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ENGLISH — Paper I

Time Allowed : 2½ Hours]

[Maximum Marks : 100

PART - A

(Marks : 32)

I. Answer any *three* of the following questions in about 30 words each. Each question carries *two* marks : 3 × 2 = 6

1. Who was the unexpected visitor to Mrs. March's house ? Why was she disliked ?
2. How does the female Ridley prepare her nest ?
3. Describe the author's emotions on having excelled at the race.
4. Why did the caged bird decline the invitation of the free bird ?

II. Explain any *two* of the following excerpts with reference to the context. Each question carries *three* marks : 2 × 3 = 6

5. "We know why the forest has gone crazy, don't we ?"
6. "There are lots of people in this world, and I have to accommodate my liberty to their liberties."
7. "You will go to paradise, and your name will be remembered forever as my first helper."
8. "It's not that I am so smart, it's just that I stay with problems longer."

[Turn over

III. Answer any *two* of the following questions, each in a paragraph of about 100 words. Each question carries *five* marks : $2 \times 5 = 10$

9. Describe the circumstances that forced Prem to leave the city.
10. Write a paragraph on the conservation of sea turtles.
11. How is the element of the supernatural brought out in the play *St. Joan* ?
12. How did the magnetic compass spark the genius of young Einstein ?

IV. Answer any *one* of the following questions in about 200 words. Each question carries *ten* marks : $1 \times 10 = 10$

13. Why did Mrs. March pretend to be ill ? Justify her act.
14. Write an essay on the simple pleasures experienced by Tagore in his boyhood.

PART - B

(Marks : 27)

V. Answer any *three* of the following questions each in not more than 30 words. Each question carries *two* marks : $3 \times 2 = 6$

15. Why does the poet say, 'Joy is born of parents poor' ?
16. What kind of a place was chipping-under-Bone ?
17. What does the poet want to do once he gains the will ?
18. How did the girl behave when the stone cutter was at work ?

VI. Answer the questions for any *two* of the following excerpts from the prescribed poems. Each question carries *three* marks : $2 \times 3 = 6$

19. O what is that light I see flashing so clear

Over the distance brightly, brightly ?

- i) Who utters these lines ?
- ii) What was the flashing due to ?
- iii) How do these lines help us understand the poem better ?

20. Let them not make me a stone and let them not
Spill me.

Otherwise kill me.

- i) Whom does 'them' refer to ?
- ii) What does 'stone' stand for ?
- iii) What is the request of the speaker ?

21. 'The enemy faints not, nor falleth'

- i) Whose words are these ?
- ii) What is the mood of the speaker as conveyed in this line ?
- iii) Name the figure of speech used here.

22. The two of us were chiselling,
together, I and death.

- i) Who are the 'two' ?
- ii) What was the narrator doing ?
- iii) What does the poet convey by these lines ?

VII. Answer any *two* of the following, each in about 100 words. Each question carries
five marks : 2 × 5 = 10

23. Explain how the element of suspense is developed in the poem 'O What is That Sound'.

24. What are the evils of society referred to in the poem 'Prayer Before Birth' ?

25. Explain the central theme of the poem :

'Say Not the Struggle Naught Availeth'.

26. Describe the images illustrated in the poem 'Romance'.

VIII. 27. Quote from memory either of the following :

5

Joy's like a Lark.....

..... others hear ;

OR

Where there is a will

..... willed it .

[Turn over

PART - C

(Marks : 18)

IX. Choose the appropriate response which conveys a similar meaning to the italicized word / phrase in the main sentence. 5 × 1 = 5

28. They face *threat* from the sharks.

- i) This punishment is too severe.
- ii) There is great risk of danger in climbing this steep cliff.
- iii) They were filled with fear when the thief brandished a knife.

29. There were *rotting* animals in the forest .

- i) There was a riot in our village.
- ii) We find a lot of decaying vegetables in the market.
- iii) We have sweet smelling flowers in our garden.

30. The walk *revived* her spirits.

- i) The weary travellers took rest under the tree.
- ii) Coffee refreshed her thoughts.
- iii) My sister looks very beautiful.

31. In the excitement my knowledge of space had *deserted* me.

- i) He was forsaken by his friend.
- ii) My mother supports me in all that I do.
- iii) The article deserves careful study.

32. I have changed a *dormant* snail paced earth into a gigantic power house of surging progress.

- i) Some insects are very small.
- ii) Our servants sleep very little.
- iii) Children who are inactive, cannot progress well in their studies.

X. Choose the most appropriate antonyms of the italicized words from the *four* alternatives given with each sentence. $5 \times 1 = 5$

33. God is very *merciful*.

- | | |
|------------------|-----------------|
| i) omnipotent | ii) unforgiving |
| iii) unfortunate | iv) mighty. |

34. Olive Ridley is the most *abundant* of the eight species.

- | | |
|-----------|---------------|
| i) scarce | ii) beautiful |
| iii) tiny | iv) amazing. |

35. Olive Riddleys are listed as *endangered* species.

- | | |
|-----------------|----------------|
| i) protected | ii) hazardous |
| iii) marvellous | iv) poisonous. |

36. The freedom of not being petted made up for the harshness of this *bondage*.

- | | |
|--------------|--------------|
| i) slavery | ii) illness |
| iii) liberty | iv) tyranny. |

37. The nests are *narrow* in their mouth.

- | | |
|-----------|-----------|
| i) thin | ii) large |
| iii) flat | iv) wide. |

XI. Use any *two* of the following words in sentences of your own. $2 \times 1 = 2$

38. curious

39. chaos

40. lurking.

XII. Use any *two* of the following phrases in sentences of your own : $2 \times 1 = 2$

41. emerge from

42. submit to

43. to content with.

XIII. Fill in the blanks, choosing the right alternatives given in the brackets :

$2 \times 1 = 2$

44. All the guests from their seats. (*raised/rose*)

45. The manager the papers on his desk. (*laid/lay*)

[Turn over

XIV. a) Use one word for the phrasal verb or idiom italicized in either of the following sentences : 1

46. They will *call on* us this evening.

OR

They *set out* early as they had a long way to go.

b) Use a phrasal verb or an idiom in the place of the italicized word in either of the following sentences : 1

47. Rita doesn't *resemble* her mother.

OR

These books must be *removed* from the library.

PART - D

(Marks : 23)

XV. Rewrite as directed. Marks are indicated against each item :

48. Before leaving, they cover their nests with sand.

(Change into a *Complex sentence*) 1

OR

Although he saw the danger, he pressed on.

(Change into a *Compound sentence*)

49. Wait here, till my arrival.

(Change into a *Complex sentence*) 1

OR

We must eat or we cannot live.

(Change into a *Simple sentence*)

50. Don't give up your efforts.

(Change the *voice*) 1

OR

Let time be never wasted.

(Change the *voice*)

51. India is one of the most populous nations.

(Rewrite using *Positive degree*) 1

OR

Very few states in India are as cold as Sikkim.

(Rewrite using *Comparative degree*)

52. That was a terrible fall. (Change into *Exclamatory sentence*) 1

OR

We can't cross the street here, ?

(Supply a *Question tag*)

53. A hungry fox saw some grapes. They were hanging from a vine. 1

(Combine into a *Simple sentence*)

OR

Don't tell lies. Your parents will be unhappy.

(Combine into a *Complex sentence*)

54. Can you tell me where have you picked her out ? 1

(Correct the sentence)

55. Identify the type of clauses in the given sentence : 2

Recent studies have proved that honey contains many of the antioxidants.

56. Fill in the blanks with appropriate articles : $4 \times \frac{1}{2} = 2$

Olive Ridleys eat enormous range of marine organisms.

..... young hatchlings have heart shaped shells, which start out

grey but reach olive green once turtles are adults.

57. Fill in the blanks with appropriate prepositions : $4 \times \frac{1}{2} = 2$

The rats were everywhere, the trees, the grass,

..... the bushes, the ground.

[Turn over

58. Prem said to the old man, "Don't say that again. What I have seen in my village makes me burn with shame".

(Rewrite in Reported form of speech) 2

OR

The leader complimented us on having done our duty, but questioned what the others had done.

(Rewrite in the Direct form of speech)

59. mercy on us what has happened cried jo

(Punctuate the sentence) 2

60. Fill in the blanks with the correct tense forms of the verbs given in brackets : 3

I (feel) that a moment of a life time (come). There (be) no pain, only a great unity of movement and aim.

61. No, I can't read the last line on the chart.

(Frame a suitable question) 1

OR

They asked me if I was speaking the truth. (Frame a 'Wh' question)

62. Identify the sentence pattern : 1

Laughing and larking doesn't pay.

63. Form a sentence on the given pattern : 1

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ENGLISH — Paper II

Time Allowed : 2 $\frac{1}{2}$ Hours]

[Maximum Marks : 100

PART - A

I. Rearrange the following sentences in logical sequence and rewrite in a paragraph using connectors wherever necessary : 5 + 5

1. So the students, were rightly excited about it.
2. Being just an arm's length away from a bear and miss being attacked was perhaps a great adventure.
3. But the guard showed them the pugmarks of a tiger which they had missed seeing, crossing the road that same night.
4. Now, what would you say to that !
5. And they were sure that they had not missed the best sight this trip could provide.

II. Read the given passage and answer the questions given below in a sentence or two each : 10

He looked at me sympathetically and said, "For this paper, people fight, go away from our ancestral land, leave our forest and go to cities. Have we not led a complete life without that piece of paper ? Our ancestors did. We are children of God, settled here happily without this paper. This is God's land. Nobody owns this land. No river is created by us. No mountain is made by us. The wind does not listen to us. The rain does not ask our permission. These are gifts of God. How we can sell or buy land, I do not understand. When nothing is yours then how can you make such transactions ? This little paper of yours can turn our lives upside down.

1. What paper is the old man talking about ?
2. How did his ancestors live ?
3. What are the natural resources named by him ?
4. Why does he feel that no transaction is possible ?
5. What, according to him, can ruin our lives ? Is it true ?

[Turn over

III. Answer any *two* of the following in an essay form within 200 words each :

2 × 10 = 20

1. How does the mother's instinct help the seagull to take the first flight ?
2. Relate what was so memorable about the "Last Lesson".
3. Narrate the encounter with the tribal people by the author.
4. How did the author help the old man ?

PART - B

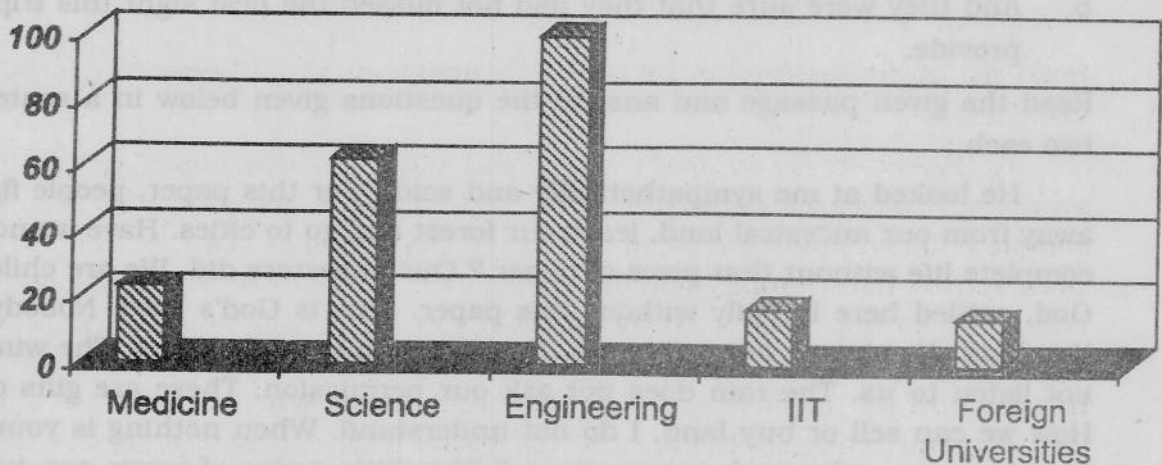
IV. Write a précis of the following passage reducing it to one-third of its length : 10

India is chiefly an agricultural country. The cultivation of crops depends on a proper supply of water throughout the year. From olden times, large parts of our country have suffered from periods of too much of rain, alternating with periods of drought. People have known that if the excess waters of the flood seasons can be stored up for use in the fields during the dry seasons, the problem would be solved. Unfortunately, they have neither the knowledge nor the means to do much in this matter. What little they knew they had tried to put into practice. They have dug canals to carry away water from the great perennial rivers. This was a heavy and expensive one practicable over only a small area. Large tanks were excavated, small bunds or dams have been built to hold water or hold back floods.

V. Study the graph given below and answer the questions :

5

No. of students opting for various courses (from a school) :



Questions

1. Which course is the most popular ?
2. Which is the lowest course sought by students ?
3. How much is the difference between medicine and science ?
4. What is the ratio between science and engineering students ?
5. Why is the number of students opting for foreign universities less ?

OR

Read the following passage and make notes :

Energy is derived from two kinds of energy resources namely, renewable and non-renewable. We use fuels like coal, petrol, diesel and kerosene. These cannot be renewed and are called as non-renewable resources. But energy from wind, water and sun can be renewed.

VI. Rewrite each of the following sentences correctly :

5

1. He is a tall man, like I am.
2. He had no other desire but to make money.
3. One should take care of his books.
4. The ship, with its crew were lost.
5. Divide it between me and him.

VII. Read the given poem and answer the questions given below :

10

Lies beauty in doing duty

Right in time indeed !

The best of prayers ever it's

For you and I and all

It eases head and pleases heart

And keeps off restless life on earth.

Earn it will a place in heaven

When time comes, life beyond

Less of duty or devoid of it

Is just to kill our conscience alone

Where is right for as to claim

If duty is not discharged at all ?

Questions :

1. Where does our beauty lie ?
2. How does doing duty help us all ?
3. What does doing duty keep off ?
4. What are the ills of not doing one's duty ?
5. What can't be claimed, if we don't do our duty ?

OR

[Turn over

Paraphrase the poem given below :

This is my prayer to Thee, my Lord

Strike at the root of penury in my heart

Give me the strength lightly to bear my joys and sorrows

Give me the strength to make my love fruitful in service

Give me the strength never to disown the poor or bend my knees before insolent
might.

Give me the strength to surrender my strength to thy will with love.

- VIII. 1. Write a letter to the Principal of your school, thanking him/her for the scholarship awarded. 10

OR

2. Write a letter to your father describing in detail about your hostel life.

OR

3. Write a letter to the Editor of a newspaper on the menace of chickungunia disease and how it has affected your neighbourhood.

(Sign yourself as X. If you write your name, Reg. No. or address your answer paper will not be valued)

- IX. Build up a dialogue between a car owner and a mechanic. 5

OR

Complete the dialogue with five responses :

Constable : Sir, Good morning.

Inspector : Good morning. You look excited. What's the matter ?

Constable :

- X. Read the given passage and prepare an attractive advertisement : 5

A toothpaste that is introduced recently with calcium and iodine content.

Contact : 27, Third-Street, K. K. Nagar, Madurai.

Phone : 2724651.

- XI. Expand the idea contained in the following statement in about 100 words : 10

All that glitters is not gold.

,OR

As you sow, so you reap.

9. The pre-images of 3 under the function

$$f = \{(0, 1), (2, 3), (1, 4), (7, 3)\} \text{ are}$$

- a) 1 and 2 b) 2 and 7
c) 0 and 2 d) 1 and 7.

10. If $A = \{1, 3, 5\}$, B is the set of integers and $f: A \rightarrow B$ defined by

$$f(x) = x^2 - 1, \text{ then the range of } f \text{ is}$$

- a) $\{1, 9, 25\}$ b) $\{3, 9, 24\}$
c) $\{0, 8, 24\}$ d) $\{0, 1, 9\}$.

11. Composition of functions is

- a) Associative b) Commutative
c) Commutative and Associative d) not Associative.

12. If $A = \{2, 5, 7\}$, $B = \{5, 8, 10\}$, then

$$f = \{(2, 5), (5, 8), (7, 10), (5, 10)\} \text{ is}$$

- a) one-one into function b) many-one function
c) constant function d) not a function.

13. Ram deposits Rs. 50 per month for 2 years. At the end of 2 years, he receives Rs. 1,800 as the maturity value. Then the interest paid by the bank is

- a) Rs. 800 b) Rs. 100
c) Rs. 600 d) Rs. 300.

14. The quarterly interest received on Rs. 24,000 in a fixed deposit with a bank for 2 years paying 9% per annum is

- a) Rs. 240 b) Rs. 540
c) Rs. 270 d) Rs. 360.

[Turn over

15. If the difference between C.I. and S.I. on Rs. 6,000 for 2 years is Rs. 9-60, then the rate of interest is
- a) 6% b) 10%
- c) 12% d) 4%.
16. If $P(x) = 2x^3 - 9x^2 + x + 12$ and $P\left(\frac{3}{2}\right) = 0$, then by factor theorem, the corresponding factor of $P(x)$ is
- a) $2x + 1$ b) $2x - 3$
- c) $2x - 1$ d) $3x + 2$.
17. The G.C.D. of $4(x-1)^2(x+2)$ and $6(x-1)(x-2)$ is
- a) $24(x-1)^2(x^2-1)$ b) $(x-1)$
- c) $2(x-1)$ d) $24(x-1)$.
18. The partial fraction representation of $\frac{x}{(x+1)^2}$ is
- a) $\frac{A}{x+1}$ b) $\frac{A}{x+1} + \frac{B}{(x+1)^2}$
- c) $\frac{Ax+B}{(x+1)^2}$ d) $\frac{Ax+B}{x+1} + \frac{Cx+D}{(x+1)^2}$.
19. If α and β are the roots of $ax^2 + bx + c = 0$, then $(\alpha + \beta)^2$ is
- a) $-\frac{b^2}{a^2}$ b) $\frac{c^2}{a^2}$
- c) $\frac{b^2}{a^2}$ d) $\frac{bc}{a}$.
20. The roots of $x^2 - 8x + 12 = 0$ are
- a) real and irrational b) real and rational
- c) real and equal d) unreal.

SECTION - B

II. Answer any ten questions :

$10 \times 2 = 20$

21. Find the middle term of an A.P. $-3, -1, 1, \dots, 33$.
22. Find the sum of $21^2 + 22^2 + \dots + 35^2$.
23. Which term of the progression $1, 2, 4, 8, \dots$ is 512 ?
24. The radii of two cylinders are in the ratio $2 : 3$. Find the ratio of their volumes if their heights are in the ratio $5 : 3$.
25. The curved surface area of a cone is 550 sq.cm. and the total surface area is 704 sq.cm. Find its radius.
26. The volume of a sphere is numerically equal to its surface area. Find its diameter.
27. If $(-6, a), (b, 4), (2, c), (d, 7)$ is an identity function, find the values of a, b, c and d .
28. If $P = \{-2, -1, 0, 1\}$, $Q = \{1, -2, 6, -3\}$ and
 $R = \{(x, y) / y = x^2 - 3, x \in P, y \in Q\}$, list the elements of R and identify the function.
29. If $f: R \rightarrow R$ is defined by $f(x) = ax + 3$ and $g: R \rightarrow R$ is defined by $g(x) = 4x - 3$, find a so that $f \circ g = g \circ f$.
30. If the difference between S.I. and C.I. for 3 years at 5% per annum is Rs. 61, find the principal.
31. A person opens an R.D. account paying Rs. 150 per month for 3 years. If the rate of interest is 12% per annum, what is the amount of interest he gets at the end of 3 years ?

[Turn over

32. Find the value of k , if the division of $kx^3 + 9x^2 + 4x - 10$ by $x + 3$ leaves the remainder 5.

33. Simplify : $\frac{6x^2 - 5x + 1}{9x^2 + 12x - 5}$.

34. If $(2A + B)x + (A + B) \equiv 11x + 7$, find the values of A and B .

35. The sum S of first n natural numbers is given by the formula

$$S = \frac{n(n+1)}{2}. \text{ If } S = 231, \text{ find } n.$$

PART - II

N. B. : i) This Part contains *four* Sections, **Section - C**, **Section - D**, **Section - E** and **Section - F**.

ii) **Section - C** and **Section - E** contain 3 questions each. Answer any *two* questions in each Section.

iii) **Section - D** and **Section - F** contain 4 questions each. Answer any *three* questions in each Section.

iv) Each question carries *five* marks.

SECTION - C

III. Answer any *two* questions : $2 \times 5 = 10$

36. In an A.P., the sum of the first 10 terms is 175 and the sum of the next 10 terms is 475. Find the A.P.

37. Find the 3 numbers in G.P. whose sum is 14 and product is 64.

38. Find the sum of n terms of the series $0.4 + 0.94 + 0.994 + \dots$.

SECTION - D

IV. Answer any *three* questions : $3 \times 5 = 15$

39. Verify $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ using Venn diagram.

40. Given $f(x) = x - 2$, $g(x) = 3x + 5$, $h(x) = 2x - 3$, verify that

$$(g \circ h) \circ f = g \circ (h \circ f).$$

41. Rahul deposited Rs. 5,000 in a bank which pays 6% S.I. per annum for 2 years. Ajay deposited on the same day Rs. 5,000 in another bank which pays $5\frac{1}{2}\%$ C.I. per annum. Who will get more interest and how much ?
42. At the end of 3 years, a recurring deposit fetches Rs. 16,398 with 9% S.I. per annum. Find the amount to be deposited every month.

SECTION - E

V. Answer any *two* questions :

2 × 5 = 10

43. A hollow cylindrical iron pipe is 40 cm long. Its outer and inner diameters are 8 cm and 5 cm respectively. Find the volume of the material and the weight of the pipe if 1 c.c. of iron weighs 7 gm.
44. A right circular cone of height 40 cm and base radius 15 cm is casted into smaller cones of equal sizes with base radius 5 cm and height 4 cm. Find how many cones are made.
45. A hollow spherical shell has an inner radius of 8 cm. If the volume of the material is $\frac{1952\pi}{3}$ c.c., find the thickness of the shell.

SECTION - F

VI. Answer any *three* questions :

3 × 5 = 15

46. If both $x - 2$ and $x - \frac{1}{2}$ are factors of $px^2 + 5x + r$, show that $p = r$.
47. Resolve into partial fractions :

$$\frac{x^2 + x + 1}{(x - 2)^2 (x + 2)}$$

48. Find the values of a and b if $\frac{1}{x^4} - \frac{6}{x^3} + \frac{13}{x^2} + \frac{a}{x} + b$ is a perfect square.
49. If α and β are the roots of the equation $2x^2 - 3x - 4 = 0$, form the equation whose roots are $\frac{1}{\alpha^2}, \frac{1}{\beta^2}$.

[Turn over

PART - III

- N. B. :
- i) The Part contains Section - G
 - ii) Answer any *one* question.
 - iii) Each question carries *ten* marks.

SECTION - G

VII. Answer any *one* question :

$1 \times 10 = 10$

50. Solve graphically : $x^2 - x - 12 = 0$.

51. Draw the graph of $y = x^2 - 3x$ and hence solve the equation

$$x^2 - 3x - 4 = 0.$$

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MATHEMATICS — Paper II

Time Allowed : $2\frac{1}{2}$ Hours]

[Maximum Marks : 100

PART - I

- N. B. :
- i) This Part contains *two* Sections, **Section - A** and **Section - B**.
 - ii) **Section - A** contains Multiple Choice Questions. Answer *all* the 20 questions. Each question carries *one* mark.
 - iii) **Section - B** contains 15 questions. Answer any *ten* questions. Each question carries *two* marks.

SECTION - A

Choose the correct answer from the given alternatives :

$20 \times 1 = 20$

1. $A = \begin{pmatrix} -5 & 2 & 1 \\ 0 & -3 & 5 \\ 0 & 0 & 1 \end{pmatrix}$ is an example for

- a) lower triangular matrix
 - b) upper triangular matrix
 - c) diagonal matrix
 - d) scalar matrix.
2. Determine the matrix A given by $(a_{ij})_{2 \times 2}$ if $a_{ij} = i - j$

a) $\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$

b) $\begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$

c) $\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$

d) $\begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}$

[Turn over

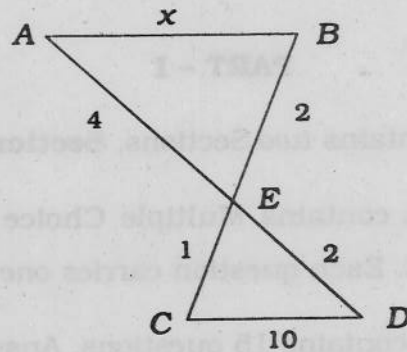
3. The identity for matrix addition is

- a) unit matrix b) null matrix
c) negative matrix d) equal matrix.

4. Two chords AB and CD of a circle cut internally at E . If $AE = 6$ cm, $BE = 8$ cm and $EC = 4$ cm, then ED is equal to

- a) 14 cm b) 12 cm
c) 10 cm d) 32 cm.

5. From the figure x is

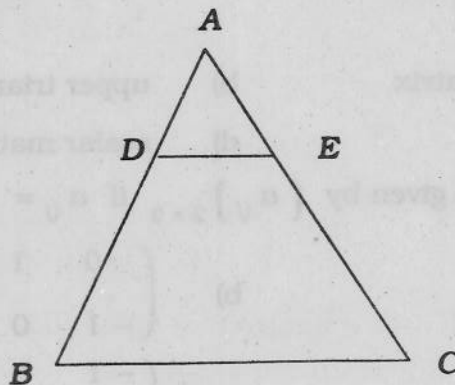


- a) 20 b) 5
c) 4 d) 10.

6. In $\triangle ABC$, AD is the median and also bisects $\angle A$. If $AB = 16$ cm, $BC = 8$ cm, then AC is

- a) $(\sqrt{4})^2$ b) 8
c) 4^2 d) 2.

7. In $\triangle ABC$, $DE \parallel BC$, $AB = 7$, $AD = 3$, $AE = 4.5$, then EC is



- a) 7 b) 6
c) 4.5 d) 8.

8. The distance between the centres of two circles is 10 cm and the radii are 4 cm and 2 cm respectively. The length of their transverse common tangent is
- a) 6 cm b) 8 cm
c) 12 cm d) 10 cm.
9. The slope of the line joining the points (4, - 2) and (2, - 4) is
- a) 1 b) - 1
c) 2 d) - 2.
10. If (5, 7), (3, a), (6, 6) are collinear, then the value of a is
- a) 3 b) 6
c) 9 d) 12.
11. The x-intercept of the line $4x - 7y + 28 = 0$ is
- a) 7 b) - 7
c) $\frac{1}{7}$ d) $-\frac{1}{7}$.
12. If the straight line $5x + 4y = k$ passes through (2, - 1) then the value of k is
- a) 14 b) 3
c) 6 d) 1.
13. The area of triangle formed by the points (0, 4), (4, 0) and origin is
- a) 8 sq.units b) 16 sq.units
c) 2 sq.units d) 4 sq.units.
14. $\frac{\sin^3 \theta + \cos^3 \theta}{\sin \theta + \cos \theta} =$
- a) 1 b) $1 - \sin \theta \cos \theta$
c) $\sin \theta + \cos \theta$ d) $\tan \theta$.
15. If the height of the tree and the length of its shadow are equal in measurement, then the sun is seen at an angle of elevation of
- a) 30° b) 45°
c) 60° d) 90° .

24. ABT is a secant of a circle which intersects at A and B and PT is a tangent to the circle at P . If $AT = 9$ cm, $AB = 5$ cm, find PT .
25. ΔABC and ΔDEF are similar. The area of ΔABC is 9 sq.cm and that of ΔDEF is 16 sq.cm. If $EF = 4.2$ cm, find BC .
26. Prove that the points $(4, 5)$, $(6, -1)$ and $(0, 17)$ are collinear.
27. The line joining $A(-2, 4)$ and $B(3, -5)$ is parallel to the line joining $C(0, 4)$ and $D(-3, y)$. Find y .
28. Find the equation of the straight line passing through the points $(3, 6)$ and $(-2, 5)$.
29. Show that $2x - 5y + 1 = 0$ and $6x - 15y = 4$ are parallel.
30. If $\theta = 30^\circ$, verify that $\sin 3\theta = 3 \sin \theta - 4 \sin^3 \theta$.
31. Prove that $(\operatorname{cosec} \theta - \sin \theta)(\sec \theta - \cos \theta)(\tan \theta + \cot \theta) = 1$.
32. A kite is flying at a height of 75 metres from the level ground attached to a string inclined at 60° to the horizontal. Find the length of the string.
33. If $\tan A = \frac{\sin 60^\circ}{1 + \cos 60^\circ}$, find A where A is acute.
34. Three coins are tossed simultaneously. What is the probability of getting at least one head?
35. The numbers of ice-cream cones bought by men, women, boys, girls and children on a day at the trade fair were 40, 42, 46, 48 and 44 respectively. Find the Standard Deviation.

PART - II

- N. B. : i) This Part contains *four* Sections, **Section - C, Section - D, Section - E** and **Section - F**.
- ii) **Section - C** and **Section - E** contain 3 questions. Answer any *two* questions in each Section.
- iii) **Section - D** and **Section - F** contain 4 questions. Answer any *three* questions in each Section.
- iv) Each question carries *five* marks.

SECTION - C

Answer any *two* questions :

$2 \times 5 = 10$

36. State Thales theorem and prove it.
37. $ABCD$ is a quadrilateral with $AB = AD$. AE and AF are bisectors of $\angle BAC$ and $\angle DAC$ respectively. Prove that EF is parallel to BD .
38. Prove that if the diagonals of a quadrilateral cut each other in the same ratio, the quadrilateral is a trapezium.

SECTION - D

Answer any *three* questions :

$3 \times 5 = 15$

39. If $A = \begin{pmatrix} 2 & 3 \\ 4 & 5 \end{pmatrix}$ and $B = \begin{pmatrix} -1 & -3 \\ -4 & -4 \end{pmatrix}$, verify that $(AB)^T = B^T A^T$.

40. If $A = \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$, show that $A^2 - 5A + 7I_2 = 0$.

41. Calculate the S.D. for the following :

$x :$	6	9	12	15	18
$f :$	7	12	13	10	8

42. Two dice are thrown together. What is the probability of getting a total of 8 or a product 12 ?

SECTION - E

Answer any two questions :

2 × 5 = 10

43. Prove that $(1 + \tan \alpha \tan \beta)^2 + (\tan \alpha - \tan \beta)^2 = \sec^2 \alpha \cdot \sec^2 \beta$.
44. Using the formula $\sin(\alpha + \beta) = \sin \alpha \cos \beta + \cos \alpha \sin \beta$, show that
- $$\sin 75^\circ = \frac{\sqrt{3} + 1}{2\sqrt{2}}$$
45. The angle of elevation of a tower at a point is 45° . After going 20 metres towards the foot of the tower the angle of elevation of the tower becomes 60° . Calculate the height of the tower.

SECTION - F

Answer any three questions :

3 × 5 = 15

46. Find the equation of the line passing through the point of intersection of the lines $2x + y - 3 = 0$ and $5x + y - 6 = 0$ and perpendicular to the line joining the points $(1, 2)$ and $(2, 1)$.
47. Find the area of the quadrilateral $ABCD$ given
 $A(1, 2)$, $B(-3, 4)$, $C(-5, -6)$ and $D(4, -1)$.
48. Find the value of a so that $3x + y = 2$, $5x + 2y = 3$ and $ax - y = 3$ are concurrent.
49. Find the centroid of the triangle whose equations of the sides are
 $4x - y - 19 = 0$, $x - y - 4 = 0$, $x + 2y + 11 = 0$.

PART - III

- N. B. : i) This Part contains **Section - G**.
 ii) Answer any one question.
 iii) Each question carries ten marks.

SECTION - G

Answer any one question :

1 × 10 = 10

50. Draw a circle of radius 3 cm. At a point P on it, draw a tangent to the circle without using the centre.
51. Construct a ΔXYZ in which base $XY = 7$ cm, $m\angle Z = 50^\circ$ and the altitude is at a distance of 5 cm from X .
-

SECTION - 2

2 x 5 = 10

Answer any two questions:

43. Prove that $(1 + \tan \alpha \tan \beta)^2 + (\tan \alpha - \tan \beta)^2 = \sec^2 \alpha \sec^2 \beta$

44. Using the formulae $\sin(\alpha + \beta) = \sin \alpha \cos \beta + \cos \alpha \sin \beta$, show that

$$\sin 75^\circ = \frac{\sqrt{3} + 1}{2\sqrt{2}}$$

45. The angle of elevation of a tower at a point is 45° . After going 30 metres towards the foot of the tower the angle of elevation of the tower becomes 60° . Calculate the height of the tower.

SECTION - 3

2 x 5 = 10

Answer any three questions:

46. Find the equation of the line passing through the point of intersection of the lines $2x + y - 3 = 0$ and $2x + y - 6 = 0$ and perpendicular to the line joining the points $(1, 2)$ and $(2, 1)$.

47. Find the area of the quadrilateral ABCD given

$$A(1, 2), B(2, 4), C(3, 2) \text{ and } D(4, 1)$$

48. Find the value of α so that $2x + y - 2$, $2x + 2y + 3$ and $ax - y + 3$ are concurrent.

49. Find the centroid of the triangle whose equations of the sides are

$$2x - y - 10 = 0, x - y - 4 = 0, x + 2y + 11 = 0$$

PART - III

M.R.T. This Part contains Section - B.

- (i) Answer any one question.
- (ii) Each question carries two marks.

SECTION - 4

1 x 10 = 10

Answer any one question:

50. Given a circle of radius 5 cm. At a point P on it, draw a tangent to the circle without using the centre.

51. Construct a ΔXYZ in which base $YZ = 7$ cm, $\angle Z = 60^\circ$ and the altitude is at a distance of 5 cm from X.

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MATHEMATICS — Paper I

(New Syllabus)

Time Allowed : $2\frac{1}{2}$ Hours]

[Maximum Marks : 100

PART - I

- N. B. :
- This Part contains *two* Sections, **Section - A** and **Section - B**.
 - Section - A** contains Multiple Choice Questions. Answer *all* the 20 questions. Each question carries *one* mark.
 - Section - B** contains 15 questions. Answer any *ten* questions. Each question carries *two* marks.

SECTION - AI. Choose the correct answer from the given alternatives : 20 × 1 = 20

1. The number of terms in the A.P. 7, 13, 19,, 97 is

- | | |
|-------|--------|
| a) 97 | b) 17 |
| c) 16 | d) 15. |

2. The ratio of sum of n terms of an A.P. to the sum of m terms is 256 : 441.Then the ratio of the m^{th} term to the n^{th} term is

- | | |
|------------|-------------|
| a) 31 : 41 | b) 16 : 21 |
| c) 21 : 16 | d) 41 : 31. |

[Turn over

3. If $1^2 + 2^2 + \dots + 10^2 = 385$, then $2^2 + 4^2 + 6^2 + \dots + 20^2$ is

a) 770

b) 1150

c) 1540

d) 385×385 .

4. If n, p, q are in G.P., then the expression for p in terms of n and q is

a) $\frac{n}{q}$

b) $(nq)^{1/2}$

c) $q^2 n$

d) nq .

5. If two cylinders have their radii in the ratio 4 : 5 and heights in the ratio 5 : 6, then the ratio of their volumes is

a) 8 : 15

b) 15 : 8

c) 6 : 5

d) 4 : 5.

6. A sector of a circle of radius 21 cm and central angle 120° is made into a cone by bringing its radii together. Radius of the cone thus obtained is

a) 21 cm

b) 7 cm

c) 14 cm

d) 10.5 cm.

7. The relation between the volume V of a sphere of radius r and its surface area S is

a) $V = \frac{2}{3} r S$

b) $V = \frac{r}{3} S$

c) $V = \frac{4}{3} S r$

d) $V = 4S$.

8. If A and B are any two sets, then $A \cap B' =$

a) $A + B$

b) $A - B$

c) $A \cup B$

d) $A' \cap B$.

9. If $\{(4, 5), (5, x)\}$ represents a constant function, then the value of x is

a) 3

b) 4

c) 5

d) 6.

10. Given $f(x) = (-1)^x$ is a function from N to Z . The range of f is

a) $\{1\}$

b) N

c) $\{1, -1\}$

d) Z .

11. The pre-images of 5 under the function

$$f = \{(2, -5), (3, 5), (4, -5), (5, 5)\}$$
 is

a) 2 and 3

b) 3 and 5

c) 3 and 4

d) 6.

12. $f(x) = x^2 - x$, then $f(x-1) - f(x+1)$ is

a) $4x$

b) $4x + 2$

c) $2 - 4x$

d) $4x - 2$.

13. A recurring deposit of Rs. 50 per month at 10% S.I. per annum will fetch at the end of 2 years an interest of

a) Rs. 250

b) Rs. 125

c) Rs. 375

d) Rs. 500.

14. The quarterly interest due on Rs. 1,000 at 12% rate of interest is

a) Rs. 120

b) Rs. 40

c) Rs. 30

d) Rs. 60.

15. If the difference between C.I. and S.I. on Rs. 2,000 for 2 years is Rs. 20, then the rate of interest is
- a) 10% b) 20%
 c) 30% d) 15%.
16. If $3x + 2$ is a factor of $p(x)$ then
- a) $p\left(\frac{2}{3}\right) = 0$ b) $p\left(\frac{3}{2}\right) = 0$
 c) $p\left(-\frac{2}{3}\right) = 0$ d) $p\left(-\frac{3}{2}\right) = 0.$
17. The G.C.D. of $4(x-1)^2(x+2)$ and $6(x-1)(x-2)$ is
- a) $24(x-1)^2(x^2-1)$ b) $x-1$
 c) $2(x-1)$ d) $24(x-1).$
18. $\frac{a^2}{a^2-b^2} + \frac{b^2}{b^2-a^2} =$
- a) $a-b$ b) $a+b$
 c) a^2-b^2 d) 1.
19. $\frac{x+3}{x^2-x-6} = \frac{A}{x+2} +$
- a) $\frac{A}{x+3}$ b) $\frac{B}{x+3}$
 c) $\frac{B}{x-3}$ d) $\frac{B}{x^2-x-6}.$
20. If α and β are the roots of the equation $x^2 + 2x + 8 = 0$, then the value of $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$ is
- a) $\frac{1}{2}$ b) 6
 c) $-\frac{3}{2}$ d) $\frac{3}{2}$

SECTION - B

II. Answer any ten questions :

 $10 \times 2 = 20$

21. Which term of the sequence 13, 15, 17, is 71 ?
22. The 5th term of an A.P. is 27 and the 8th term is 12. Determine the A.P.
23. Evaluate : $3 + 6 + \dots + 210$.
24. The volume of a cylinder is 448π cu.cm and height is 7 cm. Find its radius.
25. A conical tent of 56 m base diameter requires 3080 sq.m of canvas for the curved surface. Find its vertical height.
26. 8 metallic spheres each of radius 2 cm are melted and cast into a single sphere. Calculate the radius of the new sphere.
27. If $A = \{ 1, 3, 5 \}$, B is the set of integers and $f: A \rightarrow B$ defined by $f(x) = x^2 - 1$, find the range of f .
28. $A = \{ -8, -7, -5, 1, 2, 4 \}$, $B = \{ -7, 1, 3, 4, 5, 6 \}$ and $C = \{ -8, -5, 2, 4, 6, 7 \}$; find $(A - B) \cap (A - C)$.
29. Given $f(x) = 7x - 3$ and $g(x) = x^2 - 2$; show that $f \circ g \neq g \circ f$.
30. Find the difference between C.I. and S.I. on Rs. 8,000 at 5% per annum for 3 years.
31. A person deposits Rs. 40 in a bank every month at 10% S.I. per annum. How much will he get at the end of 3 years ?
32. If the polynomials $ax^3 + 4x^2 + 3x - 4$ and $x^3 - 4x + a$ leave the same remainder when divided by $x - 3$, find the value of a .
33. Find the H.C.F. of $(x - 3)^2$; $x^2 - 9$ and $x^2 - x - 6$.
34. Given $(2A + B)x + (A + B) = 11x + 7$; find the values of A and B .
35. If α and β are the roots of the equation $3x^2 - 5x + 2 = 0$, find the value of $\frac{\alpha^2}{\alpha} + \frac{\beta^2}{\beta}$.

PART - II

- N. B. :
- i) This Part contains *four* Sections, **Section - C**, **Section - D**, **Section - E** and **Section - F**.
 - ii) **Section - C** and **Section - E** contain 3 questions each. Answer any *two* questions in each Section.
 - iii) **Section - D** and **Section - F** contain 4 questions each. Answer any *three* questions in each Section.
 - iv) Each question carries *five* marks.

SECTION - C

- III. Answer any *two* questions : $2 \times 5 = 10$
36. Three numbers are in Arithmetic Progression and their sum is 15. If 1, 3, 9 are added to them respectively, they form a G.P. Find the numbers.
 37. How many terms of the series $1 + 6 + 11 + \dots$ must be taken so that their sum is 970 ?
 38. Find three numbers in G.P. whose sum is 52 and the sum of their product in pairs is 624.

SECTION - D

- IV. Answer any *three* questions : $3 \times 5 = 15$
39. Using Venn diagram, verify $A - (B \cap C) = (A - B) \cup (A - C)$.
 40. Given $f(x) = x^2 + 4$; $g(x) = 3x - 2$; $h(x) = x - 5$; verify $f \circ (g \circ h) = (f \circ g) \circ h$.
 41. Umayal deposited Rs. 8,000 in a bank which pays 8% S.I. per annum for 2 years. Noorjahan deposited Rs. 8,000 in another bank for 2 years which pays 7.5% C.I. per annum. Who will get more and how much ?
 42. How much one should deposit every month in a bank paying 5% S.I. per annum on monthly R.D., if at the end of 6 years one wants to get Rs. 3,318 ?

SECTION - E

V. Answer any *two* questions : 2 × 5 = 10

43. A hollow cylindrical pipe has a total surface area of 1320 sq.cm. If its internal diameter is 8 cm and height is 7 cm, find its external radius.
44. A sector of a circle of radius 12 cm has the angle 120° . If it is rolled up so that two bounding radii are joined together to form a cone, find the volume of the cone.
45. A hollow spherical shell has an inner radius of 8 cm. If the volume of the material is $\frac{1952\pi}{3}$ c.c., find the thickness of the shell.

SECTION - F

VI. Answer any *three* questions : 3 × 5 = 15

46. If $ax^3 + bx^2 + x - 6$ has $x + 2$ as a factor and leaves a remainder 4 when divided by $x - 2$, find the values of a and b .
47. Find the values of a and b , if $49x^4 - 70x^3 + 109x^2 + ax - b$ is to be a perfect square.
48. Split into partial fractions :

$$\frac{4x^2 - x - 9}{(x - 1)^2 (x + 2)}$$

49. If the roots of $(a - b)x^2 + (b - c)x + (c - a) = 0$ are equal, prove that $2a = b + c$.

PART - III

- N. B. : i) This Section contains 2 questions. Answer any *one* question.
 ii) Each question carries *ten* marks.

SECTION - G

VII. Answer any *one* question : 1 × 10 = 10

50. Draw the graph of $y = x^2 - 2x - 8$ and hence solve the equation $x^2 - 2x - 15 = 0$.
51. Solve graphically : $x^2 - x - 12 = 0$.
-