



# ADAT- 2017

(Aditya Degree Admission Test, a compulsory exam for admission into 3 years degree course)



## ADITYA DEGREE COLLEGES

ANDHRA PRADESH

Time : 2hrs

Max Marks :100

- Instructions: 1. There will be 5 Sections- Mathematics, Physics, Chemistry, Aptitude & Softskills.  
2. Each section consists of 20 bits & each bit carries 1 Mark.  
3. Each wrong answer entails 1/4 negative marking.

### SECTION -A (MATHEMATICS)

1. The range of the function  $f(x) = \frac{x}{1+x^2}, x \in R$
1.  $(-\infty, \infty)$       2.  $[-1, 1]$       3.  $\left[-\frac{1}{2}, \frac{1}{2}\right]$       4.  $[-\sqrt{2}, \sqrt{2}]$
2. If  $Z$  is a complex number of unit modulus and argument  $\theta$ , then  $\arg \left[ \frac{1+z}{1+\bar{z}} \right] =$
1.  $-\theta$       2.  $\frac{\pi}{2} - \theta$       3.  $\theta$       4.  $\pi - \theta$
3. The minimum value of  $4^x + 4^{1-x}, x \in R$  is
1. 2      2. 4      3. 1      4. 0
4. The number of solutions of the equation  $\sin 2x - 2 \cos x + 4 \sin x = 4$  in the interval  $[0, 5\pi]$
1. 3      2. 5      3. 4      4. 6
5. In a  $\Delta ABC$ , if  $\angle A = 90^\circ$ , then  $\cos^{-1} \left( \frac{R}{r_2 + r_3} \right)$  is
1.  $90^\circ$       2.  $30^\circ$       3.  $60^\circ$       4.  $45^\circ$
6. The number of  $3 \times 3$  non-singular matrices with four entries as 1 and all other entries as 0, is
1. less than 4      2. 5      3. 6      4. atleast 7
7. The term independent of  $x$  in the expansion of  $\left( 3x - \frac{2}{x^2} \right)^{15}$  is
1.  $-3003 (3^{10}) (2^5)$       2.  $-3003 (3^{10}) (2^4)$       3.  $3003 (3^{10}) (2^5)$       4. None
8. The number of ways in which an examiner can assign 30 marks to 8 questions giving not less than 2 marks to any questions is
1. 108120      2. 124320      3. 116280      4. 144240
9. The number of sides of polygon having 90 diagonals
1. 14      2. 15      3. 16      4. 17
10. If 4 people are chosen at random, then find the probability that no two of them were born on the same day of the week
1.  $\frac{{}^7C_4}{7^4}$       2.  $\frac{{}^7P_4}{7^4}$       3.  ${}^7C_4$       4.  ${}^7P_4$



11. Let  $f: \mathbb{R} \rightarrow \mathbb{R}$  be a positive increasing functions with  $\lim_{x \rightarrow \infty} \frac{f(3x)}{f(x)} = 1$ , then  $\lim_{x \rightarrow \infty} \frac{f(2x)}{f(x)} =$
1.  $\frac{2}{3}$                       2.  $\frac{3}{2}$                       3. 3                      4. 1
12.  $\sqrt{42 + \sqrt{42 + \sqrt{42 + \dots}}} =$
1. -6                      2. 5                      3.  $\sqrt{43}$                       4. 7
13. The maximum value of  $f(x) = (x-2)^2(x-3)$
1. 2                      2. 4                      3. -4                      4. 0
14. The reflection of  $y = \sqrt{x}$  w.r.t y - axis is
1.  $y = -\sqrt{x}$                       2.  $y = \sqrt{-x}$                       3.  $y = -\sqrt{-x}$                       4.  $x = \sqrt{y}$
15. The point on the line  $3x - 2y = 1$  which is close to the origin
1.  $\left(\frac{3}{13}, \frac{2}{13}\right)$                       2.  $\left(\frac{5}{11}, \frac{2}{11}\right)$                       3.  $\left(\frac{3}{5}, \frac{2}{5}\right)$                       4.  $\left(\frac{3}{13}, \frac{-2}{13}\right)$
16. The triangle PQR is inscribed in the circle  $x^2 + y^2 = 25$ , If  $Q = (3,4)$  and  $(-4,3)$  then  $\angle QPR =$
1.  $\frac{\pi}{2}$                       2.  $\frac{\pi}{3}$                       3.  $\frac{\pi}{4}$                       4.  $\frac{\pi}{6}$
17. The length of the latusrectum of a conic is 5. If focus is  $(-1,1)$  and its directrix is  $3x - 4y + 2 = 0$  then conic is
1. Parabola                      2. Ellipse                      3. Hyperbola                      4. Rectangular hyperbola
18.  $SP^1$  is focal chord of the Ellipse  $4x^2 + 9y^2 = 36$ , If  $SP = 4$  then  $SP^1 =$  -----
1.  $\frac{2}{3}$                       2.  $\frac{3}{5}$                       3.  $\frac{4}{3}$                       4.  $\frac{4}{5}$
19. The value of  $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \frac{\sin^2 x}{1+2^x} dx =$
1.  $\pi$                       2.  $\frac{\pi}{2}$                       3.  $4\pi$                       4.  $\frac{\pi}{4}$
20. If  $f$  and  $g$  are differentiable functions in  $(0,1)$  satisfying  $f(0) = 2 = g(1)$   $g(0) = 0$  and  $f(1) = 6$  then for some  $c \in (0,1)$
1.  $2 f^1(c) = g^1(c)$                       2.  $2 f^1(c) = 3g^1(c)$                       3.  $f^1(c) = g^1(c)$                       4.  $f^1(c) = 2g^1(c)$

### SECTION - B (PHYSICS)

21. One Parsec is equal to
1. 3.084 light years                      2. 3.26 light years                      3. 32.6 light years                      4. 0.326 light years
22. A boy of mass 40kg hangs from a horizontal bar by holding it by his two hands kept parallel. The tension in each hand is
1. 40kg wt                      2. 30kg wt                      3. 20kg wt                      4. 0
23. A body is projected from the earth at an angle of  $30^\circ$  with the horizontal with some velocity. If its range is 20m, the maximum height reached by it in meters is
1.  $5\sqrt{3}$                       2.  $\frac{5}{\sqrt{3}}$                       3.  $\frac{10}{\sqrt{3}}$                       4.  $10\sqrt{3}$
24. If earth stops rotating the value of  $g$  at the poles
1. increases                      2. decreases                      3. doesn't change                      4. becomes zero



25. The amount of heat required to convert 1 gm of water at  $0^{\circ}\text{C}$  into steam at  $100^{\circ}\text{C}$  in calories is  
1. 640                      2. 540                      3. 180                      4. 720
26. A conductor of length  $l$  rotates with angular speed " $\omega$ " in uniform magnetic field of induction  $B$  which is perpendicular to its motion. The induced e.m.f developed between the two ends of the rod is  
1.  $\frac{Bl^2\omega}{2}$                       2.  $\frac{Bl^2\omega}{4}$                       3.  $Bl^2\omega$                       4.  $2Bl^2\omega$
27. If a change in current of 0.01 amp in one coil produces a change in magnetic flux of  $2 \times 10^{-2}$  in the other coil, then the mutual inductance of the two coils in Henries is  
1. 0                      2. 0.5                      3. 2                      4. 3
28. A wire of length  $l$  is bent into a circular coil of one turn of radius  $R_1$ . Another wire of same material, same area of cross section and same length is bent into a circular coil of two turns of radius  $R_2$ . When same current flows through the two coils, the ratio of the magnetic inductions at the centres of the two coils is  
1. 1:2                      2. 1:1                      3. 1:4                      4. 3:1
29. The important source of energy in sun is  
1. Proton - Proton cycle                      2. Carbon - Nitrogen cycle  
3. Carbon - Carbon cycle                      4. Nitrogen - Nitrogen cycle
30. Particles and their antiparticles have  
1. Same masses but opposite spins                      2. Same masses but opposite magnetic moments  
3. Same masses and same mag moments                      4. Opposite spins and same mag moments.
31. The mass defect in a nuclear reaction is 0.3 gm. The amount of energy liberated in kwh. is  
1.  $7.5 \times 10^5$                       2.  $7.5 \times 10^4$                       3.  $7.5 \times 10^3$                       4.  $7.5 \times 10^6$
32. The following particles are baryons  
1. Nucleons and Hyperons                      2. Nucleons and Leptons  
3. Hyperons and Leptons                      4. Hyperons and Bosons.
33. If an intrinsic semi conductor is heated, the ratio of free electrons to holes is  
1. greater than one                      2. less than one  
3. equal to one                      4. decreases and becomes zero
34. If 4 moles of an ideal mono atomic gas at 400K is mixed with 2 moles of another ideal mono atomic gas at temp 700k, the temp of the mixture is (volume const)  
1.  $550^{\circ}\text{C}$                       2.  $500^{\circ}\text{C}$                       3. 550K                      4. 500K
35. The temperature of 5 moles of a gas at const volume is changed for  $100^{\circ}\text{C}$  to  $120^{\circ}\text{C}$  the change in the internal energy is 80J. The heat capacity of the gas at const volume in Joules is  
1. 8                      2. 4                      3. 0.8                      4. 0.4
36. The refractive index of plano concave lens of radius 0.3mts is  $\frac{5}{3}$ . Its focal length in air is  
1. -0.45m                      2. -0.6m                      3. -0.75m                      4. -1.0m
37. The magnetic susceptibility of a material of a rod is 499. Its permeability of vacuum is  $4\pi \times 10^{-7}$  henries/m. Its absolute permeability is  
1.  $\pi \times 10^{-4}$                       2.  $2\pi \times 10^{-4}$                       3.  $3\pi \times 10^{-4}$                       4.  $4\pi \times 10^{-4}$
38. The temporary loss of elasticity due to continuous strain is called  
1. Yield pt                      2. Permanent set                      3. Elastic fatigue                      4. Breaking she
39. The specific resistance of a material depends upon  
1. length only                      2. area of cross section                      3. temp                      4. nature of the material
40. If the tension is increased by 44% the percentage change in frequency is  
1. 20%                      2. 40%                      3. 60%                      4. 10%

### SECTION - C (CHEMISTRY)

41. The element with electronic configuration  $[\text{Ar}] 4\text{S}^2 3\text{d}^8$  is  
1. Mn                      2. Co                      3. Ni                      4. Zn



42. Which of the following is an electrophile  
1. benzene                      2.  $\text{NH}_3$                       3.  $\text{H}_2\text{O}$                       4.  $\text{SO}_3$
43. Alkali metals are stored in  
1. water                      2. alcohol                      3. kerosene                      4. open space
44. Huckel's Rule explains  
1. aromatic character      2. unsaturation      3. Hydrolysis                      4. saturation
45. Which of the following is meta directing group  
1.  $\text{CH}_3$                       2.  $\text{OH}$                       3.  $\text{NH}_2$                       4.  $\text{NO}_2$
46. In Bragg's equation  $n \lambda = 2d \sin \theta$ , the letter "d" represents  
1. density of solid                      2. distance between two faces of unit cell  
3. distance between two layers of atoms      4. diameter of atom.
47. The most electronegative element is  
1. Cl                      2. F                      3. O                      4. N
48. Which among the following is Lewis acid  
1. NaCl                      2.  $\text{BaCl}_2$                       3.  $\text{AlCl}_3$                       4.  $\text{CCl}_4$
49. Nessler's reagent is used for the detection of  
1.  $\text{Cu}^{2+}$                       2.  $\text{NH}_4^+$                       3.  $\text{Fe}^{2+}$                       4.  $\text{Zn}^{2+}$
50. Order of photochemical reaction is  
1. Zero order                      2. First order                      3. Second order                      4. None
51. Ideal gas equation is  
1.  $PV=nRT$                       2.  $PR=VT$                       3.  $Pn = VRT$                       4.  $P=nVRT$
52. Which one of the following is not linear  
1.  $\text{BeCl}_2$                       2.  $\text{CO}_2$                       3.  $\text{C}_2\text{H}_2$                       4.  $\text{H}_2\text{O}$
53. The average Kinetic energy of one mole of  $\text{N}_2$  at T K is  
1.  $\frac{2}{3} RT$                       2.  $\frac{3}{2} R$                       3.  $\frac{2}{3} R$                       4.  $\frac{3}{2} RT$
54. Sweetest Carbohydrate is  
1. Glucose                      2. Sucrose                      3. Starch                      4. Fructose
55. Which of the following is non aromatic  
1. Cyclohexane                      2. Naphthalene                      3. Anthracene                      4. Benzene
56. The element with electronic configuration  $1S^2 2S^2 2P^6 3S^2 3P^3$  is  
1. P                      2. Si                      3. S                      4. Al
57.  $\text{H}_2\text{SO}_5$  is called  
1. Sulphuric acid                      2. Caro's acid                      3. Blue Vitriol                      4. Hydrazoic acid
58. The oxidation number of oxygen in  $\text{F}_2\text{O}$  is  
1. -2                      2. +2                      3. -1                      4. +1
59. The hybridisation of carbon in alkenes is  
1.  $sp^2$                       2.  $sp^3$                       3.  $sp$                       4.  $sp^3d$
60. Units of rate of reaction is  
1. mole/sec/lit                      2. Sec/mole/lit                      3. mole/lit/sec                      4. lit/sec/mole

### **SECTION - D (APTITUDE)**

61. It is a certain code CAPITAL is coded as FZSHWZO then how LABOUR is coded in the same code  
1. OZENXQ                      2. OZEMWQ                      3. OEZXNQ                      4. OZMEQW
62. DPGGJ : MPQPS :: KNENQ : \_\_\_\_\_  
1. RFUFX                      2. RXUXF                      3. TFWWZ                      4. RFXFU
63.  $36 : 216 :: 81 : \underline{\hspace{2cm}}$   
1. 729                      2. 629                      3. 319                      4. 826
64. Pick out the different word  
1. Owl                      2. Parrot                      3. Hawk                      4. Eagle
65. Complete the series 24,60,120,210, \_\_\_\_\_  
1. 300                      2. 336                      3. 420                      4. 525
66. A is son of B. C is the brother of A, D is the son of C. How is A related to D.  
1. Grandfather                      2. Father                      3. Uncle                      4. Aunt



67. Arun travels 8km towards North, turns left and travels 3 km, then he turns right and travels 4 km then right and travels 3km. How far is he from starting point.  
1. 18 km                      2. 15km                      3. 11 km                      4. 12km
68. If 9th of month falls on the day preceding Sunday, on what day will 1st of the month fall.  
1. Friday                      2. Saturday                      3. Sunday                      4. Monday
69. If P means 'division' :R means addition :T means subtraction : V means Multiplication then find the value of 12V 4R 16P8T6.  
1. 44                      2. 50                      3. 28                      4. 72
70. Which of the following does not belong to the group  
1. 52                      2. 70                      3. 68                      4. 28
71. Find the average of 593, 477, 322, 609, 284  
1. 495                      2. 549                      3. 459                      4. 457
72. If an amount of Rs. 90792 is distributed equally among 97 persons how much amount would each person get  
1. Rs 916                      2. Rs 936                      3. Rs 956                      4. Rs 976
73. 74 % of a number is 1406. What is the number  
1. 1750                      2. 1800                      3. 1850                      4. 1900
74. A canteen requires 28 dozens of bananas for a week. How many dozens of Bananas will it requires for 47 days.  
1. 6399                      2. 3964                      3. 2256                      4. 4216
75. What is the largest number to be added to 7700 to make it a perfect square  
1. 131                      2. 44                      3. 77                      4. 98
76. Sumit invests Rs 4762 which is 25% of his monthly income, in insurance policy. What is his monthly income.  
1. Rs 28,572                      2. Rs. 23,810                      3. Rs 19,048                      4. 14,285
77. One seventh of a number is 50 what will be 64% of that number  
1. 224                      2. 238                      3. 198                      4. 328
78. The difference between 58% of a number and 39% of the same number is 247. What is 62% of the number  
1. 1300                      2. 806                      3. 754                      4. 1170
79. There are 15 dozen candles in a box , if there are 39 such boxes, how many candles are there  
1. 7020                      2. 6660                      3. 6552                      4. 3510
80. The average of 5 consecutive even numbers A,B,C,D and E is 52. What is the product of B and E  
1. 2916                      2. 2988                      3. 3000                      4. 2800

### **SECTION - E (SOFT SKILLS)**

Directions: Read the following passage carefully, identify the correct answer to each of the following questions and mark the corresponding letter to your answer.

Regular physical activity provides numerous health benefits from leaner bodies and lower blood pressure to improved mental health and cognitive functioning. As the school physical education programme promotes physical activity and can teach skills as well as from or change behavior, it holds an important key to influencing health and well-being across the life span. To improve the fitness of students, we need to rethink the design and delivery of school-based physical education programme. Adults in the United States think that information about health was more important for students to learn the content in language arts, mathematics, science, history or any other subject. Despite this high ranking, most schools devote minimal curriculum time to teaching students how to lead healthy lives. Our first step might be to consider ways to increase curriculum time devoted to physical education. In addition, schools need to thoughtfully analyse the design and delivery of school physical education programme to ensure that they are engaging, developmentally appropriate, inclusive and instructionally powerful.



81. According to this passage , regular physical activity is needed to :
- |                                   |  |
|-----------------------------------|--|
| 1. Control one's blood pressure   | 2. Lose one's weight                               |
| 3. Improve one's cognitive skills | 4. Improve one's physical as well as mental health |
82. In order to tone up the physical education programme:
1. It should be made compulsory at school
  2. As assesment of the existing programme should be made
  3. A committee should be setup in every school
  4. The programme should be reoriented and implemented
83. According to the Americans , health education is more important than teaching:
- |                    |                 |                |                     |
|--------------------|-----------------|----------------|---------------------|
| 1. social sciences | 2. liberal arts | 3. any subject | 4. natural sciences |
|--------------------|-----------------|----------------|---------------------|
84. the author wants the reoriented physical education programme to be :
- |                                   |                       |
|-----------------------------------|-----------------------|
| 1. given minimal curriculum time  | 2. very comprehensive |
| 3. Relevant to the modern society | 4. Thoughtful         |

**FILL IN THE BLANKS**

Directions: Choose the appropriate word to fill in each of the following blanks and mark the corresponding letter as your answer

**Articles:**

85. He is ----- honest person.
- |      |       |        |               |
|------|-------|--------|---------------|
| 1. A | 2. an | 3. the | 4. no article |
|------|-------|--------|---------------|
86. Have you found ----- purse you lost yesterday.
- |      |       |        |               |
|------|-------|--------|---------------|
| 1. A | 2. an | 3. the | 4. no article |
|------|-------|--------|---------------|

**Prepositions:**

87. An epidemic broke ----- in the town last year.
- |        |         |       |       |
|--------|---------|-------|-------|
| 1. Out | 2. down | 3. up | 4. on |
|--------|---------|-------|-------|
88. The cat ran ----- the mouse.
- |          |         |       |       |
|----------|---------|-------|-------|
| 1. After | 2. upon | 3. on | 4. up |
|----------|---------|-------|-------|

**Conjunctions:**

89. He could not get the prize----- she tried hard for it.
- |        |           |        |         |
|--------|-----------|--------|---------|
| 1. Yet | 2. though | 3. but | 4. when |
|--------|-----------|--------|---------|
90. She tried her best ----- she couldn't succeed.
- |            |           |            |                 |
|------------|-----------|------------|-----------------|
| 1. Besides | 2. incase | 3. however | 4. nevertheless |
|------------|-----------|------------|-----------------|

**Tenses:**

91. Someone ----- away my bike with in an hour.
- |          |         |              |              |
|----------|---------|--------------|--------------|
| 1. Takes | 2. took | 3. has taken | 4. had taken |
|----------|---------|--------------|--------------|
92. By july 2005, she ----- in this firm for eleven years.
- |              |                           |                    |                     |
|--------------|---------------------------|--------------------|---------------------|
| 1. Will work | 2. will have been working | 3. will be working | 4. has been working |
|--------------|---------------------------|--------------------|---------------------|

**Correction of sentences :**

Directions: Identify the part containing the error in each of the following sentences and mark the corresponding letter as your answer.

93. I am not hungry (A)/beside (B)/ I do not like eggs (C)/All correct. (D)
- |      |      |      |      |
|------|------|------|------|
| 1. A | 2. B | 3. C | 4. D |
|------|------|------|------|
94. Of the two proposals (A)/ we think(B)/ the second is (C)/ the most attractive.(D)
- |      |      |      |      |
|------|------|------|------|
| 1. A | 2. B | 3. C | 4. D |
|------|------|------|------|
95. Some peoples (A)/ feel that (B)/ no progress is possible (C)/ without discipline. (D)
- |      |      |      |      |
|------|------|------|------|
| 1. A | 2. B | 4. C | 4. D |
|------|------|------|------|
96. I went to the librarian and cashier (A)/ and they gave me (B)/ all facilities required (C)/ to complete the project.(D)
- |      |      |      |      |
|------|------|------|------|
| 1. A | 2. B | 3. C | 4. D |
|------|------|------|------|

**Vocabulary:**

Directions: Choose the correct synonym to each of the following words and mark the corresponding letter as your answer.

97. Exquisite
- |            |         |         |          |
|------------|---------|---------|----------|
| 1. Elegant | 2. Ugly | 3. Dark | 4. Clear |
|------------|---------|---------|----------|
98. Obsolete
- |               |                |            |           |
|---------------|----------------|------------|-----------|
| 1. Antiquated | 2. fashionable | 3. present | 4. Recent |
|---------------|----------------|------------|-----------|

Directions: Choose the correct antonym to each of the following words and mark the corresponding letter as your answer.

99. Foreign
- |            |           |          |            |
|------------|-----------|----------|------------|
| 1. Country | 2. native | 3. local | 4. citizen |
|------------|-----------|----------|------------|
100. Expedite
- |           |            |        |           |
|-----------|------------|--------|-----------|
| 1. Impede | 2. exclude | 3. add | 4. delete |
|-----------|------------|--------|-----------|

