and emitter current is 5.60 mA. The A.C. current gain  $\beta = \dots\dots\dots$
- (a) 48                      (b) 49                      (c) 50                      (d) 51
- (38) For a CE transistor current gain  $\beta = 50$ . Input resistance is  $1\text{k}\Omega$ . If change in input voltage is  $0.01\text{V}$ , A.C. then change in collector current is .....
- (a)  $100 \mu\text{A}$                       (b)  $0.01 \mu\text{A}$                       (c)  $0.25 \mu\text{A}$                       (d)  $500 \mu\text{A}$
- (39) A particle of mass  $m$  and charge  $+q$  is thrown with speed  $u$  at angle with horizontal. If in space an electric field of strength  $\vec{E}$  exist in vertical upward direction. Find the horizontal range of this projectile.
- (a)  $\frac{u^2 \sin 2}{g}$                       (b)  $\frac{u^2 \sin 2}{g + \frac{qE}{m}}$                       (c)  $\frac{u^2 \sin 2}{g - \frac{qE}{m}}$                       (d) Not possible
- (40) To transmit 20 MHz signal what should be minimum height of antenna?
- (a) 7.5 m                      (b) 3.75 m                      (c) 5 m                      (d) 2 m

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**(Space for Rough Work)**