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\* Test Schedule

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# GAT General

GRE-GAT General-Local Test

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- Test Format, Syllabus & Fully Solved Papers
- Latest Practice Tests With Explanatory Answers
- MCQs Selected From Previous Papers

For  
**M.Phil, Ph.D, HEC Scholarships  
(Local & Foreign), NTS Entry Test**

✓ Prof. Tariq Alli Khan ✓ Prof. Mahmood Arshad

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# GAT GENERAL

For

M.Phil, Ph.D,  
HEC Scholarships (Local & Foreign)  
& NTS Entry Tests

**Verbal Reasoning  
Quantitative Reasoning  
Data Processing  
Analytical Reasoning**  
*With Explanatory Answers*

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*M.Phil Education (s), M.A. English, M.A. Education,  
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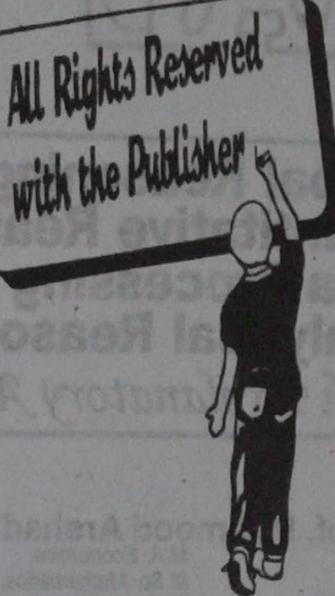
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# Preface

Dear Readers! "Dogar Publishers" does not need not to be introduced.

It is a symbol of standard books. We have been serving the nation in the field of education for the last few decades. We believe in Quality rather than Quantity, that's why our books receive unbelievable appreciation at both national and international level. We don't claim to be the best but we are proud of being one among the bests. That all became possible firstly by the grace of Allah and secondly by your co-operation, encouragement and appreciation. Dear readers, read our books, feel the difference and enjoy the excellence. We publish our books under the trademark of "Dogar's Unique Books".

GAT (GRE-Based) is not a new kind of examination at global level however it is introduced now in Pakistan. With the publication of "Dogar's Unique up-to-date Hi-Brain GAT-GENERAL", we have crossed another milestone that adds another feather to the cap of Dogar Publishers. Thanks Allah Almighty, Who enabled us to present such a unique book. We always have realize the need of such a book to meet all the requirements of the students. This book will go (Insha-Allah) a long way in helping the starved readers, who have to wait long for this book. This is the most comprehensive, elaborated and authentic book. It covers almost all the topics and is unique in matter and style. It has been written according to the new syllabus, pattern and policy of the examinations. It is a local book of International standard.

Dogar Publishers has always accepted great challenges in the field of publication of really authentic and epoch-making books. This book has been written with the counseling of a team of experts, educators, subject specialists and examination test analysts under the supervision of the Dogar Publishers Editorial Board. This book has been written purely from the examination point of view. It has been divided into different parts for the convenience of the students. Separate parts on Verbal Reasoning, Quantitative Reasoning and Analytical Reasoning have been included. Sample paper, instructions to fill the registration form, distribution of marks, important information about GAT-GENERAL are the additional qualities of the book.

This is the fully revised edition of the book which is in your hands. Valuable suggestions as well as positive criticism from both the teachers and the students for the improvement of the book would be a great source of encouragement and will be incorporated in the subsequent editions of the book. Finally, we are extremely thankful to the members of Dogar Publishers Editorial Board for their untiring and devoted efforts. Hoping for your brilliant success.

**SHAHID MAHMOOD DOGAR**

*Chief Executive/Managing Editor  
Dogar Publishers & Dogar Unique Books*



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# GAT GENERAL

## What is GAT?

- ↳ GAT is an aptitude test administered by NTS.
- ↳ GAT is conducted many a time a year.
- ↳ GAT score remains valid for TWO years.
- ↳ Once you qualify GAT, you can apply to any university of Pakistan for MS, M.Phil, or PhD classes on the basis of the score in GAT.

## Introduction - Graduate Assessment Test

- ↳ The Higher Education Commission (HEC) has assigned National Testing Service (NTS) the responsibility to conduct GAT/GRE Type Test.
- ↳ Graduate Assessment Test **GAT-GENERAL** for admissions in M.Phil **GAT-SUBJECT** for PhD. Programmes.
- ↳ The test result will remain valid for **TWO YEARS** for admissions and HEC Scholarship Schemes.
- ↳ Candidates intending to improve their previous GAT Score can also apply.
- ↳ The candidates will have to qualify other specified criteria of the Universities / HEC Schemes.
- ↳ Candidates with a minimum of sixteen years of education are eligible to appear in the test.

**GAT-General**

# *More About* **GAT**

- ◆ GRE (Graduate Record Examination) is a test for determining the capability and suitability of a student for postgraduate studies. A lot of universities in advanced countries require it as an important factor in admission criteria. HEC - Higher Education Commission (Pakistan) has mandated NTS to conduct an examination, similar to the one conducted by ETS, here in Pakistan. This is GAT - Graduate Assessment Test.
- ◆ Candidates with a minimum of sixteen years of education are eligible to appear in the test.

## **COMPULSION**

- ◆ HEC requires that every candidate seeking admission in MS, M. Phil., or PhD programs in any public or private institute must have qualified GAT with at least 50/100 score.

## **GAT SUBJECT**

- ◆ Many of Pakistani universities require that any candidate seeking admission in their MS, M. Phil., or PhD program besides GAT - General must also qualify GAT - Subject in the relevant subject. GAT - Subject is also conducted by NTS. For more information about GAT - Subjects per HEC policy decision, the GAT test validity (GAT - General / Subject) for TWO YEARS is effective from 1st January 2007 onwards.

## **GAT RETAKE**

- ◆ Candidates intending to improve their previous GAT Score can also apply. The GAT with greater score will be considered for admission.

## **GAT - SCHEDULED TESTS**

- ◆ GAT - General Scheduled Tests are conducted every three month basis by NTS. It remains valid for 2 years. Its means a GAT qualified candidate can use the result of its result for any admission occurring in 2 years after its test date.

## **GAT - CUSTOMIZED**

- ◆ Some institutes require that NTS conducted GAT - Customized Test meets their admission calendar. The result of customized GAT is only applicable to the particular admission of the institute. The result of GAT customized is not applicable to any other admission.

## Schedule of Graduate Assessment Test (GATTM General) 2016

Applications should reach NTSTM office latest by last date of submission of Registration Form. NTSTM will not be responsible for late receiving of application through Courier / Pakistan Post etc.

Sr#	Test Date	Advertisement Dates	Last Date of Submission of Registration Form	Roll No. Slip Dispatch Date	Result Announcement Date on NTS Website	Result Card Dispatch Date
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### Schedule 2016

1.	Sunday 10 <sup>th</sup> January 2016	Sunday 22 <sup>nd</sup> November 2015	Monday 14 <sup>th</sup> December 2015	Saturday 26 <sup>th</sup> December 2015	Monday 18 <sup>th</sup> January 2016	Saturday 23 <sup>rd</sup> January 2016
2.	Sunday 3 <sup>rd</sup> April 2016	Sunday 21 <sup>st</sup> February 2016	Wednesday 16 <sup>th</sup> March 2016	Monday 21 <sup>st</sup> March 2016	Monday 11 <sup>th</sup> April 2016	Saturday 16 <sup>th</sup> April 2016
3.	Sunday 17 <sup>th</sup> July 2016	Sunday 29 <sup>th</sup> May 2016	Friday 17 <sup>th</sup> June 2016	Thursday 30 <sup>th</sup> June 2016	Monday 25 <sup>th</sup> July 2016	Saturday 30 <sup>th</sup> July 2016
4.	Sunday 23 <sup>rd</sup> October 2016	Sunday 18 <sup>th</sup> September 2016	Monday 3 <sup>rd</sup> October 2016	Saturday 8 <sup>th</sup> October 2016	Monday 31 <sup>st</sup> October 2016	Saturday 5 <sup>th</sup> November 2016

## Schedule of Graduate Assessment Test (GATTM Subject) 2016

Applications should reach NTSTM office latest by last date of submission of Registration Form. NTSTM will not be responsible for late receiving of application through Courier / Pakistan Post etc.

Sr#	Test Date	Advertisement Dates	Last Date of Submission of Registration Form	Roll No. Slip Dispatch Date	Result Announcement Date on NTS Website	Result Card Dispatch Date
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### Schedule 2016

2.	Sunday 14 <sup>th</sup> February 2016	Sunday 27 <sup>th</sup> December 2015	Friday 15 <sup>th</sup> January 2016	Friday 29 <sup>th</sup> January 2016	Monday 22 <sup>nd</sup> February 2016	Saturday 27 <sup>th</sup> February 2016
3.	Sunday 15 <sup>th</sup> May 2016	Sunday 3 <sup>rd</sup> April 2016	Wednesday 20 <sup>th</sup> April 2016	Saturday 30 <sup>th</sup> April 2016	Monday 23 <sup>rd</sup> May 2016	Saturday 28 <sup>th</sup> May 2016
4.	Sunday 21 <sup>st</sup> August 2016	Sunday 10 <sup>th</sup> July 2016	Wednesday 27 <sup>th</sup> July 2016	Saturday 06 <sup>th</sup> August 2016	Monday 29 <sup>th</sup> August 2016	Saturday 03 <sup>rd</sup> September 2016
5.	Sunday 20 <sup>th</sup> November 2016	Sunday 09 <sup>th</sup> October 2016	Wednesday 26 <sup>th</sup> October 2016	Saturday 05 <sup>th</sup> November 2016	Monday 28 <sup>th</sup> November 2016	Saturday 03 <sup>rd</sup> December 2016

# Useful Information About GAT

GAT-GRADUATE ADMISSION TEST

Most of Pakistani students recognize GAT as GRE. GAT is a test by NTS - National Testing Services Pakistan. GAT provides a mean to select an applicant for higher studies (M.Phil, Ph.D) for universities.

**HEC SCHOLARSHIPS AND ADMISSION:** A student applying for any HEC Scholarship (Foreign or Domestic) must have to qualify GAT. A student applying for admission in MS, M.Phil, or Ph.D from any Pakistani university must have to qualify GAT.

**PREPARE GAT:** You can prepare GAT by your own. Buy the book "Dogar's Unique up-to-date "GAT-General". This book is according to the new syllabus approved by NTS. If you feel difficulty in preparation, you can buy also Dogar's Unique up-to-date "GRE".

**GAT TEST FORMAT:** GAT Test has three parts:

1. Verbal Reasoning	2. Quantitative Reasoning	3. Analytical Reasoning
Verbal Reasoning has three sections: 1. Vocabulary 2. Grammar 3. Composition	Quantitative Reasoning has four sections: 1. Arithmetic 2. Algebra 3. Geometry 4. Data Processing	Analytical Reasoning covers the following areas: 1. Deductive & Inductive Logic 2. Critical Thinking 3. Writing Skills

**TYPES OF GAT:** To meet the requirements of students of various disciplines, GAT has been categorized in four types i.e. A, B, C, & D. The difference in each category is only the number of questions in each section (weight of each section).

**SCHEDULED GAT:** GAT is administered by NTS every three months. The score of scheduled GAT remains valid for two years.

**TEST SCHEDULED MATCH:** If academic calendar of a university or college does not match with any scheduled test by NTS, NTS arranges a GAT test on the request of that university or college. The life of such customized test is meant for only that admission for which the university has requested to NTS.

## TEST CITIES

- 8 Compulsory Test Cities are underlined.
- Optional Test Cities are not underlined, subject to a minimum of 200 Registered Candidates.

**TEST CITIES LIST**

<i>Sr #</i>	<i>Test City</i>	<i>Sr #</i>	<i>Test City</i>
1	<u>RAWALPINDI</u>	7	<u>GUJRANWALA</u>
2	<u>LAHORE</u>	8	<u>ISLAMABAD</u>
3	<u>MULTAN</u>	9	<u>KARACHI</u>
4	<u>FAISALABAD</u>	10	<u>PESHAWAR</u>
5	<u>BAHAWALPUR</u>	11	<u>QUETTA</u>
6	<u>DERA GHAZI KHAN</u>	12	<u>HYDERABAD</u>

### **Test Day Instructions:**

Please follow these instructions carefully:

#### **Attendance:**

- Reporting time at test centre as specified on roll number slip.
- No candidate will be admitted in the test centre after specified time.
- Candidates will have to produce their roll number slips at the entry point of the test centre.
- Without the roll number slip, no candidate will be entertained for the test.

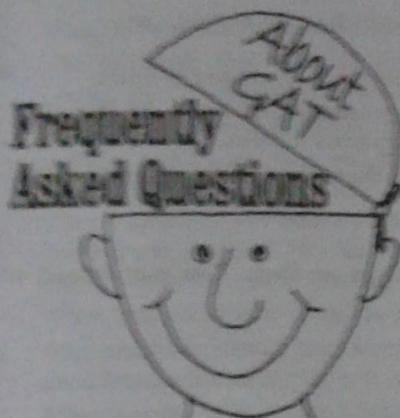
#### **Composition of Test**

- Question booklets will be in five different shuffles.
- Each question booklet will be sealed and opened by the candidates at the start of test.
- Do not break the seal till the test starts.
- No candidate will be allowed to leave the seat during the test except for an unavoidable reason e.g. toilet usage, that to in the escort of an invigilator.
- All papers will be collected at the end of test and no candidate will be allowed to move from the seat till the final count after the collection of the paper.
- Do not bring calculators, mobile phones and wrist watches with calculator in the test center.

## Important Information

Graduate Assessment Test (GAT) usually aims to assess the Verbal, Quantitative and Analytical Reasoning that have been acquired by the candidate over a period of time and that are not necessarily related to any specific field of study. The test will be held on quarterly basis in each calendar year.

- Now the candidates do not need to appear in the tests again and again who seek HEC Scholarships. The result of the test will remain **Valid for Two Years** from the test date. The result will also be acceptable for HEC Scholarships requiring NTS GAT-General Score.
- By hand submission of registration form will not be accepted.
- The candidates will be required to apply for admission in the universities and HEC Scholarship as per their respective announcements along with a copy of the NTS result card.
- **Provisional Eligible Candidate List** will be displayed on NTS website at least 12 days prior to the test date on first come first served basis of the Registration Form (within one week of the receipt of Registration Form). Queries regarding provisional data will be accepted within 5 days only from the display of the provisional list.
- **Final Eligible Candidate List** will be uploaded 2 days after last date of provisional list. Roll No. and Test Center will be allotted in the Final Eligible Candidate List.
- The roll number slips will be dispatched by NTS 10 days prior to the test date through Pakistan Postal Service.
- The candidate will be issued the **result card** through authorized courier service/Pakistan Postal Service (registered mail) **within 10 days** from test date.
- Any candidate intending to improve his NTS GAT General Score can reappear in the test, by applying afresh in the next test.
- NTS will verify the test score of the candidate on written demand of the HEC within 48 hours.



**NTS Overseas Scholarships for MS/MPhil leading to PhD for the Discipline Wise  
World Top Ranked Universities (10% Overseas Scholarships scheme)**

### Frequently Asked Question (FAQs)

- Q.** What are the General Tests that NTSTM is offering?
- Ans.** NTS™ is offering two types of General Tests, also called Graduate Assessment Tests (GAT™-General) & (GAT™-Subject).
- Q.** What are my Eligibility Criteria?
- Ans.** If you are interested to apply for GAT™-General or GAT™-Subject, you should have at least 16 years of education (B.E (Engineering), BS Hons, Masters etc).
- Q.** From Where Can I Get the Information About the NTSTM Tests?
- Ans.** You can get the information about NTSTM tests from any of the following sources:
1. Advertisements through Print Media
  2. Advertisements through Electronic Media
  3. NTSTM and its Allied Institutions' Website
- Q.** From Where Can I Get the Application Forms?
- Ans.** You can get free of charge Application Forms from NTSTM website i.e., <http://www.nts.org.pk>. However, ensure that you get these before the last date for registration.
- Q.** How Can I Register for NTSTM Test?
- Ans.** Fill your application form according to the instructions given. Submit it by paying the online Test Fee in any branch of UBL, ABL, MCB or HBL.
- Q.** How Shall I Fill the Forms?
- Ans.** A few things must be clear to you before you fill in the form. Any incomplete or ambiguous information in the form may cause delay in the registration process and you may not be able to take the test on time. The instructions to fill the form are as follows:  
If application form is in type able form, fill application form and print it. Otherwise use black ink and BLOCK LETTERS to fill out the form.

**GAT-General**

2. Download the appropriate test application form.
3. Be careful with the spellings of your name.
4. Write the correspondence/ mailing address correctly where you can be contacted in future.
5. Test Fee is submitted in the form of Online Deposit Slip in any nearest UBL, ABL, MCB or HBL branch. NTS™ Copy (Original) must be attached with the Application Form.
6. Also indicate your choice for the city, where you want to take the test out of the options available to you.
7. Please ensure:
  - \* Two passport size photographs are affixed at appropriate places on form. (Use gum instead of using staples)
  - \* Original Bank Deposit Slip (NTS™ Copy)
  - \* CNIC (Photocopy)

**Q. Where & How to Submit the Form?**

**Ans.** After you fill the form according to the instructions, send your form through any courier service or mail (Post office). Make sure to attach:

1. Two copies of your recent photographs
2. Clearly written candidate's name in the BLOCK LETTERS
3. Clearly written candidates father's name in BLOCK LETTERS
4. Clearly written National Identity Card (NIC) number
5. Clearly written candidate's postal address in BLOCK LETTERS
6. Clearly written phone number etc.

If any essential requirement is missing in the Registration Form, it will be clearly marked as rejected.

**Q. Does NTS™ Confirm My Registration?**

**Ans.** After submitting the Application Form, you will get your Roll Number Slip (Call Letter) containing Roll No., Test Venue etc on your mailing address. This slip confirms your registration. You can also visit NTS™ website for confirmation. You must take that slip with you to the test center on the day of your test otherwise you are not allowed to sit in the Examination Hall.

In case of any confusion or problems with the registration process, you can Contact NTS™ Office.

**Q. May I Register on the Day of Examination?**

**Ans.** The registration of candidates on the day of NTS™ Examination cannot be entertained. The candidate should get registered before the deadline, announced by NTS™ for the close of registration process.

**Q. How Can I Get Help in Case of Any Problem During Registration Process?**

**Ans.** If you have any confusion about the registration process, you can clarify by calling the NTS™ Office or contact NTS™ Office.

**Q. How Can I Get the Test Schedule?**

**Ans.** If you have any confusion about the Test Schedule, you can get the details from the news media and also NTS™ website.

**Q. How Can I Get My Identification Slip?**

**Ans.** Roll Number Slip confirms your registration. It serves as your Identification Slip and also informs you about the location of the center.

**GAT-General**

**Q. How to Find the Place and Schedule of Test?**

**Ans.** The schedule, time, location, etc., is published through the news media and NTST™ website i.e. [www.nts.org.pk](http://www.nts.org.pk) from where you can get further help and other information.

**Q. How to Get Myself Identified at the Test Center?**

**Ans.** At the Test Center, you are asked to show your Roll No. Slip that was sent to you after you submitted your form or your information from NTST™ website in print. The staff at the Test Center identifies you with the photograph attached on the slip or from your NIC, it is must. If you fail to show your Roll No. Slip to the administration on the test day or if your photograph does not match your appearance, you may not be allowed to enter the Test Center.

**Q. What Should I Take With Me to the Test Center?**

**Ans.** The candidate should take sharpened pencils, pen with eraser and clip-board. Besides this, the candidate is also asked to show his/her Roll No. Slip.

**Q. What are the Things that I Should Not Take With Me in the Test Center?**

**Ans.** Calculators, cell phones, books, booklets, any kind of paper or cheating material are strictly not allowed to be taken inside the test center. If you are found with any of these items with you during the test, you are not allowed to take the examination and be considered disqualified.

**Q. Where Shall I Sit?**

**Ans.** Enter the examination hall and look for the seat that has your roll number pasted on it. The seats are arranged in a sequential order of roll numbers. If you do not find your seat, ask any of the invigilators at the center.

**Q. What are the Rules and Regulations that are Applied to Me Inside the Test Center?**

**Ans.**

1. The test is given on the day and at the time scheduled. You are asked to observe punctuality.
2. You are assigned a seat by the invigilation staff.
3. Testing aids are not permitted to be taken along to the Test Center. Items like calculators, cell phones, headphones, and any paper or writing material, dictionaries etc., are prohibited in the Test Center.
4. You are not allowed to eat, drink, or use tobacco during the test.
5. If you do not show the Roll No. Slip and your photograph does not match, you are not permitted to take the test.
6. No discussion or communication with the fellow candidates is allowed during the test session.
7. You are also not allowed to leave Test Center without the permission of the supervisor.
8. Under no circumstances, the test questions or any part of a test be removed, reproduced or disclosed verbally, electronically, or physically or by any other means to any person or entity.
9. Test centers do not have large waiting areas. Friends or relatives who accompany you to the Test Center are not permitted to wait in the near vicinity of the Test Center or contact you while you are taking the test.
10. If you need to leave your seat at any time during the test, raise your hand and ask the invigilator. Timing of the section does not stop.
11. Repeated unscheduled breaks will be documented and reported to NTST™.
12. NTST™ reserves the right to videotape any or all of the testing sessions.
13. Dress in such a way that you can adapt to any room temperature.
14. You cannot communicate with anyone (other than the test center staff) while the test session is in progress or even during the breaks.

**GAT-General**

15. You are not permitted to leave the Test Center vicinity during the test session or breaks.
16. If at any time during the test you believe that you have a problem with your test, or need to speak to Invigilation Staff for any reason, raise your hand to notify the Invigilation Staff.

**Q. On What Basis Can I be disqualified from the Test?**

**Ans.** If you are found indulged in any of the following activities, you are disqualified from the test.

1. Arriving late at the Test Center.
2. Taking the test for someone else.
3. Failing to provide the Roll No. Slip.
4. Using any objectionable material during the test.
5. Trying to create disturbance inside the Test Center.
6. Showing ill behavior towards the invigilation staff.
7. Trying to communicate with the fellow candidates while the test is in progress.
8. Trying to tear pages from the question paper.
9. Showing indiscipline i.e. eating, smoking etc.
10. Leaving the Test Center without permission.

**Q. How Shall I Take Test?**

**Ans.** Sit on your seat and wait for the time of the test. Make sure that you do not have any objectionable material. The invigilators give you the question book and answer sheets. Fill in the essential information in the blank columns of answer sheet. While attempting to answer questions, read the choices in each question and mark the corresponding space on the answer sheet. Do keep the time aspect in mind. You would not be given extra time.

**Q. How Shall I Mark the Answer Sheet?**

**Ans.**

1. Write Your Name, Father's Name, Roll Number etc (if required) on the answer sheet.
2. Read the directions carefully before you begin your test.
3. The GRE General Test is divided into three sections i.e. Verbal, Quantitative and Analytical Reasoning. The directions given at the beginning of every section inform you about the total number of questions and the recommended time.
4. Each question has maximum five choices and minimum two. You are required to choose the correct choice for every question and fill the corresponding oval with a lead pencil on the answer sheet.
5. The invigilator announces the procedure of marking the answer sheets. Listen carefully to the instructions. When you mark the answer sheets, make sure that the space is completely filled in. You can change the answer. Do it by erasing the earlier choice neatly.
6. Use a lead pencil or pens for marking the answer sheets.
7. Do not mark more than one answer.
8. If a question is found with no answer or it has more than one marked choice, it is not considered for marking.
9. All questions carry equal marks.
10. There is no negative marking for wrong answers. You can make a guess for answering difficult questions.

**Q. What are the Other Test Taking Strategies?**

**Ans.**

1. You are provided with a few blank pages in the test paper. You can use them for your rough work.

**GAT-General**

2. Some formulas and helping tables are given at the end of the question paper. You can take help from those for solving the questions.
3. Keep a very careful track of time.
4. Do not panic while solving your paper. Give each section a specific time period and try to complete every section on time.
5. If you have carefully read all the directions given in the test guide, do not waste your time by reading the directions on the answer sheet. They are exactly the same as in the guide.
6. Do not leave any question unanswered. If you are confused or have no idea about a certain question, try making a guess for the right answer.
7. Do not make any extra marks on the answer sheet. Computer might register these and consider them as another marked choice.

**Q. In what ways is NTSTM Subject Test Different from Other NTSTM Tests?**

**Ans.** The NTSTM Subject Tests are different from other tests in many ways. Unlike the General NTSTM Tests, NTSTM-Subject Test focuses on only one specific discipline of study. The NTSTM-Subject Tests are prepared by professionals and experts from the respective field of their expertise. These professionals have themselves designed the curricula for a very measured assessment of students/candidates. Mostly, the Subject Tests are conducted online.

**Q. What are my Eligibility Criteria for Subject Test?**

**Ans.** While there is no formal education prerequisite that holds the criteria for taking the test apart from holding 16 Years Bachelors or Masters Degree.

**Q. I have sixteen years of education with second class/division. Am I eligible for admission into the M.Phil/MS programme?**

**Ans.** A provision of admission in M.Phil/M.S programme based on first/second/third class/division is prerogative of University/Institution. Institutions are required to follow minimum requirements of the HEC and they may stringent these criteria at their own.

**Q. I have qualified GAT General with 50% and have sixteen years of education but University is denying admission on the pretext that qualifying score should be 60%.**

**Ans.** The HEC requires that scholars should pass NTS GAT test with minimum 50% score but Universities can ask for more score as per their policies.

**Q. Is it necessary that GAT test should be qualified with minimum of 50% cumulative score before admission into the M.Phil/M.S programme?**

**Ans.** Yes, GAT test conducted by the National Testing Service is required to be qualified with a minimum 50% score at the time of admission to M.Phil/M.S.

**Q. For M. Phil/M.S degree, total 30 credit hours are required out of which 24 credit hours are for course work. Can I complete 30 credit hours by course work?**

**Ans.** HEC requires minimum 24 credit hours course work and has recommended thesis of minimum 6 credit hours. However, degree with 30 credit hours course work is also acceptable.

**Q. I have acquired 3.0 CGPA in M.S and submitted PhD application with University, which is denying admission and is asking for 3.5 CGPA in M.S for admission in the PhD programme.**

**Ans.** One of the minimum requirements of the HEC for admission into PhD programme is 3.0 CGPA in M.Phil/M.S degree. However, Universities can raise this as per their policy.

**Q. I am currently registered in Ph.D. Could you please update me regarding the condition of International GRE Subject Test? Is the condition abolished?**

**Ans.** No, the condition is there but the HEC has approved to also accept the GAT Subject Test (NTS) for PhD admissions in those eight subjects where the International GRE Subject is offered.

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**Q.** I have already cleared the International GRE / University based Subject Test (approved by HEC) with the requisite percentile/accumulative score. Should I also appear for NTS GAT Subject Test?

**Ans.** Students who have already cleared the International GRE/ University based Subject Test (approved by HEC) and achieved the requisite percentile/accumulative score are not required to clear the NTS GAT Subject Test.

**Q.** What does mean by Comprehensive Exam?

**Ans.** Comprehensive Exam is requirement for all doctoral programs, and precedes defense of the PhD research proposal. The student must pass both the written and oral components after the completion of 18 credit Hours Course Work. Successful completion of both the comprehensive exam and the PhD research proposal must be completed before a student can be granted Doctoral Candidacy status.

**Q.** I have completed course work for PhD. Is it necessary to appear in comprehensive examination? What score should be acquired for qualifying that exam?

**Ans.** Yes, comprehensive examination is mandatory and it should be qualified. Qualifying score should be in accordance with rules of the Institution.

**Q.** What does a Public Defense mean?

**Ans.** The defense is done in a public presentation in which teachers, students, and the general public can participate. The Scholar presents his/her Research Work and answers the questions of the audience. Public thesis defense is mandatory, in the presence of a board of senior researchers, consisting of members from an outside organization or a University. The University concerned will notify in advance the date, time and venue of the event via its website, Newspapers and electronic media.

**Q.** My PhD thesis is evaluated with favorable comments by two foreign experts. University is not processing my case for final seminar, because they are asking for the third evaluation.

**Ans.** The evaluation of thesis by two foreign experts with positive comments/recommendations is minimum requirement of the HEC. Universities can evaluate theses from more than two experts.

**Q.** How many PhD scholars one professor/supervisor can supervise?

**Ans.** One supervisor can supervise five PhD Scholars that can be increased to eight under special circumstances in certain teaching departments subject to prior approval of the Higher Education Commission (HEC).

**Q.** Which countries are academically/technically advanced?

**Ans.** Following countries are developed countries:

**List of Industrially/Academically advanced countries for evaluation of PhD thesis**

(For all subjects unless noted)

1 Australia	19 Ireland
2 Austria	20 Italy
3 Belgium	21 Japan
4 Bulgaria	22 Luxembourg
5 Canada	23 Netherlands
6 China+	24 New Zealand
7 Czech Republic	25 Norway
8 Denmark	26 Romania
9 Egypt*	27 Portugal

**GAT-General**

- |              |                   |
|--------------|-------------------|
| 10 Finland   | 28 Poland         |
| 11 France    | 29 Singapore      |
| 12 Germany   | 30 South Korea    |
| 13 Greece    | 31 Spain          |
| 14 Hong Kong | 32 Sweden         |
| 15 Hungary   | 33 Switzerland    |
| 16 Iceland   | 34 Turkey         |
| 17 India*    | 35 United Kingdom |
| 18 Iran*     | 36 United States  |

\* For Oriental Languages (Arabic etc.) Islamiyat, Islamic Studies

+ For Science Engineering & Technology

Quality Assurance Division, HEC, Islamabad

**Q. Is there any financial assistance for GRE Test?**

**Ans.** Universities/DAI will refund GRE fee to those students who will qualify GRE Test with the required score.

**Q. How many students a supervisor can supervise?**

- Ans.**
- The maximum number of PhD students under the supervision of a full time faculty member will normally be 5 which may be increased to 8 under special circumstances in teaching departments subject to prior approval of the Higher Education Commission.
  - Eminent faculty/scientists such as HEC distinguished professors, Fellow of Royal Societies (FRS) and those who have cumulative impact factor of 100 or more can supervise as many PhD students as they wish.

**Q. Can adjunct faculty members (of the University) supervise PhD students?**

**Ans.** Yes, adjunct faculty members (of the University), can supervise the PhD students.

**Q. How to calculate 50% percentage score from the ETS scorecard?**

**Ans.** 50% (percentage) score is calculated from total scaled score in each subject which is available in GRE Guide book at page number 14. For example, for Mathematics, total scaled score is 900 and its 50 percent is 450.

**Q. Will HEC notifies clarifications mentioned in FAQs, as Universities are insisting for the HEC notification?**

**Ans.** Clarifications made in FAQs are approved by the authorities and need no further notification.

*Test Format*

# GAT GENERAL

## GAT - GENERAL PAPER DISTRIBUTION

Category	Discipline	Verbal Reasoning	Quantitative Reasoning	Analytical Reasoning	Total
GAT A	Business and Engineering Students	35%	35%	30%	100%
GAT B	Arts, Humanities and Social Sciences Students	50%	30%	20%	100%
GAT C	Agricultural, Veterinary, Biological & Related Sciences Students	45%	35%	20%	100%
GAT D	Religious Studies Students	50%	30%	20%	100%

Note: This category is specially designed for students coming from Madrasa background (Shahadat-Ul-Almiya) or equivalent having equivalence from Higher Education Commission (HEC) and desired to seek admission in M. Phil / MS/LLM disciplines.

### Syllabus, Distribution of Marks and Time

Section	Contents	Questions	Marks	Time
I	English (Verbal)	30	30	35
II	Quantitative	30	30	35
III	Analytical	40	40	50
	Total	100	100	120 minutes

## DETAILED DEVISION OF MARKS

### GATTM General Curriculum

Category	Test Type	Verbal Reasoning	Quantitative Reasoning	Analytical Reasoning	Total
<b>&gt; GATTM-A Curriculum</b>					
GATTM A	Business and Engineering Students	35%	35%	30%	100%
<b>&gt; GATTM-B Curriculum</b>					
GATTM B	Art, Humanities and Social Sciences Students	50%	30%	20%	100%
<b>&gt; GATTM-C Curriculum</b>					
GATTM C	Agricultural, Veterinary, Biological & Related Sciences Students	45%	35%	20%	100%
<b>&gt; GATTM-D Curriculum</b>					
<b>NOTE*:</b> This category is specially designed for students coming from Madrassa background (Shahdat-Ul-Aalmiya) or equivalent having equivalence from Higher Education Commission (HEC) and desired to seek admission in M. Phil/MS/LLM disciplines.					
GATTM D	Religious Studies Students	50%	30%	20%	100%

### Graduate Assessment Test Detailed Curricula for All GATTM Categories

#### GATTM Category A – Business and Engineering Students (Detailed)

Total No. of Questions = 100

Time Allowed = 120 minutes

Topics	Segment % Weight	Number of Questions
Verbal Reasons (English)	35%	35
A: Vocabulary		
A1: Prefixes, Suffixes	5% of 35%	2
A2: Analogies	10% of 35%	3

**GAT-General****GAT™ Category A – Business and Engineering Students (Detailed)**

A3: Antonyms	5% of 35%	2
A4: Conceptual	5% of 35%	2
<b>Sub-total for Vocabulary</b>	<b>25% of 35%</b>	<b>9</b>
<b>B: Grammar</b>		
B1: Tenses and Aspects	20% of 35%	7
B2: Parts of Speech (Conjunctions, Nouns, Pronouns, Verbs, Adverbs, Adjectives, Articles, Prepositions)	10% of 35%	3
B3: Conditionals	5% of 35%	2
B4: Functions	5% of 35%	2
<b>Sub-total for Grammar</b>	<b>40% of 35%</b>	<b>14</b>
<b>C: Comprehension</b>		
C1: Inferencing	15% of 35%	5
C2: Linking Devices	6% of 35%	2
C3: Main Idea	5% of 35%	2
C4: Title	3% of 35%	1
C5: Topic Sentences	3% of 35%	1
C6: Types of Passage (Narrative, Descriptive, Expository, Scientific, Entertaining, Didactic, Rhetorical)	3% of 35%	1
<b>Sub-total for Comprehension</b>	<b>35% of 35%</b>	<b>12</b>
<b>Quantitative Reasoning</b>	<b>35%</b>	<b>35</b>
<b>Arithmetic</b>		
Business Mathematics, Financial Mathematics, Consumer Mathematics, Percentage Ratio and Proportion, Zakat, Ushr and Inheritance	33% of 35%	12
<b>Algebra</b>		
Fundamentals of Geometry, Practical Geometry, Areas and Volumes, Matrices and Determinants, Basic Statistics, Arithmetic and Geometric Sequences, Linear Graphs, Sets and Functions	33% of 35%	12
<b>Geometry</b>		
Introduction to Trigonometry, Projection of a Side of a Triangle, Chords of a Circle, Tangent to a Circle, Chords and Arcs, Angles in a segment of a Circle, Practical Geometry Circles, Congruent Triangles, Parallelograms and Triangles, Line Bisectors and Angle Bisectors	17% of 35%	6
<b>Data Processing</b>		
Basic Statistics and Probability	17% of 35%	5
<b>Analytical Reasoning</b>		
Deductive and Inductive Logic, Critical Thinking and Writing Skills	100% of 30%	30

## GAT General

<b>GAT™ Category A - Business and Engineering Students (Detailed)</b>		
Grant Total All Segments	100%	100
<b>GAT™ Category B - Arts, Humanities And Social Sciences Students (Detailed)</b>		
Total No. of Questions = 100 Time Allowed = 120 minutes		
Topics	Segment % Weight	Number of Questions
Verbal Reasoning (English)	50%	50
<b>A: Vocabulary</b>		
A1: Prefixes, Suffixes	5% of 50%	3
A2: Analogies	10% of 50%	5
A3: Antonyms	5% of 50%	3
A4: Conceptual	5% of 50%	2
<b>Sub-total for Vocabulary</b>	<b>25% of 50%</b>	<b>13</b>
<b>B: Grammar</b>		
B1: Tenses and Aspects	20% of 50%	10
B2: Parts of Speech (Conjunctions, Nouns, Pronouns, Verbs, Adverbs, Adjectives, Articles, Prepositions)	10% of 50%	5
B3: Conditionals	5% of 50%	2
B4: Functions	5% of 50%	3
<b>Sub-total for Grammar</b>	<b>40% of 50%</b>	<b>20</b>
<b>C: Comprehension</b>		
C1: Inferencing	15% of 50%	8
C2: Linking Devices	6% of 50%	3
C3: Main Idea	5% of 50%	3
C4: Title	3% of 50%	1
C5: Topic Sentences	3% of 50%	1
C6: Types of Passage (Narrative, Descriptive, Expository, Scientific, Entertaining, Didactic, Rhetorical)	3% of 50%	1
<b>Sub-total for Comprehension</b>	<b>35% of 50%</b>	<b>17</b>
<b>Quantitative Reasoning</b>	<b>30%</b>	<b>30</b>
<b>Arithmetic</b>		
Business Mathematics, Financial Mathematics, Consumer Mathematics, Percentage Ratio and Proportion, Zakat, Usir and Inheritance	33% of 30%	10
<b>Algebra</b>		

*Introduction*

**GAT-General**

<b>GAT™ Category A – Business and Engineering Students (Detailed)</b>			
Fundamentals of Geometry, Practical Geometry, Areas and Volumes, Matrices and Determinants, Basic Statistics, Arithmetic and Geometric Sequences, Linear Graphs, Sets and Functions		33% of 30%	10
<b>Geometry</b>  Introduction to Trigonometry, Projection of a Side of a Triangle, Chords of a Circle, Tangent to a Circle, Chords and Arcs, Angles in a Segment of a Circle, Practical Geometry Circles, Congruent Triangles, Parallelograms and Triangles, Line Bisectors and Angle Bisectors		17% of 30%	5
<b>Data Processing</b>  Basic Statistics and Probability		17% of 30%	5
<b>Analytical Reasoning</b>  Deductive and Inductive Logic, Critical Thinking and Writing Skills		20%	20
<b>Grand Total All Segments</b>		100% of 20%	20
		100%	100

**GAT™ Category C – Agriculture, Veterinary, Biological & Related Sciences Students (Detailed)**

Total No. of Questions = 100

Time Allowed = 120 minutes

Topics	Segment % Weight	Number of Questions
<b>Verbal Reasons (English)</b>	45%	45
<b>A: Vocabulary</b>		
A1: Prefixes, Suffixes	5% of 45%	2
A2: Analogies	10% of 45%	5
A3: Antonyms	5% of 45%	2
A4: Conceptual	5% of 45%	2
<b>Sub-total for Vocabulary</b>	25% of 45%	11
<b>B: Grammar</b>		
B1: Tenses and Aspects	20% of 45%	9
B2: Parts of Speech (Conjunctions, Nouns, Pronouns, Verbs, Adverbs, Adjectives, Articles, Prepositions)	10% of 45%	5
B3: Conditionals	5% of 45%	2
B4: Functions	5% of 45%	2
<b>Sub-total for Grammar</b>	40% of 45%	18
<b>C: Comprehension</b>		
C1: Inferencing	15% of 45%	7
C2: Linking Devices	6% of 45%	3
C3: Main Idea	5% of 45%	3

<b>GAT™ Category C – Agriculture, Veterinary, Biological &amp; Related Sciences Students (Detailed)</b>		
C4: Title	3% of 45%	1
C5: Topic Sentences	3% of 45%	1
C6: Types of Passage (Narrative, Descriptive, Expository, Scientific, Entertaining, Didactic, Rhetorical)	3% of 45%	1
<b>Sub-total for Comprehension</b>	<b>35% of 45%</b>	<b>16</b>
<b>Quantitative Reasoning</b>	<b>35%</b>	<b>35</b>
<b>Arithmetic</b>		
Business Mathematics, Financial Mathematics, Consumer Mathematics, Percentage Ratio and Proportion, Zakat, Ushr and Inheritance	33% of 35%	12
<b>Algebra</b>		
Fundamentals of Geometry, Practical Geometry, Areas and Volumes, Matrices and Determinants, Basic Statistics, Arithmetic and Geometric Sequences, Linear Graphs, Sets and Functions	33% of 35%	12
<b>Geometry</b>		
Introduction to Trigonometry, Projection of a Side of a Triangle, Chords of a Circle, Tangent to a Circle, Chords and Arcs, Angles in a Segment of a Circle, Practical Geometry Circles, Congruent Triangles, Parallelograms and Triangles, Line Bisectors and Angle Bisectors	17% of 35%	6
<b>Data Processing</b>		
Basic Statistics and Probability	17% of 35%	5
<b>Analytical Reasoning</b>	<b>20%</b>	<b>20</b>
Deductive and Inductive Logic, Critical Thinking and Writing Skills	100% of 20%	20
<b>Grand Total All Segments</b>	<b>100%</b>	<b>100</b>
<b>GAT™ Category D – Religious Studies Students (Detailed)</b>		
Total No. of Questions = 100		
Time Allowed = 120 minutes		
Topics	Segment % Weight	Number of Questions
<b>Verbal Reasons (English)</b>	<b>50%</b>	<b>50</b>
<b>A: Vocabulary</b>		
A1: Prefixes, Suffixes	5% of 50%	3
A2: Analogies	10% of 50%	5
A3: Antonyms	5% of 50%	3
A4: Conceptual	5% of 50%	2
<b>Sub-total for Vocabulary</b>	<b>25% of 50%</b>	<b>13</b>

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<b>GAT™ Category C – Agriculture, Veterinary, Biological &amp; Related Sciences Students (Detailed)</b>		
<b>B: Grammar</b>	20% of 50%	10
B1: Tenses and Aspects	10% of 50%	5
B2: Parts of Speech (Conjunctions, Nouns, Pronouns, Verbs, Adverbs, Adjectives, Articles, Prepositions)	5% of 50%	2
B3: Conditionals	5% of 50%	3
B4: Functions	40% of 50%	20
<b>Sub-total for Grammar</b>		
<b>C: Comprehension</b>	15% of 50%	8
C1: Inferencing	6% of 50%	3
C2: Linking Devices	5% of 50%	3
C3: Main Idea	3% of 50%	1
C4: Title	3% of 50%	1
C5: Topic Sentences	3% of 50%	1
C6: Types of Passage (Narrative, Descriptive, Expository, Scientific, Entertaining, Didactic, Rhetorical)	35% of 50%	17
<b>Sub-total for Comprehension</b>	30%	30
<b>Quantitative Reasoning</b>		
<b>Arithmetic</b>	33% of 30%	10
Business Mathematics, Financial Mathematics, Consumer Mathematics, Percentage Ratio and Proportion, Zakat, Ushr and Inheritance		
<b>Algebra</b>	33% of 30%	10
Fundamentals of Geometry, Practical Geometry, Areas and Volumes, Matrices and Determinants, Basic Statistics, Arithmetic and Geometric Sequences, Linear Graphs, Sets and Functions		
<b>Geometry</b>		
Introduction to Trigonometry, Projection of a Side of a Triangle, Chords of a Circle, Tangent to a Circle, Chords and Arcs, Angles in a Segment of a Circle, Practical Geometry Circles, Congruent Triangles, Parallelograms and Triangles, Line Bisectors and Angle Bisectors	17% of 30%	5
<b>Data Processing</b>		
Basic Statistics and Probability	17% of 30%	5
<b>Analytical Reasoning</b>	20%	20
Deductive and Inductive Logic, Critical Thinking and Writing Skills	100% of 20%	20
<b>Grand Total All Segments</b>	100%	100

## LIST OF DISCIPLINES FOR GAT-GENERAL

### CATEGORY - A

#### **ENGINEERING & TECHNOLOGY**

##### **Technology includes**

Management Engineering

Management Information Systems

Ergonomics

Technical & Vocational Education

Industrial Research

##### **Engineering including**

Textile Engineering

Industrial Engineering

Computer Engineering

Civil Engineering

Bioengineering

Systems Engineering

Environmental Engineering

Engineering Economy

Engineering Meteorology

Applied Mechanics

Acoustical Engineering

Structural Engineering

Engineering Geology

Transportation Engineering

Applied Optics

Photonics

Plasma Engineering

Hydraulic Engineering

Environmental Engineering

Mechanical Engineering

Electrical Engineering

Electronics

Nuclear Engineering

Aeronautics

Astronautics

Mining Engineering

Metallurgy

Business Education

Finance all subjects including

Public Finance

Banking

Finance Management

Commerce

Business Administration & Management

### CATEGORY - B

#### **ARTS & HUMANITIES**

Fine Arts

Photography

Recreational & Performing Arts, Music

Physical Education and Sports

Languages and Literature

Museology (Museum Science)

Journalism, Advertisement, Mass Communication

#### **SOCIAL SCIENCES**

Anthropology including

Physical Anthropology

Archeology

Economics

Statistics

Political Science

International Relations

Psychology

Philosophy

Sociology

Criminology

Administrative Sciences including

Public Administration

Library and Archival Sciences

History

Geography

Religious Studies

Education

Law and Legislature

**GAT-General**

**CATEGORY - C**  
**AGRICULTURE & VETERINARY SCIENCES**

Agriculture
Plant Culture
Forestry, Horticulture
Animal Culture
Aquaculture, Fisheries

Pediatrics

Public Health including

Promotion of Health

Incidence &amp; Prevention of Disease

Epidemiology

Dentistry

Pharmacology

Pharmacy

Nursing

**BIOLOGICAL & MEDICAL SCIENCES**

Biology including
Evolution & Genetics
Microbiology
Botanical Sciences
Botany
Palaeobotany
Zoological Sciences
Zoology
Paleozoology
Marine Sciences (Biological Aspects)
Biological Anthropology
Biotechnology
Medicine all subjects including
Medicine
Human Anatomy, Cytology, Histology
Human Physiology
Pathology
Internal Medicine
Pharmacy, Pharmacology & Therapeutics
Medicine (Clinical) including
Surgery & related medical specialities
Gynaecology related medical specialities
Experimental Medicine
Ophthalmology
Dermatology

**PHYSICAL SCIENCES**

Physics all specialities including

Mechanics

Electricity &amp; Electronics

Modern Physics

Nuclear Physics

Chemistry all subjects including

Biochemistry

Analytical Chemistry

Crystallography

Astronomy

Astronomy &amp; Allied Sciences

Earth (Astronomical Geography)

Mathematical Geography

Astro-geology

Astro-physics

**Earth, Atmosphere & Marine Sciences**

Earth Sciences &amp; Allied Sciences

Geology, Hydrology, Meteorology

Petrology, Mineralogy

Economic Geology

Paleontology-Palaeozoology, Palaeobotany

Oceanography

**Mathematics**

Applied Mathematics

**Statistics / Computer Sciences & related disciplines**

Information Technology, Software Engineering

## Graduate Assessment Test Eligible Fields For All GAT™ Categories

### Graduate Assessment Test (GAT™-A)

Total No. of Questions = 100

Time Allowed = 120 minutes

#### Business Education

##### Finance All Subjects Including

- Public Finance
- Banking
- Finance Management
- Commerce
- Business Administration & Management

#### Engineering & Technology

##### Technology Including

- Management Engineering
- Management Information System
- Ergonomics
- Technical & Vocational Education
- Industrial Research

##### Engineering Including

- Textile Engineering
- Industrial Engineering
- Computer Engineering
- Civil Engineering
- Bio engineering
- Systems Engineering
- Environmental Engineering
- Engineering Economy
- Engineering Meteorology
- Applied Mechanics
- Acoustical Engineering
- Structural Engineering
- Engineering Geology
- Transportation Engineering
- Applied Optics
- Photonics

**GAT-General**

**Graduate Assessment Test (GAT™ A)**

- Plasma Engineering
- Hydraulic Engineering
- Environmental Engineering
- Mechanical Engineering
- Electrical Engineering
- Electronics
- Nuclear Engineering
- Aeronautics
- Astronautics
- Mining Engineering
- Metallurgy

**Graduate Assessment Test (GAT™ B)**

Total No. of Questions = 100

Time Allowed = 120 minutes

**Arts & Humanities**

- Fine Arts
- Photography
- Recreational & Performing Arts, Music
- Technical & Vocational Education
- Languages and Literature
- Museology (Museum Science)
- Journalism, Advertisement, Mass Communication

**Social Sciences**

**Anthropology Including**

- Physical Anthropology
- Archeology
- Economics
- Statistics
- Political Science
- International Relations
- Psychology
- Philosophy
- Sociology
- Criminology

**Graduate Assessment Test (GAT™-A)**

**Administrative Sciences Including**

- Public Administration
- Library and Archival Sciences
- History
- Geography
- Religious Studies
- Education
- Law and Legislature

**Graduate Assessment Test (GAT™-C)**

Total No. of Questions = 100

Time Allowed = 120 minutes

**Agriculture & Veterinary Sciences**

- Agriculture
- Plant Culture
- Forestry, Horticulture
- Animal Culture
- Aquaculture, Fisheries

**Biological & Medical Sciences**

**Biology Including**

- Evolution & Genetics
- Microbiology
- Botanical Sciences
- Botany
- Palaeobotany
- Zoological Sciences
- Zoology
- Palaeozoology
- Marine Sciences (Biological Aspects)
- Biological Anthropology
- Biotechnology

**Medicine All Subjects Including**

- Medicine

**GAT-General**

**Graduate Assessment Test (GAT™-C)**

- Human Anatomy, Cytology, Histology
- Human Physiology
- Pathology
- Internal Medicine
- Pharmacy, Pharmacology & Therapeutics

**Medicine (Clinical) Including**

- Surgery & Related Medical Specialities
- Gynaecology Related Medical Specialities
- Experimental Medicine
- Ophthalmology
- Dermatology
- Pediatrics

**Public Health Including**

- Promotion of Health
- Incidence & Prevention of Disease
- Epidemiology
- Dentistry
- Pharmacology
- Pharmacy
- Nursing

**Physical Sciences**

**Physics All Specialities Including**

- Mechanics
- Electricity & Electronics
- Modern Physics
- Nuclear Physics

**Chemistry All Specialities Including**

- Biochemistry
- Analytical Chemistry
- Crystallography

**Astronomy**

- Astronomy & Allied Sciences
- Earth (Astronomical Geography)

**Graduate Assessment Test (GAT™-C)**

- Mathematical Geography
- Astro-Geology
- Astrophysics

**Earth, Atmosphere & Marine Sciences**

- Earth Sciences & Allied Sciences
- Geology, Hydrology, Meteorology
- Petrology, Mineralogy
- Economic Geology
- Palaeontology, Palaeozoology, Palaeobotany
- Oceanography

**Mathematics**

- Applied Mathematics

**Statistics/Computer Sciences & Related Disciplines**

- Information Technology, Software Engineering

**Graduate Assessment Test (GAT™-D)**

Total No. of Questions = 100

Time Allowed = 120 minutes

**Madrassa Education**

(Students having Master's Degree equivalence from HEC)

- Fiqh
- Usul al-Fiqh
- Uloom-ul-Hadith
- Uloom-ul-Tafsir
- Logic
- Arabic Language
- Arabic Literature
- Aqida
- Hadith
- Tafsir

## GAT-General

## GAT-GENERAL (LOCAL) — TEST FORMAT

### *Do You Know*

**Verbal Reasoning:** There are three major sections in the Verbal Reasoning section: Vocabulary, Grammar, and Comprehension. There are a total of 35 questions in this section, as follows:

1. Vocabulary	9 questions	2. Grammar	14 questions
3. Comprehension	12 questions		

- Each Verbal Reasoning test is of only 35 minutes, so time is of the essence. 35 questions are to be answered in 35 minutes; you have about 1 minute to answer each question.
- This portion of the TEST essentially is a test of vocabulary. The stronger your vocabulary, the easier it will be to answer the questions in the Antonyms, Sentence Completions, and the Analogies. After all, although each type of question is different, essentially it is a test of vocabulary. The Comprehension Test is exactly what it says: Comprehension.

**Quantitative Reasoning (Arithmetic):**

- We will refer to this section of the Test as the arithmetical skills section, which requires a basic understanding of fundamental arithmetical concepts and abilities. You are asked to solve problems and to utilize mathematical reasoning. Fortunately, most of the mathematics on this test is high school level mathematics, and should not be that difficult. Unfortunately, by the time you have reached your last year in college, or have been out of college for some time, and getting ready to take the test, you have probably forgotten most of your high school math. We have provided you with a basic math review, covering all of the topics that will be included in this portion of the test.
- The mathematics section of the test includes three main areas and contains 35 questions to be answered in 35 minutes - again, about 1 minute per question.

1. Arithmetic 6 questions	2. Algebra	12 questions
3. Geometry 6 questions	4. Basic Statistics Probability	5 questions

- The *Quantitative Reasoning* questions require you to be able to reason quickly and accurately about two quantities provided. It requires a sense of logic and reasoning. The chapter on Quantitative Reasoning offers numerous fully explained examples, as well as dozens of practice questions.
- *Basic Arithmetic* involves traditional computational skills, and includes arithmetic, algebra, and geometry. Fortunately, if your math skills are somewhat weak, these are multiple choice questions, and if you can develop strong question answering skills, you can improve your chances.
- *Analytical Reasoning:* There are two basic types of questions in this section, but they both require strong reasoning skills. There are 30 questions in this section, to be answered in 50 minutes, and consist of the following types of questions:

1. Deductive and Inductive Logic, Critical Thinking and Writing Skills.	30 questions
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- As you will see in the strategies section, many of these questions involve diagramming or making tables and charts. Once you've learned the basic skills for answering these types of questions, they will not seem as intimidating as they might, if you just encountered them "cold" on a test.

## GAT PREPARATION

Follow these GAT preparation tips to score higher.

### EVALUATION PLANNING

- To have a better understanding of the GAT sections, take a full length test in very beginning.
  - Analyze your performance on the test and identify your weak and strong areas.
  - Plan a 15 days schedule of preparation. Think you are to take the test after 15 days and start preparing. Focus your weak and strong areas of the test. Do not consider time per question during this session.
  - For 100% success in Entry Test, read "Dogar's Unique up-to-date GAT General Self Study Papers".
- After the 15-day preparation, you are guaranteed to have a better and clear understanding of not only your own strong and weak zones but also of the nature and sections of the GAT. Thereafter, you will be able to plan your preparation.

### COLLECT STUDY MATERIAL

You must have study authentic material and topics for better practice and understanding. You can collect all stuff from

- **Authentic Books and Study Material:**

- Dogar's Unique up-to-date "*Hi Brain GAT-General*" is the recommended book available in the market.
  - Dogar's Unique understanding "GRE" with Explanatory Answers.
  - Dogar's Unique up-to-date "GAT GENERAL SELF TEST PAPERS"

### CORE PLANNING

Now plan for 30 days preparation. Focus on your weak areas but don't let your strong area tarnish. Give time and efforts to each section. Take topic and section evaluation tests time to time. Direct your activities towards identified weak areas.

### PINPOINT PLANNING

After core preparation of 30 days, take an evaluation test. Observe, whether particular types of questions are wrong or wrong questions are of varied types.

For this, read **Dogar's Unique up-to-date "GAT-GENERAL Self Test Model Papers"**.

- If you find a particular type error, improve it
- If you find a varied type question errors, revise core planning for 10 days and again start pinpoint evaluation

**GAT-General**

# **INSTRUCTIONS for GAT TEST DAY**

**PLEASE FOLLOW THESE INSTRUCTIONS CAREFULLY**

## **ATTENDANCE**

- Reporting Time at test centre as specified on Roll No. Slip.
- NO candidate will be admitted in the test centre after specified time.
- Candidates will have to produce their Roll Number Slips at the entry point of the test centre.
- Without the Roll Number Slip, NO candidate will be entertained for the test.
- Question booklets will be in five different shuffles.
- Each question booklet will be sealed and opened by the candidates at the start of test.
- Do not break the seal till the test starts.
- No candidate will be allowed to leave the seat during the test except for an unavoidable reason e.g. toilet usage, that to in the escort of an invigilator.
- All papers will be collected at the end of test and no candidate will be allowed to move from the seat till the final count after the collection of the papers.
- Don't bring calculators, mobile phones and wrist watches with calculator in the test center.

## **ABOUT SHADING/FILLING THE CIRCLES**

- Shading/filling of two answers against single question is wrong, it will be marked ZERO.
- Over-writing and cutting near answer circle or anywhere on answer sheet will distract the readability and may be marked ZERO in the specific answer circle.
- Only Use Blue Or Black Ball Pen To Shade/Fill The Circles.
- Don't bring any other stationery item including rough/extraneous sheets as two blank sheets for rough work are placed inside the Question booklet.
- Use of any other material that is not provided by NTS will be illegal and subject to disciplinary action.
- Don't write anything on Question Booklet except your NAME, ROLL NO. and SIGN on the front title of Question Booklet before attempting the questions.
- **The question Booklet will be taken back after the test is over so DO NOT ATTEMPT TO TEAR OR REMOVE ANY PAGE FROM QUESTION BOOKLET. NUMBER ONE IS ALLOWED TO KEEP ANY PART OF IT.**
- Do not ask the invigilation staff about the content of questions. They are not allowed to

explain or correct any question in the paper. The checking system has the capability to determine the erroneous questions and adjust accordingly.

- Every candidate is required to sign the attendance sheet brought to her/him by the invigilators. The ROLL NO SLIPS will also be collected by the same staff after the attendance is completed.
- You are bound to NTS discipline rules till you leave the test center premises.
- Any disturbance in any way caused by you will disqualify you from the test and NTS reserves the rights to carry out legal action against such attempt.
- The chief supervisor has complete authority to cancel any paper at any stage if the activities of the candidate are found against the discipline.

## HOW TO FILL THE ANSWER SHEET

One page printed answer sheet is provided to answer the questions. Use only ball pen (black / blue) to shade / fill the circles. (Bring pen / clip board with you, erasing materials are not allowed.) Answer sheet contains five circles containing five options of answer for one question, containing alphabets from A to E inside, against each question number. The candidate has to completely shade / fill one circle that he / she thinks is correct. For example, the candidate feels that the correct answer of the given question is "A", then he / she may shade / fill the circle containing alphabets 'A' with ball pen like this:

<b>Correct Filling</b>	<input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
<b>Incorrect Fillings</b>	<input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
	<input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
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	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/>
	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/>
	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>

**Personal Information on Answer Sheet:** The answer sheet contains personal data of candidate on the top of the sheet. It has candidate name, father name, roll number and photograph. The candidate is required to critically check these fields and sign in the required space. If any field of personal information is found incorrect, the candidate must inform the invigilator present around.

## HOW TO FILL THE REGISTRATION FORM?

- ↳ Select your test city for desired test center choice.
- ↳ Please write your valid email address as your roll number, test center and other information will be sent to you at this email address (keep checking your emails regularly).
- ↳ Roll number slips and result cards will be sent through courier service. Give valid and clear address where delivery is certain. Candidates must fill the "postal address", "postal city" and "postal city district" in their online registration forms to receive the test roll number slip and result card.
- ↳ In academic record portion, write down your major subjects and percentage of secured marks in two digits only, forms having any information other than percentage will not be processed. In academic record column, "Board / University" (please write only particular board name in abbreviation (e.g. FBISE Islamabad, BISE Rawalpindi, BISE Gujranwala, BISE Abbottabad etc.
- ↳ **Incomplete or improperly filled registration forms will not be processed.**
- ↳ Please stay interactive with our website for eligible candidates list, test venue and all related information: [www.nts.org.pk](http://www.nts.org.pk)
- ↳ Post your original deposit slip to NTSTM Islamabad.
- ↳ **Note:**
- ↳ By hand submission of deposit slip will not be accepted.
- ↳ The candidates will be required to apply for admission in the universities as per their respective announcements along with a copy of the NTSTM result card.
- ↳ Provisional eligible candidates list will be displayed on our website on first come first served basis of the registration (within one week of the receipt of last date of submition of online registration form).
- ↳ Final eligible candidates list will be uploaded 2 days after last date of provisional list. Roll number and test center will be allotted in final eligible candidates list.
- ↳ The roll number slips will be dispatched by NTSTM about 10 days prior to the test date.
- ↳ NTSTM will dispatch the result cards within 7 days after the test date.

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## DISTRICTS LIST OF PAKISTAN

Please find your Correspondence City District from the Districts List given below and write it in the box of Correspondence City District in your GAT™ Registration Form:

- FEDERAL
- PUNJAB
- BALOCHISTAN
- KHYBER PAKHTUNKHWA
- SINDH
- AZAD KASHMIR
- FATA & FANA
- NORTHERN AREAS (GILGIT-BALTISTAN)

<b>FEDERAL</b>		
Islamabad		
<b>PUNJAB</b>		
Attock	Kasur	Okara
Bahawalnagar	Khanewal	Pakpattan
Bahawalpur	Khushab	Rahim Yar Khan
Bhakkar	Lahore	Rajanpur
Chakwal	Layyah	Rawalpindi
Dera Ghazi Khan	Lodhran	Sahiwal
Faisalabad	Mandi Bahauddin	Sargodha
Gujranwala	Mianwali	Sheikhupura
Gujrat	Multan	Sialkot
Hafizabad	Muzaffargarh	Toba Tek Singh
Jhang	Nankana Sahib	Vehari
Jhelum	Narowal	
<b>BALOCHISTAN</b>		
Awaran	Kalat	Mastung
Barkhan	Kech	Musakhel
Bolan	Kharan	Nasirabad
Chagai	Khuzdar	Panjgur
Dera Bugti	Kila Abdullah	Pishin
Gwadar	Kila Saifullah	Quetta

**GAT-General****BALOCHISTAN**

Jaffarabad	Kohlu	Sibi
Jhal Magsi	Lasbelo	Zhob
Kachhi	Loralai	Ziarat

**KHYBER PAKHTUNKHWA**

Abbottabad	Haripur	Mardan
Bannu	Karak	Nowshera
Batagram	Kohat	Peshawar
Buner	Kohistan	Shangla
Charsadda	Lakki Marwat	Swabi
Chitral	Lower Dir	Swat
Dera Ismail Khan	Malakand P.A	Tank
Hangu	Mansehra	Upper Dir

**SINDH**

Badin	Kashmore	Shikarpur
Dadu	Khairpur	Sukkur
Ghotki	Larkana	Tando Allahyar
Hyderabad	Matiari	Tando Muhammad Khan
Jacobabad	Mirpurkhas	Tharparkar
Jamshoro	Naushahro Feroze	Thatta
Kamber & Shahdad Kot	Nawabshah	Umerkot
Karachi	Sanghar	

**AZAD KASHMIR**

Bhimber	Bagh	Poonch
Kotli	Muzaffarabad	Sudhnati
Mirpur	Neelum	

**FATA & FANA**

Bajaur	Mohmand	Orakzai
Khyber	North Waziristan	South Waziristan
Kurram		

**NORTHERN AREAS (GILGIT-BALTISTAN)**

Astore	Ghanche	Gilgit
Diamer	Ghizer	Skardu

Roll No. \_\_\_\_\_ (To be filled by NTS)

## (رجسٹریشن فارم پر کرنے کی ہدایات)

**APPLICATION FORM****(GAT-III 2015)  
GAT-General**

Affix two recent photographs  
1x1.5 inches  
only



رجسٹریشن فارم کے سب سے اوپر والے حصے میں روپئیں کا کام ہے جسے امیدوار نے خالی چھوڑ دیتا ہے۔ یہ حصہ NTS کے ذیلی استعمال کے لیے ہے۔ اس کے پیچے تصاویر کی جگہ ہے جہاں امیدوار نے 1.5 x 1 اینچ کی دو عدد تازہ تصاویر چھپ کر لیتی ہیں۔ تصاویر کا پہلی صفحہ پرکے نیلے رنگ کا اتنا چھپا ہے تاکہ کپیوفر میں بھی دکھائی دے۔ دوسری تصاویر کی پشت پر شناخت کے لیے اپنا نام ضرور تحریر کریں تاکہ اتحادی سرکز میں اس کے ذریعے آپ کی شناخت کی جاسکے۔ دیے گئے سائز کے علاوہ کسی اور سائز کی تصاویر قابل قبول نہیں ہوں گی۔

## 1. Bank

Online Deposit of Rs: 600/- from Designated Bank Branches only.

Bank Code	211	Deposit Date	11-05-2015
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رجسٹریشن فارم کے کالم نمبر 1 میں امیدوار اس بک کا نام اور برائج کا کوڈ تحریر کرے جس میں اس نے اتحادات کی رجسٹریشن فسیں بھیج کر دی ہوں۔

2. DESIRED TEST CITY (Mandatory, The preferred city where you want to appear for the test)  
(See instructions to fill test center codes)

TEST CENTER CODE (In Digits)	TEST CENTER CODE (In Words)
31	Thirty-One

رجسٹریشن فارم کے کالم نمبر 2 میں اس شہر کا دو صد و الہا کوڑ درج کریں جس شہر میں آپ امتحان دینا چاہتے ہیں۔ دو صد و دو لے کوڑ کے سامنے اسے الفاظ میں بھی تحریر کریں۔ شہروں کے نام اور ان کے کوڈی فہرست رجسٹریشن فارم کی پشت پر دی گئی ہے۔ یہ کالم پر کرنے سے پہلے اپنا مطلب بہ شہر اور اس کا کوڈ ضرور دیکھیں۔

3. Proposed Field of Study (Mandatory). More than one checked discipline can lead towards rejection of application form. Consult the list of disciplines/subjects on NTS website: [www.nts.org.pk](http://www.nts.org.pk) before making the selection.)

1	Agriculture & Veterinary Sciences	5	Business Education
2	Biological & Medical Sciences	6	Social Sciences
3	Physical Sciences	7	Arts & Humanities
4	Engineering & Technology		

رجسٹریشن فارم کے کالم 3 میں کل 7 شعبہ تحریر کیے گئے ہیں۔ ان میں سے اپنا مطلب شعبہ منتخب کر کے اس پر نشان لکھیں۔

4. NAME in full	J A V E D	A H M A D						
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(Use CAPITAL LETTERS)

رجسٹریشن فارم کے کالم نمبر 4 میں اپنا پورا نام بڑے اگر بڑی حروف میں تحریر کریں۔ نام اس امداز سے لکھا جائے کہ ہر خطے میں ایک حرف آئے اور

نام کے ہر لفظ کے بعد ایک خاتہ خالی چھوڑا جائے۔

5. FATHER'S NAME	F A W A D	A H M A D					
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(Use CAPITAL LETTERS)

رجسٹریشن فارم کے کالم نمبر 5 میں اپنے والد کا نام بڑے اگر بڑی حروف میں تحریر کریں۔

6. N.I.C. #	4 1 2 5 4 - 5 8 9 8 5 7 0 - 5
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(New Only)

Introduction

**GAT-General**

رجسٹریشن فارم کے کالمنبر 6 میں اپنا شناختی کارڈ نمبر تحریر کریں۔

7. DATE OF BIRTH DD MM YY  
[ 09 ] [ 02 ] [ 86 ]

رجسٹریشن فارم کے کالمنبر 7 میں اپنی تاریخ پیو اکش اس طرح درج کریں گے۔ پہلے خانے میں پیو اکش کی تاریخ، دوسرا میں ماہ اور تیسرا میں سال۔

8. E-MAIL *mehmood@yahoo.com*

(Mandatory, most of the future correspondence will be done using e-mail address)

رجسٹریشن فارم کے کالمنبر 8 میں اپنا وہ ای میل ایڈریس تحریر کریں ہے آپ باقاعدگی سے مکمل ہوں۔ NTS کی جانب سے زیادہ تر ملکی اکاؤنٹ اسی ای میل ایڈریس کے ذریعے ہوگی۔

9. Gender:  Male  Female

رجسٹریشن فارم کے کالمنبر 9 میں اپنی جنس کے بارے میں معلومات فراہم کریں گے۔ ہوئے متعلقہ خانے پر نشان لگائیں۔

10. CORRESPONDENCE POSTAL ADDRESS Street No. 7, House No. 157, Wapda Town,

(All correspondence will be made on this address through postal service, see instructions)

A-Block

CITY Lahore

کالمنبر 10 میں خط و کتابت کے لیے اپنا پیدا تحریر کریں۔ پیدا واسی اور عمل ہونا چاہیے کیونکہ امتحان کے لیے آپ کی رہنمائی اور رولٹ کارڈ بذریعہ ڈاک اسی پر ارسال کیے جائیں گے۔

11. TELEPHONE NO. (OFF.) [ 042-6841549 ] (RES.) [ 042-7510753 ] Mobile [ 0321-4156975 ]  
(City Code-Phone No.)

رجسٹریشن فارم کے کالمنبر 11 پر اپنے دفتر، گھر اور موبائل فون نمبر تحریر کریں۔ دفتر اور گھر کے فون نمبر کے ساتھ اپنے شہر کا شی کوڈ تحریر کرنے کا ہوں۔

12. ACADEMIC RECORD

Certificate / Degree	Obtained Percentage only	Board / University
SSC (10 Years)	80	FBISE ISLAMABAD
HSSC (12 Years)	75	FBISE ISLAMABAD
Bachelors Degree (14 Years)	-	-
Masters/Bachelors (Hons.) (16 Years)	75	CIIT, ISLAMABAD
M.Phil Degree (18 Years)	-	-

\* Have you appeared before in GAT test?  Yes  No

\* If Yes, please write your Roll No.

Note: Please do not attach any documents other than CNIC copy & Deposit Slip.

کالمنبر 12 میں اپنے حاصل کردہ تعلیمی سرٹیفیکیٹ اور ڈگریوں کی تفصیل تحریر کیجیے۔ حاصل کردہ نمبر لکھنے کی وجہ سے اسے بحمد اللہ میں تحریر کریں۔ اس کا نام تفصیلی طور پر لکھنے کی وجہ میں تخفیفات میں تحریر کریں۔ FBISE Board of Intermediate & Secondary Education, Lahore، ہندوستان کی بجاے "B.I.S.E Lahore" تحریر کریں۔ کالمنبر 12 کے آخر میں پوچھا گیا ہے کہ کیا آپ نے اس سے پہلے GAT کے امتحان میں پرٹ کی ہے؟ جواب دینے کے لیے متعلقہ خانے پر نشان لگائیں۔ رجسٹریشن فارم کے ساتھ اپنے شناختی کارڈ کی فوٹو کا اپنے اور یہکہ چالان کی رسید ضرور لے لیں۔

**UNDERTAKING BY THE APPLICANT**

I JAVED AHMAD d/s/w of FAWAD AHMAD do hereby solemnly affirm that I have read and understood the conditions for appearing in the NTS Test for award of scholarship, advertised in the print and electronic media and that I have filled the form as per instructions given above and in the event any information contained herein is found to be untrue, I shall be liable to disciplinary action which may result in cancellation of my test.

Date: 20.05.2015

*Signature of the Candidate*

بے سے ملکیت ہے اپنے امدادی اور مددی کرنے کے بعد اپنے دھن کریں اور ہمارے ذمہ میں دھن کرنے سے پہلے  
کوئی اپنے اپنے امدادی اور مددی کرنے کے بعد اپنے دھن کریں اور ہمارے ذمہ میں دھن کرنے سے پہلے  
کوئی کام جو شرکت پر ہے نہ۔ مگر اپنے کے

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**SAMPLE BANK RECEIPT**

**National Testing Service**  
Building Diversify & Diversify our Professional Testing  
NTS GROUP

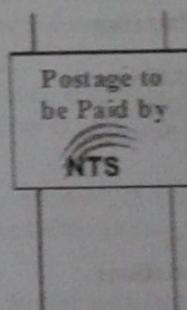
Branch Code:	Branch Name:	Date:																																				
ONLINE DEPOSIT SLIP																																						
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**National Testing Service**  
Building Diversify & Diversify our Professional Testing  
NTS GROUP

Branch Code:	Branch Name:	Date:																																				
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**SAMPLE ENVELOPE**

To,  
Manager Operations,  
National Testing Service  
402, Street No. 34, Sector I-8/2,  
Islamabad.



Registration Form GAT-III (2015)

# GAT SUBJECT

## Paper Distribution

- Subject Test helps to evaluate, analyze, solve problems, understand relationships and interpret material in a specific area of study.

- 100 MCQs are distributed on the following format:

<b>Major Subjects (Core Area)</b>	70%
<b>English (Verbal)</b>	15%
<b>Analytical Reasoning</b>	15%

- Total Test Time = 120 Minutes (2 Hours)

- Candidates with a minimum of eighteen years of education are eligible to appear in the test.

## GAT-SUBJECTS

- |                                      |  |
|--------------------------------------|--|
| 1. Agriculture Economics             | 28. Management Sciences                    |
| 2. Agriculture Extension             | 29. Mass Communication                     |
| 3. Agriculture-Crop Production       | 30. Mathematics                            |
| 4. Agriculture-Crop Protection       | 31. Mechanical Engineering                 |
| 5. Agriculture-Food Sciences         | 32. Metallurgical and Material Engineering |
| 6. Agriculture-Genetics              | 33. Microbiology                           |
| 7. Architecture                      | 34. Pakistan Studies                       |
| 8. Bio Chemistry                     | 35. Brahvi                                 |
| 9. Botany                            | 36. Balochi                                |
| 10. Chemistry                        | 37. Punjabi                                |
| 11. Civil Engineering                | 38. Pashto                                 |
| 12. Computer Engineering             | 39. Saraiki                                |
| 13. Computer Science                 | 40. Sindhi                                 |
| 14. Economics                        | 41. Urdu                                   |
| 15. Education                        | 42. Pharmacy                               |
| 16. Electrical Engineering           | 43. Physics                                |
| 17. Electronics                      | 44. Political Science                      |
| 18. English (Linguistics)            | 45. Psychology                             |
| 19. English (Literature)             | 46. Sociology                              |
| 20. Environmental Sciences           | 47. Statistics                             |
| 21. Fine Arts                        | 48. Telecommunication Engineering          |
| 22. Geography                        | 49. Textile Engineering                    |
| 23. History                          | 50. Veterinary (Animal Sciences)           |
| 24. Home Economics                   | 51. Veterinary (Bio-Medical Sciences)      |
| 25. International Relations          | 52. Veterinary (Clinical Sciences)         |
| 26. Islamic Studies                  | 53. Veterinary (Patho-Biological Science)  |
| 27. Library and Information Sciences | 54. Zoology                                |

## TEST FORMAT OF GAT SUBJECT

Total Questions (MCQs)	= 100
Total Test Time	= 120 Minutes (2 Hours)
Test Type: Paper Based	

## TEST CONTENTS

General Section	= 30% of the Total Test
Subject Section	= 70% of the Total Test

## AREAS OF GENERAL SECTION

English (Verbal)	= 15%
Analytical Reasoning	= 15%

Note: Lists of eligible candidates, test venue and candidate instructions will be displayed on NTS website at least 7 days prior to test date.

## Minimum Criteria for MS/M.Phil and Ph.D. Programs

This is for the information of all concerned that the degrees awarded by the Universities/Degree Awarding Institutions must meet the following minimum criteria for recognition by the HEC:

### MS/M.Phil Programme:

1. Sixteen years of schooling or 4 year education (130 credit hours) after HSSC/F.A./F.Sc/Grade 12 equivalent will be required for admission in the M.Phil/MS.
2. The GAT-General ([www.nts.org.pk/gat/gat.asp](http://www.nts.org.pk/gat/gat.asp)) conducted by the National Testing Service with a minimum 50% cumulative score will be required at the time of admission to M.Phil/M.S. The GAT-General test is valid for a period of two years.
3. For award of M.Phil/M.S/Equivalent degree, candidates will either need to complete 30 credit hours of course work or complete 24 credit hours of course work along with a minimum of 6 credit hours for research work/thesis.

(\*a. 6 credit hours of research is mandatory for M.Phil. However, exemption may be allowed only for MS in those disciplines where research is not possible. (This exemption from research can only be for non-science subjects/disciplines)

(\*b. The Head of Department may allow the student to do course work of 6 credit hours in lieu of 6 credit hours of research. This exemption can only be allowed if the student wants to terminate his/her course at MS and do not want to do PhD)

4. There should be at least 2 relevant full time Ph.D. faculty members in a department to launch the M.Phil/MS/MBA programmes.

**GAT-General****PHD PROGRAMME:****Admission requirement:**

1. For admission into the PhD, minimum CGPA 3.0 (out of 4.0 in the Semester System) or First Division (in the Annual System) in M.Phil/M.S/Equivalent is required.

**Subject Test:**

2. A subject test conducted by the National Testing Service (NTS) or ETS, USA in the area of specialization chosen at the PhD level must be cleared prior to admission for the PhD Program.
  - a. In the case of GAT Subject test (<http://www.nts.org.pk/GAT/GATSubject.asp>), minimum of 60% marks is required to pass the test.
  - b. In the case of GRE subject test, the minimum score will be acceptable as follows:
    - i. 45% Percentile Score: Valid for Admissions until December 31, 2015
    - ii. 50% Percentile Score: Valid for Admissions until December 31, 2016.
    - iii. 60% Percentile Score: Valid for Admissions thereafter.
  - c. If the Test is not available in NTS subject list, then a University Committee consisting of at least 3 PhD faculty members in the subject area and approved by the HEC will conduct the Test at par with GRE Subject Test and qualifying score for this will be 70% score.

**Course Work:**

3. Course work of 18 credit hours preferably in the first year is required to be completed and followed by a comprehensive examination for granting candidacy as PhD researcher.

**Foreign Expert Evaluation:**

4. The Ph.D. Dissertation must be evaluated by at least two Ph.D. experts from technologically/academically advanced foreign countries in addition to local committee members.

**Open defense:**

5. An open defense of Dissertation is essential part of PhD Program after positive evaluation.

**Research Paper:**

6. Acceptance/publication of at least one research paper in an HEC approved "X" category journal is a requirement for the award of Ph.D.degree ("Y" in case of Social Sciences only).

**Plagiarism Test:**

7. The Plagiarism Test must be conducted on the Dissertation before its submission to the two foreign experts.

**Copy of PhD Dissertation to HEC:**

8. A copy of Ph.D. Dissertation (both hard and soft) must be submitted to HEC for record in Ph.D. Country Directory and for attestation of the PhD degree by the HEC in future.

**Conduct of PhD Program:**

9. There should be at least 3 relevant full time Ph.D. faculty members in a department to launch the Ph.D. Program.
10. The maximum number of Ph.D. students under the supervision of a full time faculty member is five which may be increased to eight under special circumstances in certain teaching departments subject to prior approval of the Higher Education Commission (HEC).

## HIGHER EDUCATION COMMISSION (NATIONAL AND FOREIGN SCHOLARSHIP SCHEME)

- HEC Scholarships for MS/MPhil leading to PhD (90% Overseas Scholarship scheme),
- Overseas Scholarships Scheme For PhD In Selected Fields Phase-I
- HRD Initiative-Monetary Support for PhD Program of Faculty Development for UETs 2009-10
- Fulbright Scholarship Support Program (Masters / PhD Scholarships, USA)
- PhD Scholarships for Engineering & Sciences in Germany.
- MS/M.Phil Leading to PhD Scholarships for Teacher of Weaker Universities
- Partial Support for PhD Studies Abroad
- HEC Overseas Scholarships for MS/MPhil leading to PhD for the Discipline Wise World Top Ranked Universities (10% Overseas Scholarships scheme)
- PhD Scholarship for study of Science, Engineering & Technology, Austria
- 1000 Scholarships for studies in General Comprehensive Medicine in Cuba
- PhD Scholarship for Basic Sciences, China
- HEC Scholarship for MS (Engineering) In South Korean Universities /Industry
- Development of High Level S&T Manpower through Split PhD Program
- Commonwealth Scholarships for PhD, Split Site PhD and Post Doctoral Fellowships, Tenable in UK in 2011
- International Research Support Initiative Program
- PhD Scholarships for Natural & Basic Sciences in France
- Overseas Scholarships for Masters in Engineering

- |   |
|---|
| <ul style="list-style-type: none"><li>➤ The Higher Education Commission (HEC) has assigned National Testing Service (NTS) the responsibility to conduct GRE Type Test i.e.</li><li>➤ Graduate Assessment Test GAT-GENERAL for admissions in M.Phil and HEC Scholarship Schemes and GAT-SUBJECT for PhD. Programmes.</li><li>➤ The test result will remain valid for TWO YEARS for admissions and HEC Scholarship Schemes.</li><li>➤ Candidates intending to improve their previous GAT Score can also apply.</li><li>➤ The candidates will have to qualify other specified criteria of the Universities / HEC Schemes.</li><li>➤ Candidates with a minimum of sixteen years of education are eligible to appear in the test.</li><li>➤ Mobile phones are not allowed in Test Center premises.</li><li>➤ As per HEC policy decision, the GAT test validity (GAT - General / Subject) for TWO YEARS is effective from 1st January 2007 onwards.</li></ul> |
|---|

## FULLY SOLVED MODEL PAPER GAT-GENERAL

1. Candidates MUST read and follow instructions given on the reverse of answer sheet before attempting the question paper.
2. All answers are required to be written on the answer sheet and NOT on this question paper.
3. Attempt all questions which carry equal marks

Time Allowed: 2 Hours (120 Minutes)

Total MCQs : 100  
Total Marks : 100

### 1. VERBAL REASONING

NO. OF QUESTIONS = 35

**ANALOGIES - Directions:** The following questions consist of pairs of words which are related to each other one way or other. Each pair is followed by four pairs of words marked A, B, C and D, which comprise the answer pairs. Find out an answer pair that has the same relationship as the question pair.

- |                        |                        |                         |                           |                         |
|------------------------|------------------------|-------------------------|---------------------------|-------------------------|
| 1. REVENGE: VENGEANCE  | (A) Sleep: Dream       | (B) Sun: Moon           | (C) Envy: Jealousy        | (D) Heaven: God         |
| 2. CONDONE: OFFENCE    | (A) Punish: Criminal   | (B) Mitigate: Penitence | (C) Overlook: Aberration  | (D) Mistake: Judgement  |
| 3. PROTOPLASM: CELL    | (A) Chain: Link        | (B) Fibre: Plastic      | (C) Coin: Money           | (D) Chemistry: Elements |
| 4. CORRUGATED: STRIPED | (A) Box: Zebra         | (B) Paint: Crayon       | (C) Roughness: Smoothness | (D) Pit: Dot            |
| 5. DESTRUCTION: DEATH  | (A) Was: Dirt          | (B) Germs: Infection    | (C) Sneeze: Cold          | (D) Cough: Sneeze       |
| 6. NOUN: GRAMMAR       | (A) Adverb: Adjective  | (B) Clove: Spices       | (C) Boat: Sea             | (D) Name: Person        |
| 7. SHOE: FOOT          | (A) Wrapper: Chocolate | (B) Sheet: Bed          | (C) Cap: Hat              | (D) Bottle: Cork        |
| 8. GOLD: SHINE         | (A) Water: Drink       | (B) Health: Body        | (C) Silver: Ornament      | (D) Earth: Gravity      |
| 9. NOSE: FACE          | (A) Hand: Palm         | (B) Mountain: Surface   | (C) Chair: Platform       | (D) Flag: Pole          |
| 10. BOOK: READ         | (A) Ointment: Apply    | (B) Bat: Ball           | (C) Watch: Time           | (D) Marriage: Home      |

**ANTONYMS - Directions:** In each of the following antonym questions, a word printed in capital letters precedes four or five lettered words or phrases. From these five lettered words or phrases, pick the one most nearly opposite in meaning to the capitalized word.

- |                  |                |               |                 |             |
|------------------|----------------|---------------|-----------------|-------------|
| 11. ABBREVIATE : | (A) abridge    | (B) expand    | (C) achieve     | (D) accept  |
| 12. BLOOMING :   | (A) Fading     | (B) flowering | (C) quiet       | (D) mild    |
| 13. CALIBRE :    | (A) inability  | (B) distinct  | (C) yielding    | (D) brave   |
| 14. ERUDITION :  | (A) ignorance  | (B) evict     | (C) scholarship | (D) dubious |
| 15. HOSTILE :    | (A) friendly   | (B) opposed   | (C) humid       | (D) cruel   |
| 16. KEY :        | (A) solution   | (B) strangers | (C) class       | (D) mystery |
| 17. VIVACIOUS :  | (A) dull       | (B) lively    | (C) quickness   | (D) nice    |
| 18. WOO :        | (A) pursue     | (B) court     | (C) shun        | (D) unjust  |
| 19. YOKE :       | (A) link       | (B) release   | (C) supple      | (D) refuse  |
| 20. ZEST :       | (A) reluctance | (B) relish    | (C) pleasure    | (D) guest   |

**GRAMMAR - Directions:** Read each sentence to find out whether there is any error in it. The error, if any, may be in one part of the sentence. The number of that part is the answer. If there is no error, the answer is "5".

21. He could not (1) went to a planetarium (2) to watch (3) the comet Halley (4).  
 22. He had not (1) gone to a planetarium (2) to see (3) the comet Halley (4).  
 23. In summer (1) the days (2) and nights (3) are hot (4).  
 24. We found (1) it difficult (2) to across (3) the road (4).  
 25. We found (1) it easy (2) to get across (3) to him (4).

**DIRECTING THE ERRORS - Directions:** In the following sentences, every sentence has been divided into four parts, which are marked a, b, c and d. One of these parts may contain an error. Read each sentence carefully and mark the part which contains the error. In case there is no error in the sentence, the answer is 'e'. The correct answers are given at the end of the paper.

26. (a) I have written (b) a letter (c) at him to his Multan address (d) today (e) No Error.  
 27. (a) His favourite maxim (b) is — cut your shirt (c) according (d) to the cloth (e) No Error.  
 28. (a) His brother (b) Shafeeq is (c) an excellent cook (d) is it not? (e) No Error.  
 29. (a) I have (b) brought a (c) he-duck and a she-duck (d) for my friend (e) No Error.  
 30. (a) Later on he (b) became a monk (c) and she became (d) a monkess (b) No Error.

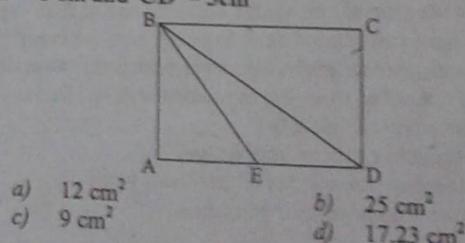
**READING COMPREHENSION - Directions:** Read the passage carefully once and detect its theme. Note what the questions are about. Answer the questions.

It is difficult to reconcile the ideas of different schools of thought on the question of education. Some people maintain that pupils at school should concentrate on a narrow range of subjects which will benefit them directly in their subsequent careers. Others contend that they should study a wide range of subjects so that they have not only the specialized knowledge necessary for their chosen careers but also sound general knowledge about the world they will have to work and live in. Supporters of the first theory state that the greatest contributions to civilization are made by those who are most expert in their trade or profession. Those on the other side say that, unless they have a broad general education, the experts will be too narrow in their outlook to have sympathy with their fellows or a proper sense of responsibility towards humanity as a whole.

31. 'Schools of thought' can be explained as:  
 (A) Groups of people who study in a particular school thoughtfully  
 (B) Groups of people having the same ideas but with different perception on a particular subject  
 (C) Groups of people whose job is to think  
 (D) Groups of people who are schooled to think
32. Broad general knowledge is necessary because  
 (A) It teaches us about different things  
 (B) It broadens one's outlook  
 (C) Specialization is incomplete without it  
 (D) Without it no one would get a job
33. The idea of the first school of thought in the passage is that  
 (A) Students should study all the subjects they want to  
 (B) Students should study a few subjects that will help them in their profession  
 (C) Students should concentrate on studies  
 (D) Students should not undertake any specialized work
34. Supporters of the first theory say that  
 (A) Experts have done nothing to help mankind  
 (B) People with general knowledge are more useful than experts  
 (C) Experts have contributed most to progress in the modern world  
 (D) People with general knowledge have contributed to civilization
35. According to the second school of thought, education will not be very effective if pupils  
 (A) Ignore the study of fine arts  
 (B) Have nothing but general knowledge  
 (C) Have inadequate knowledge of their own work  
 (D) Do not have a wide general education

## 2. QUANTITATIVE REASONING

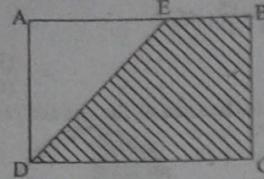
36. In a graduated tax system:
- The tax rate stays the same regardless of taxable income
  - The tax rate gets lower as taxable income gets larger
  - The tax rate gets higher as taxable income gets smaller
  - The tax rate gets higher as taxable income gets larger
37. A foreign company's deposit slip lists these items: (bills) 8 fifties, 22 twenties, 9 tens, 30 fives; (coins) 20 dimes, 18 nickels, 90 pennies; (checks) \$45.67, \$99.12. The depositor received no cash back. What was the deposit was made?
- A. \$1,228.99      B. \$1,282.99      C. \$1,328.99      D. \$14,82.99
38. Which method are most companies LEAST likely to use to record the number of hours their employees work?
- A. Total deposit      B. Final deposit      C. Net deposit      D. Gross deposit
39. Which method are most companies LEAST likely to use to record the number of hours their employees work?
- A. Employees pass a magnetic stripe card through a reader
- B. Employees insert a time card into a time clock
- C. Employees write their hours worked on a time sheet
- D. Employees keep track of their hours worked mentally
40. Which of the following describes how to calculate net pay?
- A. Subtract the total deductions from the net pay
- B. Add the total deductions to the gross pay
- C. Subtract the total deductions from the gross pay
- D. Subtract the total deductions from the take-home pay
41. Dante Michel's charge account statement showed a previous balance of \$277.45, a finance charge of \$3.22, new purchases of \$299.33, and a payment of \$316.00. What is his new balance?
- a. \$234      c. \$267  
b. \$264      d. \$287
42. Arianne Greene's charge account statement shows an unpaid balance of \$376.00. The monthly finance charge is 1.85% of the unpaid balance. What is the finance charge?
- a. \$5.64      c. \$6.96  
b. \$5.95      d. \$7.98
43. Destiny Paxton has a previous balance at a retail store of \$59.27. She had payments and credits of \$29.21. The finance charge is 1.75% of the unpaid balance and she had \$16.16 in new purchases. What is the new balance?
- a. \$43.21      c. \$47.11  
b. \$46.75      d. \$47.26
44. ALGEBRA Blake Ewasko's charge account uses the unpaid balance method to compute the finance charges at a monthly periodic rate of 2.15%. During the month, he charged \$189.34, made a \$100.00 payment, and had a \$21.54 finance charge. Find Blake's new balance.
- a. \$1,001.86      c. \$1,312.74  
b. \$1,101.86      d. \$1,320.74
45. Use Figure 7.1. Amna Ashraf credit card's finance charge is computed at 1.5% of the average daily balance. What is the finance charge for the month?
- a. \$1.50      c. \$2.11  
b. \$1.85      d. \$2.54
46. In the figure below, ABCD is a rectangle and E is the mid point of one side, what is the area of triangle BCD? If  $\overline{BE} = 5\text{ cm}$  and  $\overline{CD} = 3\text{ cm}$



- a)  $12\text{ cm}^2$   
c)  $9\text{ cm}^2$

- b)  $25\text{ cm}^2$   
d)  $17.23\text{ cm}^2$

47. In the figure below, given that  $AD = 6$ ,  $CD = 8$ ,  $AE = x$ . What is the area of the shaded region?



- a)  $28 - 2x$   
b)  $4(14 - 4x)$   
c)  $48 - 3x$   
d)  $7(6 - 3x)$

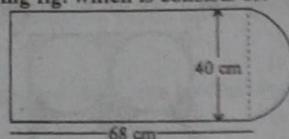
48. If the radius of the circle is decreased by 20%, what happens the area?

- a) 10% increase  
b) 20% decrease  
c) 80% increase  
d) 36% decrease

49. A square, with perimeter 16, is inscribed in a circle, what is the area of the circle?

- a)  $3\pi$   
b)  $2\sqrt{2}\pi$   
c)  $32\pi$   
d)  $8\pi$

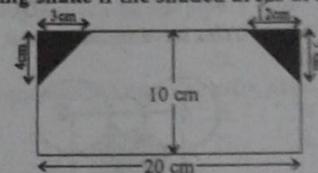
50. Calculate the area of the following fig. which is consists of:



The rectangle is of 40 cm and 68 cm and half a circle of diameter 40 cm

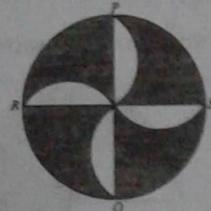
- a)  $2535 \text{ cm}^2$   
b)  $2720 \text{ cm}^2$   
c)  $3348 \text{ cm}^2$   
d)  $628 \text{ cm}^2$

51. What is the area of the following shape if the shaded areas are cut away?



- a)  $100 \text{ cm}^2$   
b)  $125 \text{ cm}^2$   
c)  $120 \text{ cm}^2$   
d)  $164 \text{ cm}^2$

52. In the following figure,  $PQ$  and  $RS$  are perpendicular, and each of the unshaded regions is a semicircle. What is the ratio of the white area to the shaded area?



- (A)  $4/\pi$   
(B)  $1/1$   
(C)  $2/3$   
(D)  $1/2$

53. If  $C$  is the circumference of a circle of radius  $r$ , then which of the following statement is true?

- |                       |                         |
|-----------------------|-------------------------|
| (A) $\frac{C}{r} < 6$ | (B) $\frac{C}{r} = 6$   |
| (C) $\frac{C}{r} > 6$ | (D) $\frac{C}{r} = \pi$ |

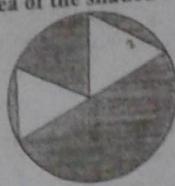
**GAT-General**

54. If  $C$  is the circumference of a circular disk in centimeters, and  $A$  is the area of the same circular disk in square centimeter. Then  $\frac{C}{A} = \frac{A}{C}$ , iff  $r =$

(A) 1  
(C) 3

(B) 2  
(D) 4

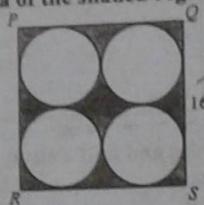
55. In the following figure, what is the area of the shaded region, if each of the triangle is equilateral?



(A)  $8\pi$   
(C)  $3\pi$

(B)  $\frac{8}{3}\pi$   
(D)  $6\pi$

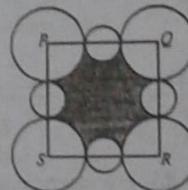
56. In the following figure,  $PQRS$  is a square, and all the circles are tangent to one another and to the sides of the squares. What is the area of the shaded region?



(A) 256  
(C) 256 $\pi$

(B)  $64\pi$   
(D)  $64(4 - \pi)$

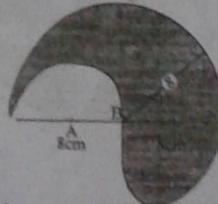
57. In the following figure, the large circles have radius 4, and the small circles have diameter 4. What is the area of the square  $PQRS$ ?



(A) 144  
(C) 100

(B) 169  
(D) 64

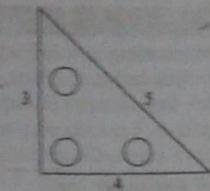
58. In the following metal cam, A, B and C are the centres of the semicircles shown. What is the area of the cam?



a)  $32.07 \text{ cm}^2$   
c)  $101.53 \text{ cm}^2$

b)  $157.08 \text{ cm}^2$   
d)  $201.06 \text{ cm}^2$

59. The sketch below shows a triangular copper plate with sides of 3cm, 4cm and 5cm. It has three small circular holes cut out of it. The radius of each circle is 3mm. What is the area of the copper triangle?



- a)  $6 \text{ cm}^2$   
 c)  $5.9973 \text{ cm}^2$   
 b)  $5.16 \text{ cm}^2$   
 d)  $5.71 \text{ cm}^2$

60. What is the shaded area in the following diagram?



- a)  $50.29 \text{ cm}^2$   
 c)  $16.29 \text{ cm}^2$   
 b)  $16 \text{ cm}^2$   
 d)  $34.29 \text{ cm}^2$

61. If 'a' is the actual value and 'e' is its estimated value, the absolute error is:  
 A.  $a - e$   
 C.  $a/e$   
 B.  $[a - e]$   
 D.  $(a - e)/e$
62. If 'a' is the actual value 'e' is its estimated value, the formula for relative error is:  
 A.  $a/e$   
 C.  $|a-e|/e$   
 B.  $(a - e)/e$   
 D.  $(a - e)/e$
63. Data taken from the publication, 'Agricultural Situation', will be considered as:  
 A. Primary data  
 C. Primary and secondary data  
 B. Secondary data  
 D. Neither primary nor secondary data
64. Mailed questionnaire method of enquiry can be adopted if respondents:  
 A. Live in cities  
 C. Are educated  
 B. Have high income  
 D. Are known
65. The statement, "Designing of an appropriate questionnaire itself wins half the battle", was given by:  
 A. A.R. Illesic  
 C. H. Huge  
 B. W.I. King  
 D. H. Secrist
66. If  $X$  is a random variable and  $f(x)$  is its p.d.f.,  $E\left(\frac{1}{X}\right)$  is used to find:  
 A. Arithmetic mean  
 C. Geometric mean  
 B. Harmonic mean  
 D. First central moment
67. If  $X$  is a random variable and its p.d.f. is  $f(x)$ ,  $E(\log x)$  represents:  
 A. Arithmetic mean  
 C. Harmonic mean  
 B. Geometric mean  
 D. Logarithmic mean
68. If  $X$  and  $Y$  are two random variables, the covariance between the variables  $aX + b$  and  $cY + d$  in terms of  $\text{COV}(X, Y)$  is:  
 A.  $\text{COV}(aX + b, cY + d) = \text{COV}(X, Y)$   
 C.  $\text{COV}(aX + b, cY + d) = ac\text{COV}(X, Y) + bd$   
 B.  $\text{COV}(aX + b, cY + d) = abcd \times \text{COV}(X, Y)$   
 D.  $\text{COV}(aX + b, cY + d) = ac\text{COV}(X, Y)$
69. If  $X$ ,  $Y$  and  $Z$  are three random variables, then:  
 A.  $\text{COV}(X + Y, Z) = \text{COV}(X, Z) + \text{COV}(Y, Z)$   
 C.  $\text{COV}(X + Y, Z) = \text{COV}(X, Y, Z)$   
 B.  $\text{COV}(X + Y, Z) = \text{COV}(X, Z, YZ)$   
 D.  $\text{COV}(X + Y, Z) = 0$
70. If  $X$  is a random variable and  $r$  is an integer, then  $E(X^r)$  represents:  
 A.  $r^{\text{th}}$  central moment  
 C.  $r^{\text{th}}$  raw moment  
 B.  $r^{\text{th}}$  factorial moment  
 D. None of the above

GAT-General

3. ANALYTICAL REASONING

NO. OF QUESTIONS = 30

Direction: Three women — X, Y, and Z are traveling in a van with five children — A, B, C, D and E. The van has a driver's seat and one passenger seat in the front, and two benches behind the front seats, one bench behind the first. Each bench has room for exactly three people. Everyone must sit in a seat or on a bench and seating is subject to the following restrictions: A women must sit on each bench. Either X or Y must sit in the driver's seat. C must sit immediately beside E.

71. Which of the following can sit in the front passenger seat?  
(A) C    (B) D  
(C) X    (D) Y  
(E) Z
72. Which of the following groups of three can sit together on a bench?  
(A) A, C and E    (B) A, C and Z  
(C) A, Y and Z    (D) B, D and Y  
(E) D, E and X
73. If A sits immediately beside Z, which of the following CANNOT be true?  
(A) C sits immediately beside Y.                        (B) D sits immediately beside Z.  
(C) B sits in the front passenger seat.                    (D) A sits on the same bench as B.  
(E) B sits on the same bench as X.
74. If Y sits on a bench that is behind where C is sitting, which of the following must be true?  
(A) B sits in a seat or on a bench that is in front of where E is sitting.  
(B) D sits in a seat or on a bench that is in front of where A is sitting.  
(C) A sits on the same bench as B.                        (D) D sits on the same bench as Y.  
(E) E sits on the same bench as Z.

Direction: Four computer operators (Ali, Babar, Cheema and Dar) each have to perform duties at the NADRA on four different days, Thursday through Sunday. The following is their duty schedule: Cheema has his duty day before Ali. Dar has his duty day later than Babar.

75. Which of the following is a possible order of duty days for the four operators?  
(A) Cheema, Dar, Ali and Babar                        (B) Dar, Cheema, Ali and Babar  
(C) Babar, Cheema, Dar and Ali                        (D) Ali, Cheema, Dar and Babar  
(E) Ali, Babar, Dar and Cheema
76. If Cheema has his duty day on Saturday, who must have his duty day on Thursday?  
(A) Either Ali or Dar    (B) Dar  
(C) Ali    (D) Either Babar or Dar  
(E) Babar
77. Each of the following possible EXCEPT:  
(A) Cheema has his duty on Thursday.                    (B) Babar has his duty on Thursday.  
(C) Dar has his duty on Saturday.                            (D) Babar has his duty on Sunday.  
(E) Ali has his duty on Sunday.

Direction: Two statements, labeled X and Y, follow each of the following questions. The statements contain certain information. In the questions you do not actually have to compute an answer, rather you have to decide whether the information given in the statements X and Y is sufficient to find a correct answer by using basic mathematics and everyday facts.

78. How much time will computer need to solve 150 problems?  
X. The computer needs 50 seconds to solve one problem.  
Y. Computer never takes more than 60 seconds to solve a problem.  
(A) Statement X Alone is sufficient but Y Alone is not sufficient to answer this question.  
(B) Statement Y. Alone is sufficient but X. Alone is not sufficient to answer this question.  
(C) Statements X and Y. TOGETHER are sufficient to answer the question but NEITHER of them is sufficient ALONE.  
(D) Statements X and Y. COMBINED are NOT sufficient to answer the question and additional information is needed to find the correct answer.

79. A horse ran 80 miles without stopping. What was its average speed in miles per hour?
- X. The journey started at 6 PM and ended at 2 AM the following day.  
Y. The horse ran 20 miles per hour for the first 40 miles.
- (A) Statement X ALONE is sufficient but Y ALONE is not sufficient to answer this question.  
(B) Statement Y ALONE is sufficient but X ALONE is not sufficient to answer this question.  
(C) Statements X and Y TOGETHER are sufficient to answer the question but NEITHER of them is sufficient ALONE.  
(D) Statements X and Y COMBINED are NOT sufficient to answer the question and additional information is needed to find the correct answer.
80. In a B.Sc. class at G.C. University, 40 boys and 15 girls registered for Calculus and Analytical geometry. How many boys passed the course?
- X. 7 students could not pass.  
Y. There were 3 girls who obtained A grade.
- (A) Statement X ALONE is sufficient but Y ALONE is not sufficient to answer this question.  
(B) Statement Y ALONE is sufficient but X ALONE is not sufficient to answer this question.  
(C) Statements X and Y TOGETHER are sufficient to answer the question but NEITHER of them is sufficient ALONE.  
(D) Statements X and Y COMBINED are NOT sufficient to answer the question and additional information is needed to find the correct answer.
81. A runner has just completed 46 miles running. How long did it take him to finish the journey?
- X. His record speed is 13.2 miles per hour.  
Y. His average speed through the journey was 9.2 miles per hour.
- (A) Statement X ALONE is sufficient but Y ALONE is not sufficient to answer this question.  
(B) Statement Y ALONE is sufficient but X ALONE is not sufficient to answer this question.  
(C) Statements X and Y TOGETHER are sufficient to answer the question but NEITHER of them is sufficient ALONE.  
(D) Statements X and Y COMBINED are NOT sufficient to answer the question and additional information is needed to find the correct answer.
82. Captain of national hockey team should be the most popular member of the team. Who is the captain of Pakistan's national hockey team?  
X. Saqlain is the best player on the team.  
Y. Junaid is the senior-most member.
- (A) Statement X ALONE is sufficient but Y ALONE is not sufficient to answer this question.  
(B) Statement Y ALONE is sufficient but X ALONE is not sufficient to answer this question.  
(C) Statements X and Y TOGETHER are sufficient to answer the question, but NEITHER of them is sufficient ALONE.  
(D) Statements X and Y COMBINED are NOT sufficient to answer the question and additional information is needed to find the correct answer.
83. The principal of a college is forming a committee. There are to be five members: three teachers, chosen from Mr. A, Mr. B, Mr. C, Mr. D and Mr. E; and two students, chosen from L, M, N, and O. The composition of the committee must conform the following conditions:  
Mr. A will serve only if O is also on the committee. Mr. C will not serve unless Mr. B and L also serve. Neither Mr. D nor Mr. E will serve without the other. If M serves, either N or O can serve.  
Which of the following is an acceptable committee?
- |  |  |
|--|--|
| (A) A, C, D, E, L<br>(C) B, D, E, L, O | (B) B, C, E, L, M<br>(D) C, D, E, L, M |
|--|--|
84. How many different committees could include Mr. A and N?
- |                |                |
|----------------|----------------|
| (A) 1<br>(C) 3 | (B) 2<br>(D) 4 |
|----------------|----------------|
85. If N and O are both on the committee, who else must be on the committee?
- |                         |                |
|-------------------------|----------------|
| (A) A<br>(C) C<br>(E) L | (B) B<br>(D) D |
|-------------------------|----------------|

GAT-General

Direction (86-87): A city map representing roads M, N, O, P, Q and R. Link roads cannot have the same colour in the map. The roads link to each other are as under:  
Each M, N, P and Q has link to O.      P has a link to Q.      Each of M and N has a link to R.

86. Which of the following roads can be the same colour as O on the map?  
(A) N      (B) P  
(C) Q      (D) R
87. Which of the following is a pair of roads that can be the same colour?  
(A) M and N      (B) N and O  
(C) O and P      (D) P and Q

Direction (88-93): A Government College sports president wishes to select four members of a sports-wing committee as special representatives to meet the requirements of college's sports activities. The committee consists of eight members four of which (K, L, M and N) are sports teachers whereas the other four (P, Q, R and S) are students.

The president can select any four of the eight committee members as long as the following rules are observed:

The four representatives must consist of exactly two sports teachers and two students.  
Either K or L must be one of the representatives but K and L both cannot be the representatives. If P is a representative then M must also be a representative.  
If R is a representative then L cannot be a representative.

88. If R is a representative but M is not a representative then the whole group can be determined if all were also true that:  
(A) K is a representative      (B) N is a representative  
(C) P is a representative      (D) S is not a representative
89. If P is a representative then which of the following CANNOT be a representative?  
(A) M      (B) N  
(C) Q      (D) R
90. If L is a representative then which of the following can be the other three representatives?  
(A) K, Q and S      (B) M, N and P  
(C) M, P and Q      (D) N, P and S
91. If neither Q nor S is a representative then which of the following is a pair of teacher representatives?  
(A) K and L      (B) K and M  
(C) K and N      (D) L and M
92. If L, N and Q are representatives then which of the following must also be a representative?  
(A) M      (B) P  
(C) R      (D) S
93. If K and N are representatives then which of the following is not a representative?  
(A) Q      (B) R  
(C) P      (D) None

Direction (94-95): Two statements, labeled (1) and (2), follow each of the following given questions. The statements contain certain information. In the question you do not actually have to compute an answer, rather than you have to decide whether the information given in the statements (1) and (2) is sufficient to find a correct answer by using basic mathematics and everyday fact?

94. What day of the week is today?  
1. Today is December 25.  
2. Amjad left Pakistan on Monday.  
(A) Statement 1. ALONE is sufficient but 2. ALONE is not sufficient to answer this question.      (B) Statement 2. ALONE is sufficient but 1. ALONE is not sufficient to answer this question.

- (C) Statements 1 and 2, TOGETHER are sufficient to answer the question but NEITHER of them is sufficient ALONE.
- (D) Statements 1 and 2, COMBINED are not sufficient to answer the question and additional information is needed to find the correct answer.
95. Can any of the four rivers be more than 200 meters wide?
- The narrowest of the four rivers is 140 meters wide.
  - Average width of the four rivers is 200 meters.
- (A) Statement 1, ALONE is sufficient but 2. ALONE is not sufficient to answer this question.
- (C) Statements 1 and 2, TOGETHER are sufficient to answer the question but NEITHER of them is sufficient ALONE.
- (D) Statement 2, ALONE is sufficient but 1. ALONE is not sufficient to answer this question.
- Statements 1 and 2, COMBINED are not sufficient to answer the question and additional information is needed to find the correct answer.
- Direction (96-98):** Six candidates.....Ali, Amin, Omer, Hamza, Saleem and Osama are being interviewed for a job. The interview will take place over four consecutive days, starting on Thursday. Each candidate will have only one interview. The day on which the different candidates will interview must conform to the following conditions:
- At least one interview will take place each day.
  - No more than two interviews will take place on any day.
  - No more than three interviews will take place on any two consecutive days.
  - Ali's interview must take place on Saturday.
  - Amin's interview must take place on the same day with another interview.
  - Saleem's interview must take place on the day before Osama's interview.
  - Omer's interview must take place on a day after Hamza's interview.
96. If only one interview takes place on Thursday which candidate could have that interview?
- (A) Ali (B) Amin  
(C) Omer (D) Saleem (E) Osama
97. If the director decides to take two interviews on Thursday and two on Sunday, how many candidates would be eligible to interview on Friday?
- (A) 1 (B) 2  
(C) 3 (D) 4 (E) 5
98. If Hamza and Osama have their interviews on the same day which of the following must be true?
- (A) Hamza's interview will take place on Thursday.  
(B) Saleem's interview will take place on Friday.  
(C) Amin's interview will take place on Saturday.  
(D) Osama's interview will take place on Saturday.  
(E) Amin's interview will take place on Sunday.
- Direction (99-100):** At IOWA University, Students of Economics must complete a total of twelve courses selected from three different parts of the syllabus...comparative economics, environmental economics, and regional economics...in order to graduate, the students must meet the following course distribution requirements:
- (i) At least six of the required twelve courses must be from the environmental economics.  
(ii) At least five of the required twelve courses must be from comparative economics and regional economics, with at least one, but no more than three, selected from comparative economics.
99. The minimum number of regional economics courses required to fulfil the course distribution requirements is
- (A) 1 (B) 3 (C) 5 (D) 2 (E) 4
100. If the student has completed six environmental economics courses and one regional economics course, the possible groups of courses to fulfil the course distribution requirements must include at least:
- (A) One Environmental Economics Course (B) Three Regional Economics Courses  
(C) One Regional Economics Course (D) Two Comparative Economics Courses  
(E) Three Comparative Economics Courses

## EXPLANATORY ANSWERS

1. (C) Both are synonymous.  
 2. (C) First possible reaction of second.  
 3. (A) Second is made of first.  
 4. (D) First is deep, second is superficial.  
 5. (B) Second is the cause of first.  
 6. (B) One is part of the second (Whole).  
 7. (A) One is cover for other.  
 8. (D) Second is quality of first.  
 9. (B) First is elevated part of second.  
 10. (A) First is item, second explanation.  
 11. (B) 12. (A) 13. (A) 14. (A) 15. (A) 16. (D)  
 17. (A) 18. (C) 19. (B) 20. (A)
21. (2) The past, present and future forms of "go" are

	<i>Past</i>	<i>Present</i>	<i>Future</i>
<i>1st person Perfect</i>	We/I went We/I had gone	We/I go We/I have gone	We/I will go We/I will have gone
<i>2nd person Perfect</i>	you went you had gone	you go you have gone	you will go you will have gone
<i>3rd person</i>	He/They went	He goes/ They go	He/They will go
<i>Perfect</i>	He/They had gone	He has gone/They have gone	He/They will have gone

22. (5) "Watch" and "see" are somewhat similar in meaning though the meanings will differ depending on the context. In this sentence the use of the word "see" is perfectly acceptable in the same way "watch" is acceptable in the previous sentence. However, note the difference in meaning between "see" and "watch" in these sentences — "He saw that the tiger was watching him." "The blind man saw the sense in the argument."
23. (5)  
 24. (3) "Across" is an adverb. It must therefore modify a verb or another adverb. Since there is no verb in the sentence, the problem can be remedied by inserting "go" before "across". Alternatively "across" can be converted into a verb "cross". The phrase can therefore be corrected to read "to cross the road", or "to go across the road". Other verbs like "walk" or "run" will do equally well.
25. (5) "Across" is modifying the infinitive "to get". Here "to get across" means "to communicate" or "make clear" or "transact".
26. (C) The correct expression is 'letter to him at his Delhi address'.  
 27. (B) The correct phrase is 'cut your coat according to the cloth'.  
 28. (D) 'Is it not' should be replaced by 'is he not'.  
 29. (C) For 'he-duck' use 'drake' and for 'she-duck' use 'duck'.  
 30. (D) The feminine gender of 'monk' is 'nun'.  
 31. (B) 'Schools of thought' means two persons or groups having different ideas or opinions on the same subject or topic.
32. (B) The second school of thought supports the idea of having knowledge of a wide range of subjects for wider perception and outlook.
33. (B) The idea of the first school of thought is that people should focus on few subjects to benefit their career.
34. (C) The statement, 'Supporters of the first theory... expert in their trade or profession' gives the answer.
35. (D) The second school of thought opines that pupils should only concentrate on subjects of their interest to have an effective education and career.
36. (D) 37. (C) 38. (C) 39. (D) 40. (C) 41. (B) 42. (C) 43. (B) 44. (C) 45. (B)

46. (A) In the given rectangle,  $\overline{AB} = \overline{CD} = 3\text{cm}$ . The length of the side AE of triangle BAE can be found with the Pythagorean theorem as:

$$\begin{aligned}(BF)^2 &= (AB)^2 + (AE)^2 \Rightarrow 25 = 9 + (AE)^2 \\ \Rightarrow (AE)^2 &= 16 \Rightarrow AE = 4\end{aligned}$$

As point E is the mid-point of  $\overline{AD}$ , the length of the rectangle is twice  $\overline{AE}$  or 8 cm. The area of the

right triangle BCD is half the product of the sides adjacent to the right angle.

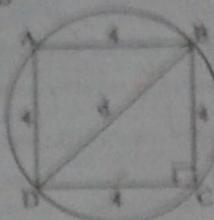
$$A = \frac{1}{2}bh = \frac{1}{2}(3)(3) = 12 \text{ cm}^2$$

47. (C) The difference between the entire rectangle and the white triangle is the shaded area. Thus

$$(6 \times 8 - 48) - \frac{6 \times 3}{2} = 48 - 36$$

48. (D) If the radius of a circle is 1, after reducing 20% it becomes 0.8. Since  $\text{Area} = \pi r^2$ ,  $\pi(0.8)^2 = 0.64\pi = 0.64\pi\%$

49. (B) Since the area of the square is 16,  
each side of the square is 4. In ABCD



$$(4)^2 + (4)^2 = (BD)^2 \Rightarrow BD = \sqrt{32} = 4\sqrt{2}$$

$$\text{The radius of the circle} = \frac{1}{2} \times \frac{4\sqrt{2}}{2} = 2\sqrt{2}$$

$$\text{Area of the circle} = \pi r^2 = \pi(2\sqrt{2})^2 = \pi(4 \times 2) = 8\pi$$

50. (C) Area of the work surface = Area of the rectangle + area inside half a circle  
Area of the rectangle =  $68 \text{ cm} \times 40 \text{ cm} = 2720 \text{ cm}^2$

$$\text{Area of the circle} = \pi r^2 = 3.14 \times \left(\frac{40}{2}\right)^2 = 3.14 \times (20)^2$$

$$= 628 \text{ cm}^2$$

$$\text{Area of the shape} = 2720 \text{ cm}^2 + 628 \text{ cm}^2$$

$$= 3348 \text{ cm}^2$$

51. (D) Area of the unshaded region = Whole Area of the rectangle - Area of first triangle - Area of second triangle

$$\text{Area of rectangle} = 20 \times 10 = 200 \text{ cm}^2$$

$$\text{Area of first triangle} = \frac{1}{2}(3)(4) = 6 \text{ cm}^2$$

$$\text{Area of second triangle} = \frac{1}{2}(12)(5) = 30 \text{ cm}^2$$

$$\text{Area of unshaded region} = 200 - 6 - 30 = 164 \text{ cm}^2$$

52. (B) Let the radius of the big circle be  $r$ ; then its area will be  $\pi r^2$ ; also the radius of the semicircle becomes  $\frac{r}{2}$

so area of the small circle will be  $\pi \left(\frac{r}{2}\right)^2$  and the area of the each semicircle is

$$\left(\pi \left(\frac{r}{2}\right)^2\right) \times \frac{1}{2} = \frac{\pi r^2}{8}$$

Then the area of the four small semicircles is

$$= 4 \left(\frac{\pi r^2}{8}\right) = \frac{\pi r^2}{2}$$

So, shaded area = Total area - White area

$$= \pi r^2 - \frac{\pi r^2}{2} = \frac{\pi r^2}{2}$$

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Therefore the ratio of shaded area is

$$\frac{\frac{\pi r^2}{2}}{\frac{\pi r^2}{2}} = \frac{1}{1}$$

53. (C) Since  $C = 2\pi r \Rightarrow C = \pi(2r)$ , but  $2r = d$

$$\text{Hence } C = \pi d \Rightarrow \pi = \frac{C}{d} \Rightarrow \frac{C}{r} = 2\pi \Rightarrow \frac{C}{r} = 2\left(\frac{2\pi}{d}\right) > 6$$

54. (B) As  $C = 2\pi r$  and  $A = \pi r^2$ , so

$$\frac{C}{A} = \frac{2\pi r}{\pi r^2} = \frac{2}{r} \quad \text{and} \quad \frac{A}{C} = \frac{\pi r^2}{2\pi r} = \frac{r}{2} \quad \text{Thus } \frac{C}{A} = \frac{A}{C} \text{ only possible, when } r=2$$

55. (B) Because the triangles are equilateral, then the white central angles each measure  $60^\circ$ , so their sum  $= 60 + 60 = 120$ . Then, the unshaded area is  $\frac{120}{360} = \frac{1}{3}$  of the circle, so the shaded area of  $\frac{2}{3}$  of the circle.

$$\text{As the area of the circle} = \pi r^2 = \pi(2)^2 = 4\pi \text{ and the area of the shaded region} = \frac{2}{3} \times 4\pi = \frac{8}{3}\pi$$

56. (D) Since  $QS = 16$ , thus the diameter of each circle is 8, and radius of each circle is 4.

$$\therefore \text{The area of each circle} = \pi r^2 = \pi(4)^2 = 16\pi$$

$$\text{Thus, the area of four circles} = 4(16\pi) = 64\pi$$

$$\text{Now, the area of the square} = 16 \times 16 = 256$$

$$\text{Area of the shaded region} = \text{Area of the square} - \text{Area of the circle}$$

$$= 256 - 64\pi$$

$$= 64(4 - \pi)$$

57. (A) Since the radius of the large circle is 4, and diameter of the small circle is 4, so each side of the square is  $4 + 4 + 4 = 12$ , so area of the rectangle  $= 12 \times 12 = 144$

58. (C) When we shift the semicircle of diameter 8cm in the space the shape becomes semicircle of diameter 10cm

$$\text{Area} = \pi r^2$$

$$= \pi \times (8)^2 = 64\pi$$

$$\text{Area of semicircle} = \frac{64\pi}{2} = 32\pi = [101.53\text{cm}^2]$$

$$\begin{aligned} 59. \quad (B) \quad \text{Area of the triangle} &= \frac{1}{2} \times \text{base} \times \text{Altitude} \\ &= \frac{1}{2} \times 4 \times 3 = 6\text{cm}^2 \end{aligned}$$

$$\text{Now } 3\text{mm} = 0.3\text{cm}$$

$$\text{Area of the circle} = \pi r^2 = 0.28\text{cm}^2$$

$$\text{Area of 3 circles} = 3 \times 0.28 = 0.84\text{cm}^2$$

$$\text{Area of copper in plate} = 6 - 0.84 = [5.16\text{cm}^2]$$

$$\begin{aligned} 60. \quad (D) \quad \text{Diameter of the circle} &= 8\text{cm} \\ \text{Radius} &= 4\text{cm} \end{aligned}$$

$$\text{Area of the circle} = \pi r^2 = \frac{22}{7} \times 16 = 50.29\text{cm}^2$$

$$\text{Area of triangle} = \frac{1}{2} \times \text{bases} \times \text{altitude}$$

$$= \frac{1}{2} \times 4 \times 4$$

$$= 8\text{cm}^2$$

$$\text{Area of 2 triangles} = 2 \times 8 = 16\text{cm}^2$$

$$\text{Area of the shaded region} = 50.29 - 16 = [34.29\text{cm}^2]$$

61. (B) 62. (C) 63. (B) 64. (C) 65. (C)  
 66. (B) 67. (B) 68. (D) 69. (A) 70. (C)
71. (B) There are five options given and asked which of the following sit on the front passenger seat. *C* cannot sit in the front passenger's seat, because by given restrictions *C* must sit immediately beside *E*, and there are only one passenger seat in front, so *C* cannot sit in the front passenger seat. *X*, *Y* and *Z* also could not sit in front seat, because by the given restriction, either *X* or *Y* must sit in the driver's seat and a woman must sit on each bench. So, if *Y* sits on driver's seat, then *X* and *Z* must be on benches, similarly, if *X* sits on driver's seat then *Y* and *Z* must be on the benches. Hence, *X*, *Y* and *Z* cannot sit on front passenger's seat. The possible children who can sit on front passenger's seat are *A*, *B* and *D*. But *D* is the only name from these three (*A*, *B* and *D*) names in the given choices. Hence the correct answer is choice (B).
72. (D) Take first choice *A*, *C* and *E*. Here we see that *C* and *E* must sit together, it is also restricted that a woman must sit on a bench, but *A* is not a women. Hence, choice *A* is not a correct answer. Take second choice, *A*, *C* and *Z*. Because *C* must sit beside *E*, so this choice is not acceptable. Take third choice, *A*, *Y* and *Z*. In this choice *Y* and *Z* are women, and according to given restriction, a woman must sit on each bench. Now if *Y* and *Z* sit on a same bench, then *X* will be on driving seat. In this case a bench will be without a woman. Hence, choice *C* is also not acceptable combination. Now take choice *D*, i.e., *B*, *D* and *Y*. In this choice, there is only one woman *Y* since *C* and *E* not occurring separately. So this choice is acceptable. In last choice, since *E* is sitting without *C*, so this choice is also not acceptable. Hence the best answer is choice *D*.
73. (E) In this question, we should choose a wrong combination in case of, if *A* sits immediately beside *Z*. Take choice *A*, *C* sits immediately beside *Y*. This is correct choice, because there is only one woman *Y* and one child *C*. The third child may be *E*. According to second choice, "D sets immediately beside Z". It may also be possible that *D* may sit beside *Z*. Here *Z* is only one woman on the bench, the third child may be *A*, according to this question. According to third choice, *B* sits in the front passenger seat. This is also possible. Because, women *X*, *Y*, *Z* and children *A*, *C* and *E* cannot sit on front passenger's seat. So *B* may sit in front passenger's seat. The fourth choice, *D* may also be true, because if *A* sits immediately beside *Z*, then there is one seat of a child is empty on that bench. Since, *C* sits beside *E*, so *C* and *E* may not be sit on this bench. Only *B* or *D* can sit on that empty seat. Hence, choice *D* may be possible. According to choice *E*, *B* sits on the same bench as *X*. Since, *X* is a woman and she cannot sit on that bench with other woman *Z*. So, *B* cannot sit as *X*. This choice may not be possible. Hence the correct answer is choice *E*.
74. (E) In this question, it is understood that *C* and *Y* are not on the same bench. Thus *E* is also not on the same bench where *Y* is. Take choice *A*, "B sits in a seat or on a bench that is in front of where *E* is sitting. From above discussion we concluded that woman *Y* is on the last bench since *C* and *E* must sit together, therefore *B*, *A* and *D* can sit only in front passenger's seat. Now, take second choice, according to this, *D* sits in a seat or on a bench that is in front of where *A* is sitting." This is also incorrect choice, because *C* and *E* sit between front and a last bench, so *D* can sit with *A* or behind *C* and *E*. According to third choice, "A sits on the same bench as *B*." *A* can sit both *B* and *D* not only *B*. Choice *C*, may also be true, but choice *D* may not be possible, because *C* and *E* must sit together. Thus if *E* sits as *Z* then the third may be *X*.
75. (C) In choice *A*, Cheema will perform his duty a day before Ali, this is according to the given restriction, but by the given restriction, Dar's duty should be a day later than Babar. Here, the Dar's duty is before Babar. Thus, this combination is not acceptable. In second choice, there is not a day's gap between Cheema and Ali, so this is also not acceptable. Choice *C*, is a right combination because, Cheema will perform his duty a day before Ali, and Dar will perform his duty a day later than Babar. Hence, the correct answer is choice *C*.
76. (E) If Cheema has his duty on Saturday, then the possible schedule is:
- |          |        |          |        |
|----------|--------|----------|--------|
| Thursday | Friday | Saturday | Sunday |
| Babar    | Dar    | Cheema   | Ali    |
- Hence, the correct answer is choice *E*.
77. (D) If Cheema has his duty on Thursday, the possible schedule is:
- |          |        |          |        |
|----------|--------|----------|--------|
| Thursday | Friday | Saturday | Sunday |
| Cheema   | Babar  | Ali      | Dar    |
- which is acceptable according to the given restrictions.
- If Babar has his duty on Thursday, then the possible schedule is:
- |          |        |          |        |
|----------|--------|----------|--------|
| Thursday | Friday | Saturday | Sunday |
| Babar    | Cheema | Dar      | Ali    |
- which is also acceptable according to the given restrictions.

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If Dar has his duty on Saturday, then the above schedule is formed, which is acceptable. If Babar has his duty on Sunday, then it is not possible to follow the given restrictions, which is unacceptable. So, if Dar has his duty on Saturday, then it is not possible to perform Dar's duty if Babar performs his duty on Sunday. Hence the correct answer is choice D.

78. (A) We can't proportion, to solve this problem.

Time in seconds      Problem      Time in second

50      1      x

$$\frac{50}{1} = \frac{x}{120}$$

$$\Rightarrow x = 120 \times 50 \Rightarrow x = 7500 \text{ seconds} = 2 \text{ hours and } 5 \text{ minutes}$$

So, statement X, ALONE is sufficient to solve this problem. Hence, the correct answer is choice A.

79. (A) Since, the journey started at 6 PM and ended at 2 AM, so this journey is 8 hours. The average speed of the horse is  $\frac{30}{3} = 10$  miles per hour. So, statement X, ALONE is sufficient to solve this problem. Hence, the correct answer is choice A.

80. (D) Statements X and Y are not sufficient to answer.

81. (B) Average speed of the runner = 9.2 m/hour

$$\text{Average speed} = \frac{\text{Distance travelled}}{\text{time}}$$

$$9.2 = \frac{45}{t}$$

$$\Rightarrow t = \frac{45}{9.2} = 5 \text{ hours}$$

So, statement Y, ALONE is sufficient but X alone is not sufficient to answer this question. Hence, the correct answer is choice B.

82. (B) COMBINED statements X and Y are not sufficient to answer the question and some additional information is needed to find the correct answer.

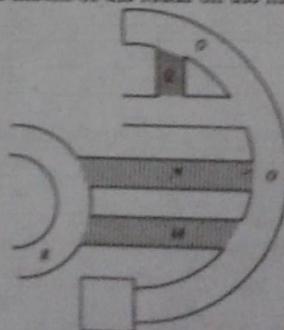
83. (C) Take choice A i.e., A, C, D, E and L, this choice will not be acceptable because according to the given condition, Mr. A will serve only if O is also in the committee. Take choice B i.e., B, C, E, L, M. This choice is also not acceptable, because according to the given restriction, neither Mr. D nor Mr. E will serve without the other. Here, E is without D. Take choice C i.e., B, D, E, L, O. Since, this choice satisfies all the given restrictions. So this combination is acceptable for committee.

84. (A) There is only possible committee can be formed including Mr. A and N. The combination of the committee is A, D, E, N, O. Hence the correct answer is choice A.

85. (C) If N and O are both on the committee, then the other three members should all be teachers. Since, Mr. C will not serve unless Mr. B and L also serve. So Mr. C would not be on the committee. If he is on the committee, the third student L must include the other two students N and O. Thus the correct answer is choice C.

86. (D) Since, link roads cannot have the same colour on the map. Now, according to the given condition, each M, N, P and Q has link to O. As R has no link to O, so its colour should be same as O. Hence, the correct answer is choice D.

87. (A) We draw the following estimated sketch of the roads on the map:



From above diagram, clearly roads  $M$  and  $N$  have no link each other. Hence,  $M$  and  $N$  should have the same colour. So, the correct answer is choice A.

88. (D) Take choice "A", which says,  $K$  is a representative. We analyze the given statement, according to this statement, if  $R$  is representative, but  $M$  is not representative. If  $K$  is representative, then  $R$  combine  $K$ . Since  $M$  is not representative, so according to above point 6,  $P$  will also not representative. This situation is given in the following table "✓" indicates the representation and "✗" represents "not representation".

✓	✗	✗	
K	L	M	N
✗		✓	
P	Q	R	S

From above table, we find two groups, i.e., KNRQ, KNRS. Thus we cannot find a single group. So, choice "A" is not correct choice. Now, if we accept choice "B", then the possible outcomes are given in the following table.

✗	✗	✗	✓
K	L	M	N
✗		✓	
P	Q	R	S

It is clear from above table, that if we accept choice "B" then whole group cannot be determined. Now, take choice, "C", according to this choice, the following table formed.

✗	✗	✗	
K	L	M	N
✓		✓	
P	Q	R	S

It cannot be acceptable, because if  $P$  is accepted then  $M$  will also be accepted. But in the given statement  $M$  is not representative.

Lastly, we prepare the table according to the choice "D"

✗	✗	✗	
K	L	M	N
✗		✓	✗
P	Q	R	S

Thus a whole group KNQR can be determined. Hence, the correct answer is choice D.

89. (B) If  $P$  is representative then  $M$  must also be representative. Thus, choice "A" is not acceptable. The correct choice is choice "B".
90. (C) If "L" is a representative, then choice "A" is not acceptable, because  $K$  and  $L$  both cannot be representative. Choice B is also not acceptable, because there will three teachers ( $L, M, N$ ) be joined in one group. The choice C is acceptable.
91. (B) If neither  $Q$  nor  $S$  is a representative, then choice "A" cannot be accepted, because  $K$  and  $L$  both cannot be representative. The choice "B" is acceptable. Hence the correct answer is choice B.
92. (D) If  $K, N$  and  $Q$  are representative, then choice "A" is not true choice, because if  $M$  join with  $K, N$  and  $Q$ , then the teacher representatives become three, but the four representative must consist of two teachers. Now, take choice, B, if we accept this choice then the group of representative is  $K, N, P, Q$ . But, according to the given condition, if  $P$  is representative then  $M$  must also be a representative. Here,  $P$  is without  $M$ , so this choice is also rejected. Now, if we accept choice "C" then the group of representative is  $K, N, Q, R$ , which is also not acceptable. If we accept choice "D", then the group of representative becomes  $K, N, Q, S$ , which is a acceptable representative group. Hence, the correct answer is choice D.
93. (C) If  $K$  and  $N$  are representative, then, clearly, choice "A", which is "Q" is not acceptable. The second choice  $R$  is also not acceptable, because if  $R$  is a representative, then  $L$  cannot be a representative. Here  $R$  is with  $K$  not with  $L$ . So  $R$  may be form a representative group. Hence this choice is also not acceptable. The choice "C" is acceptable, because if  $P$  is representative then  $M$  must also be a representative. Then the group becomes KNMP. This group is not a representative because in this group there are three teachers ( $K, N$  and  $M$ ) which is not according to the given condition. Hence, the correct answer is choice C.
94. (D) Since, there is not any link between two statements and statements (1) and (2) COMBINED are not sufficient to answer the question and additional information is needed to find the correct answer. The

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correct answer is choice D.

95. (C) Since, according to statement (1), the narrowest of the four rivers is 140 meters and according to statement (2), average width of the four rivers is 200 meters. We are asked, can any of four rivers be more than 200 meters. Let us suppose the width of the rivers;  $R_1 = 200$ ,  $R_2 = 200$ ,  $R_3 = 200$ ,  $R_4 = 140$  meters.
- $$\text{Average} = \frac{200 + 200 + 200 + 140}{4} = 185$$

But according to second statement, the average of four rivers is 200. It is only possible if any one or more rivers have their width more than 200. Hence, statements, (1) and (2) TOGETHER are sufficient to answer the question but NEITHER of them is sufficient ALONE.

96. (D) Here, first, we express the given conditions symbolically. Name of candidates Ali, Amin, Omer, Hamza, Saleem and Osama.

Days: Thu, Fri, Sat, Sun

Each days condition: 1 or 2 interviews

2 consecutive days: 2 or 3 interviews

Ali's interview = Saturday

According to condition (iv), Ali's interview will take place on Saturday. According to condition (i), Amin's interview must take place on the same day, another interview. Thus choices C and E are impossible. Since Omer's interview must take place on a day after Hamza's interview and Osama's interview must take place on a day after Saleem's interview, cannot take place on Thursday. Thus the correct choice is choice D.

97. (D) According to third condition, no more than three interviews will on any two consecutive days. Thus only one interview can take place on Friday. Therefore according to fifth condition, it cannot be Amin. Since Ali's interview is on Saturday. Thus, it cannot be Ali. Any of the other four candidates could be interviewed on Friday as indicated in the following points:

(i)	Thu Hamza/Saleem	Fri Omer	Sat Ali	Sun Amin/Osama
(ii)	Thu Amin/Saleem	Fri Hamza	Sat Ali	Sun Omer/Osama
(iii)	Thu Amin/Hamza	Fri Saleem	Sat Ali	Sun Omer/Osama
(iv)	Thu Hamza/Saleem	Fri Osama	Sat Ali	Sun Amin/Omer

Thus the correct choice is D.

98. (E) The possible schedule to fulfil this condition is:

Thu	Fri	Sat	Sun
Saleem	Hamza/Osama	Ali	Amin/Omer

Thus the correct choice is choice (E).

99. (D) Since at least five courses must be from comparative and regional economics, with at least one, but no more than three selected from comparative economics. Thus if we select three courses from comparative economics, we must select two courses from regional economics group. Thus the correct choice is option D.

100. (C)	C	E	R
	6	1	
③	①	1	
3 +	7 +	2	= 12

From above, we took 1 regional economics which is least. Thus if we take 3 from comparative and one from environmental economic, it will fulfill the requirement.

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