

HARYANA PUBLIC SERVICE COMMISSION

BAYS NO. 1-10, BLOCK-B, SECTOR-4, PANCHKULA

Advt. No. 47 / 2023

Date of Publication: 24.06.2023

The Commission invites online applications from eligible candidates for the posts of **Post Graduate Teachers (PGTs)** in the subject of **Physics** for **Mewat Cadre**, for which the **Guidelines / steps for submission of online application form by the candidates are as under:-**

1. Candidates have to compulsorily **register** online by visiting regn.hpsc.gov.in directly OR through <http://hpsc.gov.in> for submitting their online application form.
2. After registration, a login ID would be created and the candidates will have to complete the registration process by using the login ID.
3. After completion of registration, the candidates can apply against the respective advertisement as per their qualifications.
4. Duly filled application form can be submitted only after payment of requisite fee.
5. After making payment, the candidates have to take a printout of their application form and upload the same after duly checking & signing it.
6. Application process would be completed only after submission of duly signed application form by the candidates.

For more information, log on to <http://hpsc.gov.in>

Date:- 24.06.2023



Secretary

Haryana Public Service Commission,
Panchkula

HARYANA PUBLIC SERVICE COMMISSION

BAYS NO. 1-10, BLOCK-B, SECTOR - 4, PANCHKULA

Advertisement No. 47/2023

Name of the Post: Post Graduate Teachers (PGTs) in the subject of Physics for Mewat Cadre.

Applications are being invited for the posts of Post Graduate Teachers (PGTs) in the subject of Physics for Mewat Cadre.

Item (s)	Timeline
Date of Publication	24.06.2023
Opening date for submission of online applications (Opening Date)	28.06.2023
Closing date for submission of online applications (Closing Date)	18.07.2023

(The Commission's Website: www.hpsc.gov.in)

NOTE:

- (i) Candidates who had applied earlier in response to Advertisement No. 31/2022 dated 19.11.2022 issued by Haryana Public Service Commission (HPSC), would have to submit fresh application. Their eligibility conditions with regard to Age, Fee deposition and having qualified HTET would be considered as per the cut-off date of the advertisement against which the candidates had applied earlier. In respect of other eligibility conditions, the determination of eligibility shall be with respect to the closing date for submission of online application form of this advertisement i.e. 18.07.2023. The cut-off date for Advertisement No. 31/2022 issued by HPSC was 01.01.2023. The candidates would be asked to provide their earlier Application No. and on entering the same, the application would be verified on the basis of the data already available with the Commission in response to earlier Advertisement.



- (ii) This advertisement should not be considered as a continuation of the earlier advertisement mentioned above.

IMPORTANT

1. **CANDIDATES TO ENSURE THEIR ELIGIBILITY FOR THE POST:**

- (i) The Candidates applying for the post should ensure that they fulfill all eligibility conditions for the post. Their admission to the recruitment process will be purely provisional subject to satisfying the prescribed eligibility conditions. Mere issuance of e-Admit Card to the candidate will not imply that her/his candidature has been finally cleared by the Commission. The eligibility of a candidate with reference to the documents submitted by her/him is assessed only after the candidate has qualified for the interview.
- (ii) The decision of the Commission with regards to the eligibility of a candidate shall be final.

2. **HOW TO APPLY:**

Candidates are required to apply online on the website <http://hpsc.gov.in>. Detailed instructions for filling up online applications are available on the above mentioned website. No other means / mode of submission of application will be accepted.

3. **LAST DATE FOR RECEIPT OF APPLICATIONS & ISSUE OF ADMIT CARD:-**

The online Applications can be submitted up to the **Closing Date i.e. 18.07.2023** till 11:55 PM. The eligible candidates shall be issued an e-Admit Card well before the commencement of the written test. The e-Admit Card will be made available on the website <http://hpsc.gov.in/en-us/> for downloading by the candidates. No Admit Card will be sent by post.



4. FACILITATION COUNTER FOR GUIDANCE OF CANDIDATES:

In case of any guidance/information/clarification regarding their applications, candidature etc, candidates can contact Helpline Number 1800 180 0431 or Helpdesk at email ID support-hpsc@hry.gov.in on any working day, between 10.00 hrs and 16.00 hrs.

5. NAME OF POST AND CATEGORY WISE BIFURCATION OF THE POSTS:

Haryana Public Service Commission invites online application forms for recruitment of 24 posts of Post Graduate Teachers (PGTs) in the subject of Physics, for Mewat Cadre.

Category-wise bifurcation of the posts is as under:-

Total Posts						33% Horizontal Reservation for Female Candidate				ESM 5% (horizontal from Gen, SC, BCA, BCB)				PwBD 4% (horizontal from Gen, SC, BCA, BCB)			
	Gen	SC	BC-A	BC-B	EWS	Gen	SC	BC-A	BC-B	GEN	SC	BCA	BCB	VH	OH	HH	ID/MD
24	13	05	03	01	02	04	02	01	00	01	00	00	00	01	00	00	00

Note 1. Abbreviations used:

Gen/ UR	-	General/Unreserved
SC	-	Scheduled Castes
BCA	-	Backward Classes (A) {Non Creamy layer}
BCB	-	Backward Classes (B){Non Creamy layer}
EWS	-	Economically Weaker Section
ESM	-	Ex-servicemen
PwBD	-	Persons with Benchmark Disabilities
PH (VH)	-	Physically Handicapped (Visual Impairment)
PH (OH)	-	Physically Handicapped (Ortho)
PH (HH)	-	Physically Handicapped (Hard of Hearing)
PH (ID/MD)	-	Physically Handicapped (Intellectual Disability/Multiple Disability)

Note 2. The number of posts given against each category is liable to variation.

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Note 3. As per Mewat District School Education (Group-B) Service Rules, 2012 dated 11.04.2012, alongwith amendment dated 06.06.2012, minimum thirty three percent posts in each category i.e. General/Open Competition (OC), Scheduled Caste (SC), Backward Class (BC), Ex-service man (ESM) and differently abled shall be reserved for women and this reservation shall be horizontal.

6. ESSENTIAL QUALIFICATION:

The essential qualification is as per Mewat District School Education (Group-B) Service Rules, 2012 dated 11.04.2012 as amended from time to time.

PGT Physics:-

- (i) M.Sc. Physics/ Applied Physics/ Nuclear Physics/Electronics Science/ Electronics with at least 50% marks and B.Ed. from recognized university; AND
- (ii) Matric with Hindi/Sanskrit or 10+2/B.A./M.A. with Hindi as one of the subject; AND
- (iii) Certificate of having qualified Haryana Teacher Eligibility Test (HTET) / School Teachers Eligibility Test (STET).
- (iv) Consistent good academic record.

NOTE 1:

- (i) A person who has passed STET/HTET without the qualification of B.Ed., before the notification of Mewat District School Education (Group-B) Service Rules, 2012 dated 11.04.2012, shall be considered eligible for the post of PGT in the case of direct recruitment.
- (ii) As per Mewat District School Education (Group-B) Service Rules, 2012 dated 11.04.2012, and amendment dated 22.03.2018, consistent good academic record means the candidate having 50% marks after taking average of any three examination from 10th / 12th / Graduation / Post Graduation as the case may be. However, the candidate must have atleast 50% marks in Post-Graduation except PGT Computer Science and in case of PGT Computer Science, the candidate must have atleast 55% marks in Post-Graduation / Graduation as the case may be.
- (iii) As per Mewat District School Education (Group-B) Service Rules dated 11.04.2012, Professional Training Diploma or Certificate awarded by any State, Board or University other than Haryana Education Department will be recognized only if this Degree or

Diploma or Certificate has been recognized by the Haryana Government.

- (iv) As per Mewat District School Education (Group-B) Service Rules, 2012 dated 11.04.2012, Relaxation upto 5% in the qualifying marks shall be allowed to the candidates belonging to Scheduled Caste (SC) and differently abled candidates (Persons with Benchmark Disability).

NOTE 2:-

- (i) The eligibility of candidates with regard to educational qualifications shall be determined on the **Closing Date i.e. 18.07.2023** fixed for submission of online application forms.
- (ii) All applicants must fulfill the essential requirements of the post and other conditions stipulated in the Advertisement on the **Closing Date i.e. 18.07.2023**. They are advised to satisfy themselves before applying that they possess at least the essential qualifications laid down for various posts. No enquiry asking for advice as to eligibility will be entertained.
- (iii) The certificates/ documents in support of the claim should be possessed by the candidates on or before the **Closing Date i.e. 18.07.2023**. The certificates issued after the Closing Date will not be accepted by the Commission.
- (iv) The improvement in marks obtained by a candidate after the **Closing Date i.e. 18.07.2023** shall not be considered for any purpose in this recruitment.
- (v) The prescribed essential qualifications are the minimum and mere possession of the same does not entitle candidates to be called for interview.
- (vi) The candidate should, mention all her/his qualifications and experience in the relevant field over and above the minimum qualifications.

Scheme/Pattern of Exam:-

1. Screening Test

a) Total number of MCQs: 100

- (i) Around 80% of the total questions will be from the concerned subjects as per syllabus enclosed at **Annexure-I**. Remaining questions will be from the topics of Educational Psychology, Pedagogy, General Awareness, General Mental Ability,

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Comprehension, Logical Reasoning and Analytical Ability, Decision making and problem solving, Basic numeracy, Data interpretation and the questions related to History, Geography, Polity, Economy and Culture of Haryana.

- b) Time duration of the exam: 02 hours
- c) Total Marks: 100
- d) All questions carry equal marks.
- e) Each question will have five options (A, B, C, D and E). If a candidate is attempting a question, she/he shall have to darken the appropriate circle A, B, C or D and if not attempting a question then, she/he shall have to darken E circle. If no circle is darkened, one fourth (0.25) mark shall be deducted.
- f) Any candidate not darkening any of the five circles in more than 10% questions shall be disqualified.
- g) One-fourth mark will be deducted for each wrong answer.
- h) The examination paper will only be in English language.
- i) Candidates four times the numbers of advertised posts, including bracketed candidates if any, category-wise, will be called for the next stage of selection process, provided that they have secured the minimum cut-off marks of 25% in the screening test.
- j) In cases, where the total number of applicants is less or nearly four times the number of advertised posts, the Commission reserves its right to call the candidates directly for the subject knowledge test.
- k) The marks obtained by the candidates in the screening test will not be counted for final selection because it is only for short listing of category-wise candidates, for the subject knowledge test.

2. Subject Knowledge Test

- a) Time duration of exam: 03 hours



- b) Total Marks : 150
- c) The syllabus is enclosed at **Annexure-I**.
- d) The examination paper will only be in English language.
- e) The numbers of the candidates to be called for interview will be two times, including bracketed candidates if any, of the number of category-wise advertised posts provided that they have secured the minimum cut-off marks of 35%.
- f) The weightage of the subject knowledge test will be 87.5%.

3. Interview/Viva-Voce

The weightage of the interview will be 12.5%.

The final merit list will be prepared by adding the marks of the subject knowledge test and interview/viva-voce.

7. **SCALE OF PAY:** Rs.47,600-1,51,100/- + usual allowances as applicable time to time.

8. SERVICE RULES OF THE POSTS:

The Recruitment will be made strictly in accordance with the relevant Service Rules (Mewat District School Education (Group-B) Service Rules 2012) as amended from time to time and as per existing Govt. instructions issued by the Govt. upto the date of issuance of this Advertisement. The relevant Service Rules are available on the website of www.schooleducationharyana.gov.in/service-rules/page/3/

9. ELIGIBILITY CONDITIONS (NATIONALITY):

For this recruitment, a candidate must be either:-

- (a) a citizen of India, or
- (b) a subject of Nepal, or
- (c) a subject of Bhutan, or
- (d) a Tibetan refugee who came over to India before 1st January, 1962 with the intention of permanently settling in India, or
- (e) a person of Indian origin who has migrated from Pakistan, Burma,

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Sri Lanka, East African countries of Kenya, Uganda, the United Republic of Tanzania, Zambia, Malawi, Zaire, Ethiopia and Vietnam with the intention of permanently settling in India.

Provided that a candidate belonging to categories (b), (c), (d) and (e) shall be a person in whose favour a certificate of eligibility has been issued by the Government of India.

A candidate in whose case a certificate of eligibility is necessary, may be admitted to the examination but the offer of appointment may be given only after the necessary eligibility certificate has been issued to her/him by the Government of India.

- 10. AGE LIMITS:** Candidate should not be less than 18 years and not more than 42 years, as the closing date fixed for submission of online application forms to the commission **i.e. 18.07.2023.**

The relaxation in maximum age for various categories is available as under:-

Sr. No.	Categories where relaxation is admissible	No. of years of relaxation
(i)	Schedules Castes of Haryana	5 years
(ii)	Backward Classes of Haryana	5 years
(iii)	Disabled persons who covered under the Rights of Persons with Disabilities Act, 2016.	<p>(i) 10 years relaxation in age (+5 years if PwBD applicant belongs to S/Caste, S/Tribe, B/Classes, EWS Category) subject to maximum 52 years, for Group A & B posts where recruitment is made otherwise than through open competitive examination.</p> <p>(ii) 5 years' relaxation in age (+5 years if PwBD applicant belongs to S/Caste, S/Tribe, B/Classes, EWS Category (subject to maximum 52 years) for Group A & B posts where</p>

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		recruitment is made through open competitive examination. Note - Relaxation in age limit shall be applicable irrespective of the fact whether the post is reserved for PwBD or not, provided the post is identified suitable for persons with disabilities.
(iv)	Wives of military personnel who are disabled while in military service.	5 years
(v)	Widowed or legally divorced women.	5 years
(vi)	Judicially separated women residing separately for more than two years from the date as prescribed for the purpose of age for candidates of other categories.	5 years
(vii)	Unmarried women.	5 years
viii)	Ex-serviceman including Short Service Commissioned and Emergency Commissioned Officer's	Relaxation in age to the extent of his military service added by three years provided – (a) he has rendered continuous military service for a period of not less than six months before his release; and (b) he was released otherwise than by way of dismissal or discharge on account of misconduct or inefficiency. Note:- For appointment of an ex-serviceman to a post of Group A or B, his/her age will be calculated keeping in view the actual age minus (actual period of



		<p>military service plus up to three years of break, if any, between military and Civil Service). If the resultant age does not exceed the maximum age limit, including the No. of years of any other relaxation in age admissible to him, prescribed for the post for which she/he is seeking appointment she/he shall be deemed to satisfy the condition regarding age limit.</p>
(ix)	<p>Persons who have already worked or presently working on adhoc / contract / work-charged / daily wages basis in any Department / Board / Corporation of Haryana Government including Government-aided institutions under Haryana Government.</p>	<p>Relaxation in age Equal to the number of completed years only on equivalent post on adhoc/ contract/ work-charged/ daily wages basis excluding the period of break, if any, including any other age relaxation admissible, if any, subject to maximum age of 52 years and also subject to the condition that if once a person has been appointed on regular basis in any Department / Board / Corporation etc. of Haryana Government with the benefit of relaxation in age he will not be entitled to avail the same again for any subsequent appointment.</p> <p>Note:- The experience certificate (s) of equivalent post issued by the Appointing Authority of respective Department / department / Board / Corporation / Government-aided Institution only shall be valid. Before grant of benefit of relaxation in age, the</p>

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		experience certificate(s) shall be got verified by the HPSC from the concerned Appointing Authority(ties).
<p>Note:- The upper age limit for an applicant of any category (except Ex-servicemen) shall not exceed 52 years who is entitled to avail the benefit of relaxation in age of one or more of the categories mentioned above.</p> <p>Note:- The age concession to SC/BC-A/BC-B/ESM is admissible only where the posts are reserved for these category.</p>		

Note: As per Mewat District School Education (Group-B) Service Rules, 2012 dated 11.04.2012, Teachers working in privately managed Government aided, recognized and Government schools, shall be given age relaxation in upper age limit to the extent of service rendered by them as a teacher subject to a maximum of five years. However, the said relaxation shall be as a onetime measure only.

11. RESERVATION:

- (i) The benefit of reservation will be given only to those SC/BC-A/BC-B/ EWS/ PwBD/ESM category candidates who are domiciles of Haryana State.

Note:- Uploading of the category certificate is not mandatory. However, if the valid certificate is not uploaded then her/his candidature will be considered in General Category.

- (ii) **For BC-A & BC-B category candidates:-**

The candidates belonging to BC-A/BC-B categories are directed to obtain the fresh/latest BC-A or BC-B certificate, as the case may be, as per Haryana Government Notification No. 491-SW(1) 2021 dated 17.11.2021 and Government instructions No. 22/132/2013-IGS-III dated 22.03.2022. This certificate should be issued in the year 2023-2024.



- (iii) Some candidates having OBC certificate are advised to submit BC-A / BC-B certificate as per instructions detailed above.
- (iv) The women candidates seeking reservation under SC/BC-A/BC-B category are required to submit the Caste Certificate issued by the Competent Authority from **Father's side** only. It should be noted that Certificate from **any other side** will not be entertained.
- (v) The candidates of reserved categories of Haryana for which no post is available /reserved, if any, can apply for the posts of General category, if she/he fulfils all the eligibility conditions as meant for General category candidates, except fee. Such candidates must attach scanned copy of their caste certificate for claiming fee concession.
- (vi) It is clarified that only such SC/BCA/BCB candidates who are selected on the same standards as applied to General candidates shall not be adjusted against reserved vacancies. In other words, when a relax standard is applied in selection of an SC/ BCA/BCB candidate, e.g. in the age limit experience, qualification, extended zone of consideration larger than what is provided for general category candidate etc. the SC/BCA/BCB candidates are to be counted against reserve vacancies. Such candidates would be deemed as unavailable for consideration against unreserved vacancies.
- (vii) The reserved category candidates belonging to other States will compete against the posts meant for General/Unreserved Category and will be considered as General/Unreserved category candidates.
- (viii) Reservation for Freedom Fighters (FF) and their children/grand children (Dependants of Freedom Fighters) (DFF) of Haryana will be available only if quotas reserved for Ex-servicemen or Backward Classes remains unfilled due to non-availability of suitable Ex-servicemen (ESM) or Children of Ex-servicemen or non-availability of suitable candidates from Backward Classes. Over all reservation, either from the unfilled vacancies of



Ex-servicemen or from the Backward Classes, for FF and DFF of Haryana will remain limited to 2% only. This benefit will be available to all grand children i.e. sons and daughters of sons and daughters (parental as well as maternal) of the Freedom Fighters. DFF shall be required to upload the Certificate duly issued by the respective competent authority.

- (ix) The reservation for **Ex-servicemen of Haryana** will be given as per instructions issued vide No. 12/15/2019-4GS-II dated 09.03.2022 and further clarified vide letter even No. dated 13.04.2022 by the Chief Secretary to Govt. Haryana. The candidates belonging to DESM/DFF categories are directed to submit a DESM/DFF certificate valid on the closing date for submission of online application form, as the case may be.
- (A) An ex-serviceman who herself/himself or her/his family members has already secured employment in civil service on regular basis in any Department/ Board/ Corporation/ University etc. under the State Government with availing the benefit of reservation.
- (i) she/he herself/himself shall not be entitled to avail the benefit of reservation in civil service for any subsequent appointment in any Department / Board / Corporation / University etc. under the State Government. However, the benefit of age relaxation for securing another employment in a higher pay scale or post shall remain continue; and
- (ii) her/his family member shall also not be entitled to avail the benefit of reservation against the posts reserved for ex-servicemen.
- (B) (i) An ex-servicemen who herself/himself has already secured employment in civil services on regular basis in any Department / Board/ Corporation/University etc. under the State Government without availing the benefit of reservation in such case she/he herself/himself or one of her/his family members (son, daughter or spouse) will be entitled to avail the benefit of reservation;
- (ii) where an ex-servicemen who herself/himself is eligible to avail the benefit of reservation under these instructions but she/he does not want

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re-employment in civil service in such case one of her/his family members (son, daughter or spouse) will be entitled to avail the benefit of reservation.

- (C) If an ex-servicemen applies for various vacancies before joining any civil employment, she/he can avail the benefit of reservation as ex-servicemen for any one of the subsequent employments. However, to avail of this benefit, an ex-servicemen as soon as she/he joins any civil employment, should give self-declaration/undertaking to the concerned employer about the date-wise details of application for various vacancies for which she/he had applied for before joining the initial civil employment. Further, this benefit would be admissible only in respect of vacancies which are filled by direct recruitment and wherever reservation is applicable to the ex-servicemen.
- (D) The family members of martyr military personnel shall be entitled to exercise an option either:-
- (i) to avail the benefit of reservation upto two family members; or
 - (ii) to avail the benefit of compassionate appointment to one of the family members under the Ex-gratia Policy namely *Compassionate Appointment to family members of Martyr Armed forces Personnel Policy* notified by Government from time to time.
- (E) The priority list for recruiting agency for preparation of final list of selection/ appointment of ex-servicemen or their family members against the posts reserved for ex-servicemen shall be as under:-
- (i) disabled ex-servicemen, the post(s) for which they are physically fit;
 - (ii) failing i), family member of disabled ex-servicemen;
 - (iii) failing ii), other ex-servicemen who are eligible to get the benefit of reservation under these instructions;
 - (iv) failing iii), family member of other ex-servicemen who are eligible to get the benefit of reservation under these instructions.
- (F) 'Disabled ex-serviceman' means a person who has been released from military service due to disability attributable or aggravated due to military service. An ex-serviceman shall not be treated disabled one

who has been released from military service not on account of her/his disability but has been released in the normal course after the completion of her/his term or retired from military service voluntarily.

- (G) Both the reservations are horizontal, therefore, a disabled Ex-servicemen who is selected against the post reserved for Ex-servicemen will not be counted against the post reserved for PwBD.
- (H) In all circumstances the benefit of reservation against the posts reserved for Ex-servicemen shall be admissible at the time of final selection list only and not at the time of preliminary test, main test or interview.
- (I) An ex-serviceman who has been discharged from military service by way of dismissal, misconduct or inefficiency neither she/he herself/himself nor her/his family members shall be entitled to avail the benefit of reservation in civil service.

12. Definition of Ex-Serviceman (ESM) (As per Haryana Govt. Instructions No. 36034/5/85-Estt. (SCT) dated 14.04.1987, No. 12/99/8-2GSII dated 08.11.1988 and No. 12/18/2006-4GSII dated 08.01.2008) is as under:-

“An ex-serviceman’ means a person, who has served in any rank whether as a combatant or non-combatant in the Regular Army, Navy and Air Force of the Indian Union and

- (I) who retired from such service after earning her/his pension; or
- (II) who has been released from such service on medical grounds attributable to military service or circumstances beyond his control and awarded medical or other disability pension; or
- (III) who has been released otherwise than on his own request from such service as a result of reduction in establishment; or
- (IV) who has been released from such service after completing the specific period of engagements, otherwise than at his own request or by way of dismissal or discharge on account of misconduct or inefficiency, and has been given a gratuity’; and includes personnel of the Territorial Army of the following categories namely:-

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- Pension holders for continuous embodied service,
 - Persons with disability attributable to military service; and
 - Gallantry award winners.”
- a) ESM candidates of Haryana claiming benefit under this category must have valid Ex-Serviceman Certificate issued by Zila Sainik Board showing the date of entry into military and date of release, on the **Closing Date i.e. 18.07.2023** fixed for submission of online applications and will have to produce the same as and when required by the Commission.
- b) Dependents of Ex-serviceman (DESM) candidates will be considered as General / SC / BC-A / BC-B Category (their own category) candidates for all intents and purposes. However, in case of non-availability of suitable Ex-Servicemen (ESM) of Haryana, their dependent sons and daughters of the same category who fulfill all the conditions of qualifications, age etc. prescribed for the posts in question will also be considered on merit against the reserved posts for ESM and this entitlement would be available to one dependent child only. Dependents of Ex-serviceman (DESM) of Haryana claiming benefit must have valid eligibility certificate issued by Zila Sainik Board on the last date of submission of online application form.

13. For EWS Category candidates:-

As per Government instructions issued vide No. 22/12/2019-1GS-III dated 25.02.2019, the EWS certificate on prescribed proforma should be valid for the year in which the candidate have applied for the post i.e. the said certificate should be **valid** for the Financial year 2023-2024. In case the vacancies earmarked for EWS cannot be filled up due to non-availability of a suitable candidate belonging to EWS, such vacancy will be filled from General/Unreserved category.



14. EVIDENCE OF AGE: The Birth Certificate or Matriculation certificate or equivalent academic certificate or the date in accordance with the date of birth as verified in the Family Information Data Repository establish under sub section (1) of section 6 of the Haryana Parivar Pehchan Act, 2021 thereto are the only acceptable document for evidence of age.

15. APPLICATION FEE:

The category wise application fee payable through Net Banking, Debit Card and Credit Card upto 11:55 PM of the **Closing Date i.e. 18.07.2023** is as under:-

Sr. No.	Categories of candidates	Fee (Rs.)
1.	For Male candidates of General category.	1000/-
2.	For all Female candidates.	250/-
3.	(i) For Male candidates of SC / BC-A (Non Creamy Layer) / BC-B (Non Creamy Layer) / ESM categories who are bonafide residents of Haryana only. (ii) Economically Weaker Sections (EWS) who are bonafide residents of Haryana only.	250/-
4.	For all Persons with Disabilities category candidates (with at least 40% disability) who are bonafide residents of Haryana only.	NIL

Note 1: Fee will not be refunded to those candidates who did not appear in the Recruitment test.

Note 2: Applications without the prescribed fee (unless remission of fee is claimed) shall be summarily rejected.

Note 3: Fee once paid shall not be refunded under any circumstances nor can the fee be held in reserve for any other examination or selection.

16. SPECIAL INSTRUCTIONS REGARDING SUBMISSION OF APPLICATIONS:

(i) The candidates should read the instructions and procedures carefully before starting filling the Online Application Form and check all the particulars

filled up in application form after getting the printout to ensure the correctness of information and upload all documents before finally submitting the application.

- (ii) The candidates should fill all details while filling the Online Application Form. Due care should be taken by the candidates while filling up the online application form. Incomplete or defective application form shall be summarily rejected. No representation or correspondence regarding such rejection shall be entertained under any circumstances.
- (iii) Candidates are advised to fill their application forms carefully such as Name, Father's/Mother's name, Date of Birth, Category, Qualification, marks obtained, passing year, photo, Signature, details & fee etc. The candidate should mention the Category to which he belongs, in the application form. After final submission of application form, no change will be allowed and no request for change of any particular/s in the online application form shall be entertained by the Commission after submission of application form.
- (iv) Candidate will be responsible for any mistake in the application form and fees paid by her/him. In case candidate feels that she/he has filled up the form erroneously, she/he should fill up a fresh online application form alongwith fresh requisite fee before the **Closing Date i.e. 18.07.2023**.
- (v) The applicants are advised to submit only single application. However, if due to any unavoidable situation, if she/he submits another/multiple applications, then she/he must ensure that application with the Highest Application Number is complete in all respects like applicant's details, examination centre, photograph, signature, fee etc. The applicants who submit multiple applications should note that only the application with Highest/Latest Application Number shall be entertained by the Commission, and also that the fee paid against one Application Number shall not be adjusted against any other Application Number.
- (vi) After successful submission of application, candidates should take print out of application form. The hard copy of application form along with all uploaded documents must be brought at the time when called upon to do so by the Commission. No document/s which has/have not been uploaded shall be entertained.
- (vii) The application of the candidates, who do not fulfill the



qualifications/eligibility conditions on the **Closing Date i.e. 18.07.2023** shall not be accepted by the online application system.

(viii) Documents to be uploaded with Application Form:

1. Scanned Photo duly signed by the Candidate.
2. Scanned Signature of the Candidate.
3. Scanned copies of degrees and mark sheets of Educational Qualifications.
4. Scanned copy of SC/BC-A/BC-B/EWS/ESM/DESM/DFE certificate. BC-A & BC-B certificate issued in the year 2023-2024 as per Latest Government Instruction dated 17.11.2021 and 22.03.2022. EWS Certificate should be valid for the year 2023-2024.
5. Scanned copy of PwBD Certificate. (For PwBD).
6. Scanned copy of Haryana Bonafide Resident Certificate.
7. Scanned copy of NOC from Department (For Haryana Govt. Employees who have signed Bond)
8. Scanned copy of proof of having worked on adhoc/contract/work-charged/daily wages basis in any Department / Board / Corporation of Haryana Government (For candidates claiming benefit of age relaxation).
9. Scanned copy of Aadhar and Parivaar Pehchaan Patra duly signed by the candidate.

17. REGARDING NO OBJECTION CERTIFICATE BY THE EMPLOYER:

- (i) The employees of Haryana Government who have not executed any bond with the State Government, may forward their application without NOC from the Department. However, self-declaration of such Government employees is required to be submitted to the effect that employee is not facing any disciplinary proceedings. In case of employees who have executed bond with the State Government (e.g. Doctors), the NOC of Head of the Department (HOD) shall, however, be required. If the candidate resigns after sending the application, then such candidate will be interviewed only if she/he produces a letter from the HOD to the effect that she/he has resigned from the post and her/his resignation has been accepted. The NOC or the letter, as the case may



be, shall be submitted on or before the date of her/his interview failing which she/he will not be interviewed.

- (ii) The candidate who joins service under any Government, Quasi-Government Organization, Public Sector Undertaking after the submission of application and has executed a bond, will have to produce No Objection Certificate from the employer, on or before the date of her/his interview failing which he or she will not be interviewed.

Persons in private employment are not required to submit their application forms through their employer or to produce the employer's NOC / permission at the time of interview.

18. SCRIBE / EXTRA TIME FOR PWBD CATEGORY CANDIDATES:

- i) An extra / compensatory time @ 20 minutes per hour will be allowed in each paper to the Persons with Benchmark Disabilities (Blind and Low vision or Locomotor Disability), only on production of a Medical Certificate issued by Medical Board constituted by the Chief Medical Officer of concerned district, and after issuing permission by the Commission in this regard.

The PwBD (Blindness and Low vision) candidates who want only extra time (without the help of a scribe) will have to apply to the Commission for the permission for extra time well in time.

PwBD candidates suffering from Locomotors Disability who want extra/ compensatory time will have to apply to the Commission for permission. Such candidates will be allowed extra time @ 20 minutes per hour for Examination, on production of medical certificate issued by a Medical Board, clearly stating therein that the candidate's writing ability is severally affected due to her /his disability.

- ii) The PwBD (Blindness and Low vision) candidates who want the help of a scribe to write her/his paper will have to apply to the Commission for the permission of a scribe separately well in time i.e. at least 03

working days prior to the commencement of the Examination. No online request for a scribe will be accepted by the Commission.

- iii) The candidate has to make her/his own arrangement of a scribe.
- iv) The scribe should be a studying-student upto 10+2 and her/his photo & other particulars should be duly verified by the Principal of the Institution in which the student is studying.
- v) It should be noted that no such permission in the above cases will be granted by the Centre Supervisor.

19. PENALTY FOR CERTAIN ACTS:

- (A) The provisions of Haryana Public Examination (Prevention of Unfair Means) Act, 2021 would also be applicable.
- (B) A candidate who is or has been declared by the Commission to be guilty of:
 - (i) Obtaining support for his candidature by the following means, namely:—
 - (a) offering illegal gratification to; or
 - (b) applying pressure on; or
 - (c) blackmailing, or threatening to blackmail any person connected with the conduct of the examination; or
 - (ii) impersonation; or
 - (iii) procuring impersonation by any person; or
 - (iv) submitting fabricated documents or documents which have been tampered with; or
 - (v) Uploading irrelevant photos in the application form in place of actual photo/signature.
 - (vi) Making statements which are incorrect or false or suppressing material information; or
 - (vii) Resorting to the following means in connection with his candidature for the examination, namely:—
 - (a) obtaining copy of question paper through improper means;
 - (b) finding out the particulars of the persons connected with secret work relating to the examination;
 - (c) influencing the examiners; or



- (viii) being in possession of or using unfair means during the examination; or
- (ix) writing obscene matter or drawing obscene sketches or irrelevant matter in the scripts; or
- (x) misbehaving in the examination hall including tearing of the scripts, provoking fellow examinees to boycott examination, creating a disorderly scene and the like; or
- (xi) harassing or doing bodily harm to the staff employed by the Commission for the conduct of their examination; or
- (xii) being in possession of or using any mobile phone, (even in switched off mode), any electronic equipment or programmable device or storage media like pen drive, smart watches etc. or camera or bluetooth devices or any other equipment or related accessories either in working or switched off mode capable of being used as a communication device during the examination; or
- (xiii) violating any of the instructions issued to candidates along with their admission certificates permitting them to take the examination; or
- (xiv) attempting to commit or, as the case may be, abetting the commission of all or any of the acts specified in the foregoing clauses; may in addition to rendering himself liable to criminal prosecution, be liable :—
 - (a) to be disqualified by the Commission from the Examination for which he is a candidate; and/or
 - (b) to be debarred either permanently or for a specified period:—
 - (i) by the Commission, from any examination or selection held by them;
 - (ii) by the Government from any employment under them; and
 - (c) to disciplinary action under the appropriate rules if he is already in service under Government:

Provided that no penalty under this rule shall be imposed except after:—

- (i) giving the candidate an opportunity of making such representation in writing as he may wish to make in that behalf; and
- (ii) taking the representation, if any, submitted by the candidate within the period allowed to him into consideration.

20. CORRESPONDENCE WITH THE COMMISSION:

The Commission will not enter into any correspondence with the candidates

about their candidature except in the following cases:-

- i) If a candidate is not able to download her/his e-Admit Card or does not receive any other communication regarding her/his candidature for the examination well before the commencement of the examination, she/he should at once contact the Commission. Information in this regard can also be obtained Helpline Number 1800 180 0431 or Helpdesk at email ID support-hpsc@hry.gov.in on any working day. In case no communication is received in the Commission's Office from the candidate regarding non-receipt of her/his e-Admit Card well before the examination, she/he herself/himself will be solely responsible for non-receipt of her/his e-Admit Card. No candidate will ordinarily be allowed to take the examination unless she/he holds an e-Admit Card for the examination. On downloading of e-Admit Card, the candidates should check it carefully and discrepancies/errors, if any, should be brought to the notice of the Commission immediately.
- ii) Candidates should note that the name in the Admit Card in some cases may be abbreviated due to technical reasons.
- iii) Candidates must ensure that their Mobile No. & Emails IDs given in their online application are valid and active.
- iv) All communications to the Commission should invariably contain the following particulars:-
 1. Name and year of the examination.
 2. Application Number
 3. Roll Number (if received)
 4. Name of candidate (in full and in block letters)
 5. Complete postal address as given in the application.
 Communication not containing the above particulars may not be attended to.
- v) Candidates should note down their Application Number for future reference. They may be required to indicate the same in connection with their candidature in future.
- vi) Candidates will be informed of the final result in due course through HPSC website/ Newspaper and the interim enquires about the result are, therefore, unnecessary and will not be attended to. The Commission do not enter into correspondence with the candidates about reasons for their non-selection for



interview/appointment.

All correspondence with the Commission should be addressed to the Secretary, Haryana Public Service Commission, Bays No. 1-10, Block- B, Sector-4, Panchkula, Haryana.

21. GENERAL INSTRUCTIONS:

- i) The use of any mobile phone (even in switched-off mode), any electronic equipment or programmable device or storage media like pen drive, smart watches etc. or camera or blue tooth devices or any other equipment or related accessories either in working or switched-off mode capable of being used as a communication device during the examination is strictly prohibited. Any infringement of these instructions shall entail disciplinary action including ban from future examinations.
- ii) If a candidate smudge/scratch any place in any manner with Eraser, Nail, Blade, White Fluid/Whitener etc. then in such circumstances OMR Sheet/Answer Sheet and candidature of the candidate shall be cancelled. The candidate herself/himself will be solely responsible for this.
- iii) Candidates are advised in their own interest not to bring any of the banned items including mobile phones to the venue of the written test/examination as arrangement for safe-keeping cannot be assured. Commission will not be responsible for any loss in this regard.
- iv) Candidates are also advised not to bring any valuable/costly items to the venue of the written test/examination as safe-keeping of the same cannot be assured. Commission will not be responsible for any loss in this regard.
- v) Candidates should ensure that the signatures appended by them at all the places viz. at uploaded application form, attendance list, and in other documents as well as in all the correspondence with the Commission should be identical. If any variation is found in the signatures appended by a candidate, her/his candidature will be liable for cancellation by the Commission.
- vi) No candidate shall be admitted to the written test/examination unless she/he holds a certificate of Admission/Admit Card issued by the Commission.
- vii) Success in the written test/examination confers no right to appointment unless Government is satisfied after such enquiry as may be considered


Use

- necessary, that the candidate is suitable in all respects for appointment.
- viii) Candidates must ensure that information provided by them is true. If at any subsequent stage or at the time of interviews any information given by them or any claim made by them in their online applications is found to be false, their candidature will be liable to be rejected and they may also be debarred either permanently or for a specified period by the Commission from any examination or selection held by them.
- ix) The decision of the Commission in all matters relating to acceptance or rejection of an application, eligibility/suitability of the candidates, mode and criteria for selection etc. will be final and binding on the candidates. No inquiry or correspondence will be entertained in this regard.

22. WITHDRAWAL OF APPLICATIONS:

No request for withdrawal of candidature received from a candidate after she/he has submitted her/his application will be entertained under any circumstances.

Date: 24.06.2023


Secretary
Haryana Public Service Commission
Panchkula

PHYSICS

1. **Physical world and measurement** - Fundamental and derived units, systems of units, dimensional formula and dimensional equations, Accuracy and error in measurement.
2. **Description of motion** - motion in one dimension, uniformly accelerated motion, motion with uniform velocity/ Acceleration in two dimensions, motion of an object in three dimensions, relative velocity.
3. **Vectors** - Scalar and vector quantities, unit vector, addition and multiplication.
4. **Laws of motion** - first, second and third law of motion, impulse, momentum, conservation of linear momentum.
5. **Friction** - Types of friction, laws of friction, lubrication.
6. **Work, Energy and Power** - Work done by a constant / variable force, K.E., P.E., Elastic collision in one and two dimensions, gravitational P.E., P.E. of a spring, conservation of energy, conservative and non-conservative forces, power.
7. **Rotational motion** - Centre of mass, its motion, rotational motion, Torque, angular momentum, centripetal force, circular motion, moment of inertia, theorems of M.I., Rolling motion.
8. **Oscillatory motion** - Periodic motion, S.H.M. its equation, K.E. and P.E., concept of free, forced and damped oscillations, simple pendulum, oscillation of a loaded spring.
9. **Gravitation** - Universal law of gravitation, variation of g , orbital and escape velocity, planetary motion, Kepler's law.
10. **Elasticity** - Hook's law, young's modulus, bulk modulus and shear modulus of rigidity. Applications of elastic behaviour of matter.
11. **Surface tension** - Fluid pressure, Pascal's law, Archimedes principle, molecular theory of surface tension, Excess of pressure inside a drop and soap bubble, angle of contact, Capillarity, Detergents.
12. **Liquids in motion** - Type of flow of liquid, Critical velocity, Coefficient of viscosity, Terminal velocity, Stoke's law, Reynold's number, Bernoulli's theorem - its applications.
13. **Kinetic theory of gases** - Laws for gases, Ideal gas equation, Assumptions of Kinetic theory of gases, Pressure exerted by a gas, Law of equipartition of energy, Degree of freedom, Specific heats of gases and solids, Mean free path.
14. **Heat and thermodynamics** - Concept of Heat and temperature, Temp. Scales, Thermal expansion of solid, liquid and gases, specific heat, change of state, latent heat, Thermal capacity, Zeroth & first law of thermodynamics, thermodynamic process, second law of thermodynamics, Carnot engine.

15. **Radiation** - Modes of transmission of heat, thermal conductivity, Thermal radiations, Perfect blackbody, Newton's law of cooling.
16. **Waves** - Type of waves, wave equation, speed of a progressive wave, superposition principle, beats, stationary waves and normal modes, Doppler's effect.
17. **Ray optics and optical instruments** - Laws of reflection, Reflection by plane and curved mirrors, Laws of refraction, total internal refraction - applications, Lenses, Image formation by lenses, Dispersion by prism, Sattering of light, Eye, Defects of vision, Microscopes, Telescopes.
18. **Electrostatics** - Coulomb's law, electric field and potential due to a point charge and Dipole, concept of Dielectric, Gauss theorem - its applications, Electric lines of force, Force and torque experience by a dipole in uniform electric field, potential energy of a system of charges, equipotential surfaces
19. **Capacitance** - Capacity of an isolated spherical conductor, capacitor - principle, Parallel plate capacitors, effect of dielectric on capacitance, series and parallel combinations of Capacitors, Energy of a Capacitor, van de graff generator.
20. **Current Electricity** - Ohm's Law, Temperature dependence of resistance, colour code of resistors, series and parallel combination of resistors, resistivity, primary and secondary cells and their combination in series and parallel, Kirchoff's laws, wheat stone bridge and potentiometer - their applications, electrical energy and power.
21. **Magnetism and magnetic effect of current** - Natural and manmade magnet, magnetic lines of force, Bar magnet, magnetism and gauss law, magnetic moment, Torque on a magnetic dipole, magnetic field, magnetic induction, magnetic intensity, permeability, susceptibility & Intensity of magnetisation - their relations. Curie Law, Hysterisis, B-H curve. Classification of magnetic materials. Magnetic force, motion in the magnetic field, Biot - Savarts law, magnetic field by a straight Conductor & Circular Current Carrying Coil, Ampere's Circuital law, Solenoid, Toroid, Moving Coil Galvanometer, Ammeter, Voltmeter.
22. **Electromagnetic Induction** - Faraday's Law, Lenz's Law, Self Induction, Mutual Induction, Electric Generators.
23. **Alternating Current** - Mean and rms value of A.C., A.C. Circuit Containing resistance, Inductance and Capacitance, Series resonant Circuit, Q factor, Average power in A.C., Wattless Current, L C oscillations, transformer.
24. **Wave Optics** - Huygen's principle - reflection and refraction, Interference of light, young's double slit experiment, Diffraction of light, Single slit diffraction, resolving power of optical instruments, polarisation of light, law of malus. Polarization by reflection and scattering.
25. **Photoelectric effect and matter waves** - Einstein's Photoelectric equation, Photocell,



matter waves, Debroglie's hypothesis, Davison and Germer's experiment.

26. **Nuclear Physics and Radioactivity** – Nucleus, size, Mass defect, Binding energy, Nuclear fission and fusion, Nuclear reactor, Radioactivity, laws of disintegration and decays.
27. **Solids and semi conductor devices** - Energy band in solids, Semi conductor, P-N Junction, Diodes, Diode as an rectifier, Special purpose p-n junction diodes, Junction transistor, Logic gates, integrated circuit.
28. **Electromagnetic Waves and Communication** – Displacement current, Electromagnetic Waves-Source, nature. Electromagnetic spectrum, Elements of a communication system, Bandwidth of signals and transmission medium, Sky and space wave propagation, Need for modulation, Production and detection of an AM wave.
29. **MECHANICS:** Inertial frames, Galilean transformation, Non-inertial frames, fictitious forces, rotating co- ordinate systems, Coriolis force and its applications, postulates of special theory of relativity, Lorentz transformations, relativistic addition of velocities, length contraction, time dilation, Variation of mass with velocity, mass energy relation.

System of particles, concept of reduced mass, single stage and multistage rocket, Analysis of collision in centre of mass frame. Angular momentum of a system of particles, equation of motion of a rotating body, inertial coefficients, kinetic energy of rotation and idea of principles axes, Euler's Equations.

Elasticity, relation between elastic constants. Theory of bending of beams and Cantilever, Torsion of a cylinder, Bending moments and Shearing forces.

30. **WAVES & OSCILLATIONS:** Potential well and periodic oscillations. Damped harmonic oscillators, Power dissipation, Quality factor, Driven harmonic oscillator, Transient and steady state, Power absorption, Motion of twocoupled oscillators, normal modes.

Waves in media, speed of longitudinal waves in a fluid. energy density and energy transmission in Waves, , Group velocity and phase velocity, their measurements.

Noise and Music: The human ear and its responses: limits of human audibility. Intensity and loudness, bel and decibel, the musical scale. Temperament and musical instruments. The acoustics of halls. Reverberation period.

31. **ELECTROMAGNETISM** : Concept of multi poles, Electrostatic energy of uniformly charged sphere, classicalradius of an electron. Screening of E field by a conductor.

Electric field in matter: atomic and molecular dipoles, , dielectrics, polarisability, polarization vector, electric displacement, electrostatic energy of charge distribution in dielectric, Lorentz local field and Clausius Mossotti equation. Electrostatic field – conductors in electric field, Boundary conditions for potential and field at dielectric surface, uniqueness theorem, Poisson's and Laplace's equations in Cartesian cylindrical and spherical polar

coordinates, solutions of Laplace's equations in Cartesian coordinates.

Maxwell's equations (integral and differential form) and displacement current. E as an accelerating field: Electron gun, case of discharge tube, linear accelerator, E as deflecting field, CRO.

32. **THERMODYNAMICS AND STATISTICAL PHYSICS:** Maxwell velocity distribution, Transport Phenomenon: Mean free path, Coefficients of viscosity, thermal conductivity, diffusion and their interrelation. Clausius-Clapeyron equation, vapor pressure curve. Maxwell relations and their applications.

Production of low temperatures, Joule Thomson expansion and J.T. coefficients for ideal as well as van der Waals gas, Temperature inversion, Regenerative cooling, Cooling by adiabatic demagnetization, Liquid Helium, He-I and He-II, Super fluidity, Nernst heat theorem.

Phase space, Micro and Macro states thermodynamic probability, relation between entropy and thermodynamic probability. Specific heat capacity of solids, Bose Einstein statistics and its distribution function, Planck distribution function and radiation formula, Fermi Dirac statistics and its distribution function.

33. **ELECTRONICS and CIRCUIT ANALYSIS:** Four terminal networks : current voltage conventions, open, close and hybrid parameters of any four terminal network, Input, output and mutual independence for an active four terminal network. Various circuits theorems: Superposition, Thevenin, Norton, reciprocity, maximum power transfer Theorems.

Rectifiers- Half wave, full wave and Bridge rectifier, calculation of ripple factor, efficiency and regulation. Filters, Series inductor shunts capacitor, L section and π section filters. Voltage regulation and voltage stabilization by Zener diode.

Analysis of transistor amplifiers using hybrid parameters and its gain frequency response. basic idea of R-C coupled amplifiers.

Transistor biasing - stability factors, various types of bias circuits for thermal bias stability. Amplifier with Feed back : positive and negative feed back. Voltage and current feed back circuits. Advantages of negative feed back.

Oscillators : Criteria for self excited and self sustained oscillators circuit requirement for build-up of oscillation. Basic transistor oscillator circuit and its analysis; colpitts and Hartley oscillators. R-C Oscillators.

Junction Field effect transistor (JFET), circuit symbols, biasing and volt-Ampere relations.

34. **OPTICS:** Interference of a light, coherence requirements of the sources, optical path retardations, lateral shift of fringes, thin films, Newton's ring, Michelson interferometer, Fabry Perot interferometer and etalon. Fresnel diffraction: Half periods zones, circular aperture, Circular disc, straight edge, Fraunhofer diffraction: double slit, n slit, Plane diffraction grating, reflection grating, concave grating.

Lasers and Holography : Spontaneous and stimulated emission, density of states, Einstein's A and B coefficients, Energy density of radiation as a result of stimulated emission and absorption, Condition for amplification, Population inversion, Methods of optical pumping, Energy level schemes of He-Ne and Ruby lasers, working of a laser source, Special features of a laser source and their origin.

35. **QUANTUM MECHANICS AND SPECTROSCOPY:** Failure of classical Physics, Uncertainty principle and its consequences, Application of uncertainty principle.

Schrodinger equation – time dependent and time independent form, Physical significance of the wave function, probability current density, operators in quantum mechanics, Expectation values of dynamical variables, postulates of quantum mechanics, eigen function and eigen value, degeneracy, commutation relations. Ehrenfest theorem.

Time independent Schrodinger equation and stationary state solution, particle in one dimensional box, extension of results for three dimensional case and degeneracy of levels. Potential step and rectangular potential barrier coefficient, square well potential problem. Bound State Problems - Particle in one dimensional infinite potential well and finite depth potential well, simple harmonic oscillator (one dimensional), Schrodinger equation for a spherically symmetric potential, Orbital angular momentum and its quantisation, spherical harmonics, energy levels of H-atom.

Elementary Spectroscopy: Quantum features of one electron atoms, Frank-Hertz experiment, Stern and Gerlach experiment, Spin and Magnetic moment, Spin Orbit coupling and fine structure. Atoms in a magnetic field, Zeeman effect. molecular spectroscopy, Rigid rotator, diatomic molecules, Rotational spectra, Vibrational spectra, Vibrational Rotational spectra, Raman effect.

36. **NUCLEAR PHYSICS :** Quadrupole Moment and Nuclear Ellipticity, Nuclear Spin, Parity and Orbital Angular Momentum, Nuclear Mass and Mass Spectroscopy, Proton-Neutron Hypothesis, The Nuclear Potential, Mass Defect and Binding Energy, Nuclear Forces, The Liquid Drop Model.

Accelerators -Linear Accelerators, Cyclotron, Synchrocyclotron, Betatron: The

Electromagnetic Induction Accelerator, Electron Synchrotron, Proton Synchrotron.

Particle and Radiation Detectors : Ionisation Chamber, Region of Multiplicative Operation, Proportion Counter, Geiger-Muller Counter, Scintillation counter, Cloud Chamber.

37. **SOLID STATE PHYSICS:** Crystal Binding and Crystal Structure: Bravais Lattice, Miller Indices and Crystal Structure, X-ray Diffraction and Bragg's Law, Laue equation of X-ray diffraction.

Thermal Properties of the Solids : Various Theories of Lattice Specific Heat of Solids: The Einstein Model, Debye Model, Electronic Contribution of the internal Energy hence to the Specific Heat of Metals, Thermal Conductivity of the lattice. Band Theory of Solids : Wave Function in a Periodic Lattice and Bloch Theorem, Effective Mass, Momentum, Crystal Momentum .

Electrical Conductivity: Sommerfeld Theory of Electrical Conductivity, Mathiessen's Rule, Thermal Conductivity and Wildemann-Franz's Law, The Hall Effect.

Superconductivity: Experimental Features of Superconductivity, The Isotope Effect, Special Features of Superconducting Materials, Flux Quantisation, BCS Theory of Superconductivity: Cooper Pairs, High Temperature Superconductors (Basic Ideas

38. **Mathematical Physics and Classical Mechanics** : Tensors, Matrices, Fourier and Laplace transforms. Bessel and Legendre functions. String formula, basic group theory. D'Alembert's Principle, Lagrangian and Hamiltonian formalism, canonical transformation, Poisson bracket and Poisson theorem, Hamiltonian Principle and Jacobi equation.
39. **Electricity and Magnetism** : Radiation from moving charge and radiation from dipole, concepts of wave guides, Retarded potentials, Lienard-Wiechart potential, Bremsstrahlung and Synchrotron radiation, reaction force of e.m.w.
40. **Thermodynamics and Statistical Physics:** Einstein Statistics, properties of ideal Bose and Fermi Gases, Bose-Einstein condensation. Gibbs' paradox, Liouville's theorem, Landau theory of phase transitions. Langevin theory, Fokker-Planck equation.
41. **Quantum Physics:** Elementary theory of scattering in a central potential, partial wave and phase-shift analysis, Identical particle and spin statistics, WKB Method and its applications.
42. **Electronics:** Clipping and clamping circuits of operational amplifiers and its applications, inverting and non-inverting amplifiers, adder, integrator differentiator, Half and Full adder circuits, Flip-Flops, counters and registers.
43. **Atomic, Molecular and Solid State Physics** : Quantum states of an electron in an atom,

hydrogen atom spectra, Pauli's Principle, Spin-Orbit interactions, Zeeman effect, Paschen-Back effect, Stark effect, LS and JJ coupling, Hyperfine structure.

Semiconductors statistics of pure and impure semi conductors, Electrical conductivity and its temperature dependence, Recombination mechanisms, Photo conductivity, NMR, ESR and Mossbauer effect.

44. **Nuclear and Particle Physics:** Nuclear shell model, Collective model, Interaction of charged particles and electromagnetic waves with matter. Meson theory of Nuclear force, Nuclear scatter theory: p-p and n-p. Breit- Wigner scattering formula, Fermi theory of B-decay, Gamov theory of alpha decay.

