

06/12/21

2021

Roll No: _____

INTERMEDIATE PART-II (12th CLASS) (SPECIAL EXAMINATION)
PHYSICS PAPER-II

TIME ALLOWED: 2.40 Hours

MAXIMUM MARKS: 68

SUBJECTIVE

NOTE: Write same question number and its part number on answer book, as given in the question paper.

SECTION-I

2. **Attempt any eight parts.** **8 × 2 = 16**
- (i) How can you identify which plate of a capacitor is positively charged?
 - (ii) Verify that an ohm times farad is equivalent to second.
 - (iii) Is E necessarily zero inside a charged rubber balloon if balloon is spherical? Assume that charge is distributed uniformly over the surface.
 - (iv) Calculate the electric flux through a surface enclosing a charge.
 - (v) If a charged particle moves in a straight line through some region of space, can you say that the magnetic field in the region is zero?
 - (vi) What is sweep or time base generator in an oscilloscope?
 - (vii) Why does a picture on a TV screen becomes distorted when a magnet is brought near the screen?
 - (viii) What is digital multimeter, give its advantage over the analog multimeter?
 - (ix) Does the induced 'emf' always act to decrease the magnetic flux through a circuit?
 - (x) Who discovered the electromagnetic induction?
 - (xi) How would you position a flat loop of wire in a changing magnetic field so that there is no 'emf' induced in the loop?
 - (xii) Derive an expression $\varepsilon = -N \frac{\Delta\phi}{\Delta t}$
3. **Attempt any eight parts.** **8 × 2 = 16**
- (i) Do bends in wire affect its electrical resistance? Explain.
 - (ii) Is the filament resistance lower or higher in a 500W, 220V light bulb than in a 100W, 220V bulb?
 - (iii) What are thermistors? Give its two uses.
 - (iv) Name the device that will permit flow of direct current but oppose the flow of alternating current.
 - (v) Write four properties of series resonance circuit.
 - (vi) At what frequency will an inductor of inductance $1H$ have a reactance of 500Ω ?
 - (vii) Write a short note on superconductors.
 - (viii) What is meant by paramagnetic and diamagnetic substances? Give examples for each.
 - (ix) Distinguish between intrinsic and extrinsic semiconductors.
 - (x) Why ordinary silicon diodes do not emit light?
 - (xi) What is the effect of forward and reverse biasing of a diode on the width of depletion region?
 - (xii) Write some application of photo diode.
4. **Attempt any six parts.** **6 × 2 = 12**
- (i) As a solid is heated and begins to glow, why does it first appear red?
 - (ii) Does the brightness of a beam of light primarily depends on the frequency of photons or on the number of photons?
 - (iii) State uncertainty principle and give its two mathematical forms.

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(2)

- (iv) What do you understand when we say that the atom is excited?
- (v) Give two postulates of Bohr's theory.
- (vi) Why are heavy nuclei unstable?
- (vii) A particle which produces more ionization is less penetrating. Explain it.
- (viii) Define decay constant and also give its unit.
- (ix) Write the name of basic forces in nature.

SECTION-II**NOTE: Attempt any three questions.****3 × 8 = 24**

- 5.(a) Define simple and complex networks and explain Kirchhoff's rules. 5
- (b) A particle having a charge of 20 electrons on it falls through a potential difference of 100 volts. Calculate the energy acquired by it in electron volts (eV). 3
- 6.(a) Explain three methods to produce induced current. Does induced current lag to an induced emf when the circuit is closed? 5
- (b) What current should pass through a solenoid that is 0.5m long with 10,000 turns of copper wire so that it will have a magnetic field of 0.4T.? 3
- 7.(a) What is an operational amplifier? Describe the use of an operational amplifier as non-inverting operational amplifier and find its gain. 5
- (b) A circuit has an inductance of $\frac{1}{\pi} H$ and resistance of 2000Ω . A 50 Hz A.C. is supplied to it. Calculate the reactance and impedance offered by the circuit. 3
- 8.(a) What are intrinsic and extrinsic semi-conductors? Discuss the formation of P-type and N-type material with their schematic diagram. 5
- (b) The half life of ${}_{38}^{91}Sr$ is 9.70 hours. Find its decay constant. 3
- 9.(a) Define Compton effect and derive an expression for the Compton shift. 5
- (b) What are the energies in eV of quanta of wavelength? $\lambda = 400, 500$ and $700 nm$ 3

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OBJECTIVE

MAXIMUM MARKS: 17

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that bubble in front of that question number, on bubble sheet. Use marker or pen to fill the bubbles. Cutting or filling two or more bubbles will result in zero mark in that question. No credit will be awarded in case BUBBLES are not filled. Do not solve question on this sheet of OBJECTIVE PAPER.

Q.No.1

- (1) Electron volt is the unit of:
 (A) Power (B) Energy (C) Voltage (D) Current
- (2) For a charged capacitor, energy density is given by:
 (A) $\frac{1}{2} \epsilon_0 \epsilon_r E^2$ (B) $\frac{1}{2} (\epsilon_0 + \epsilon_r) E^2$ (C) $\frac{1}{2} \frac{E^2}{\epsilon_0 \epsilon_r}$ (D) $\frac{1}{2} \frac{\epsilon_0 \epsilon_r}{E^2}$
- (3) The third band of colour code for carbon resistances indicates:
 (A) Tolerance (B) Second digit of numerical value
 (C) First digit of numerical value (D) Number of zeros after first two digits
- (4) A magnetic field has a strength of one tesla if it exerts a force of one Newton on one meter length of wire carrying a current of one ampere placed at:
 (A) An angle of 60° with the field
 (B) Right angle to the field (C) Parallel to the field (D) Antiparallel to the field
- (5) The ratio of charge to mass of an electron is given by:
 (A) $\frac{V}{B^2 r^2}$ (B) $\frac{2}{B^2 r^2}$ (C) $\frac{2V}{B^2 r^2}$ (D) $\frac{V^2}{B^2 r^2}$
- (6) The lenz's law is also a statement of law of conservation of:
 (A) Energy (B) Mass (C) Momentum (D) Charge
- (7) The principle of electric generator is based on:
 (A) Faraday's law (B) Lenz's law (C) Ampere's law (D) Ohm's law
- (8) The sum of the positive and negative peak values of an A.C. cycle is called:
 (A) Instantaneous value (B) Peak value (C) p - p value (D) rms value
- (9) The impedance of the series resonance RLC circuit is minimum at resonance frequency and it is equal to:
 (A) $\frac{R}{LC}$ (B) R (C) X_C (D) X_L
- (10) Semiconductors have conductivities ranging between:
 (A) 10^7 and $10^3 (\Omega m)^{-1}$ (B) 10^{-10} and $10^{-20} (\Omega m)^{-1}$
 (C) 10^{-6} and $10^{-4} (\Omega m)^{-1}$ (D) 10^{-10} and $10^{-7} (\Omega m)^{-1}$
- (11) The base of a transistor is very thin, of the order of:
 (A) $10^{-2} m$ (B) $10^{-3} m$ (C) $10^{-4} m$ (D) $10^{-6} m$
- (12) The ratio β is called current gain of a transistor and is given by:
 (A) $\frac{I_E}{I_B}$ (B) $\frac{I_C}{I_B}$ (C) $\frac{I_E}{I_C}$ (D) $\frac{I_B}{I_C}$
- (13) If the temperature of a perfect black body is doubled, the energy radiated per second per square meter increases by:
 (A) 16 times (B) 8 times (C) 4 times (D) 2 times
- (14) Rest mass energy of a positron is:
 (A) 1.02 MeV (B) 1.00 MeV (C) 0.511 MeV (D) 0.201 MeV
- (15) First Bohr orbit radius of the hydrogen atom is:
 (A) $0.053 \mu m$ (B) $0.053 mm$ (C) $0.053 nm$ (D) $0.053 pm$
- (16) Beta particles are fast moving:
 (A) Neutrons (B) Electrons (C) He atoms (D) Photons
- (17) The surface temperature of the sun is:
 (A) $20 M^\circ C$ (B) $15 M^\circ C$ (C) $10 M^\circ C$ (D) $5 M^\circ C$

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- (4) Beta particles are fast moving:
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- (5) The surface temperature of the sun is:
 (A) 20 M°C (B) 15 M°C (C) 10 M°C (D) 5 M°C
- (6) Electron volt is the unit of:
 (A) Power (B) Energy (C) Voltage (D) Current
- (7) For a charged capacitor, energy density is given by:
 (A) $\frac{1}{2} \epsilon_0 \epsilon_r E^2$ (B) $\frac{1}{2} (\epsilon_0 + \epsilon_r) E^2$ (C) $\frac{1}{2} \frac{E^2}{\epsilon_0 \epsilon_r}$ (D) $\frac{1}{2} \frac{\epsilon_0 \epsilon_r}{E^2}$
- (8) The third band of colour code for carbon resistances indicates:
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- (9) A magnetic field has a strength of one tesla if it exerts a force of one Newton on one meter length of wire carrying a current of one ampere placed at:
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- (14) The impedance of the series resonance RLC circuit is minimum at resonance frequency and it is equal to:
 (A) $\frac{R}{LC}$ (B) R (C) X_C (D) X_L
- (15) Semiconductors have conductivities ranging between:
 (A) 10^7 and $10^3 (\Omega\text{m})^{-1}$ (B) 10^{-10} and $10^{-20} (\Omega\text{m})^{-1}$
 (C) 10^{-6} and $10^{-4} (\Omega\text{m})^{-1}$ (D) 10^{-10} and $10^{-7} (\Omega\text{m})^{-1}$
- (16) The base of a transistor is very thin, of the order of:
 (A) 10^{-2}m (B) 10^{-3}m (C) 10^{-4}m (D) 10^{-6}m
- (17) The ratio β is called current gain of a transistor and is given by:
 (A) $\frac{I_E}{I_B}$ (B) $\frac{I_C}{I_B}$ (C) $\frac{I_E}{I_C}$ (D) $\frac{I_B}{I_C}$

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OBJECTIVE KEY FOR INTERMEDIATE ANNUAL EXAMINATION, 2021

Special

Name of Subject: Physics - II Session: Special 2021

Q.Nos	Paper Code 4471	Paper Code 4473	Paper Code 4475	Paper Code 4477
1	B	A	A	B
2	A	C	C	C
3	D	C	B	A
4	B	B	C	A
5	C	FIC	D	C
6	A	B	B	B
7	A	A	A	C
8	C	D	C	D
9	B	B	C	B
10	C	C	B	A
11	D	A	FIC	C
12	B	A	B	C
13	A	C	A	B
14	C	B	D	FIC
15	C	C	B	B
16	B	D	C	A
17	FIC	B	A	D
18	F/c mean full credit.			
19				
20				

Special

سرٹیفکیٹ بابت تصحیح سوالیہ پرچہ مارکنگ Key

ہم نے مضمون فزکس پرچہ II گروپ X انٹرمیڈیٹ پارٹ سیکنڈ سٹاپڈ امتحان 2021ء کا سوالیہ پرچہ انشائیہ و معروضی (Subjective & Objective) کو بنظر حقیقت چیک کر لیا ہے یہ پرچہ ALP Syllabus کے عین مطابق Set کیا گیا ہے۔ اس سوالیہ پرچہ میں کسی قسم کی کوئی غلطی نہ ہے۔ ہم نے سوالیہ پرچہ کا اردو اور انگریزی Version بھی چیک کر لیا ہے۔ یہ Version آپس میں مطابقت رکھتے ہیں۔ نیز اس پرچہ کی معروضی (MCQs) Key کی بابت تصدیق کی جاتی ہے کہ اس میں بھی کسی قسم کی کوئی غلطی نہ ہے۔ مزید یہ کہ ہم نے Key بنانے سے متعلق دفتر کی جانب سے تیار کردہ ہدایات وصول کر کے ان کا بغور مطالعہ کر لیا ہے اور ان کی روشنی میں Key بنائی ہے۔ نیز سب ایگزامینرز کیلئے تفصیلی مارکنگ ہدایات / مارکنگ سکیم / Rubrics بھی تیار کر دی گئی ہیں۔

Prepared & Checked By:

Dated: 07-12-2021

S.#	Name	Designation	Institution	Mobile No	Signature
1	افتخار رحمان	A/P	گورنمنٹ ملٹری کالج ملتان	03326060851	
2	کلیم اللہ	A/P	گورنمنٹ کالج آف سائنس ملتان	0301-7400172	
3	بشیر احمد	A/P	المہسن کونورسٹی ملتان	03006305057	

Re-Checked By ہم نے درج بالا سوالیہ پرچہ (انشائیہ + معروضی) معروضی "Key" اور ہدایات کے حوالہ سے مکمل طور پر تہیہ کر لی ہے۔ کسی قسم کی کوئی غلطی نہ ہے۔

1	Shahn d oghal	Associate prof - Govt. civil lines		03077360030	
2	Mehar Gjaz Ahmad.	SS.S (Plus)	GHSS Qadir Par Khan Multan	03006347269	

تاریخ 08-12-2021