

https://www.mbacorner.com/

Second CAT Mock Test

1. Function $f(x)$ is a continuous function $f(x) = 0$ only for two distinct real variety $f(6) + f(8) = 0$ f(7).f(9) > 0 f(6).f(10) < 0 f(0) > 0 and $f(1) < 0$	nction defined for all real values of x, such that alues of x. It is also known that
Targeting CAT 2021? Download 10 How many of the following statem I. $f(1).f(2).f(3) < 0$ II. $f(3).f(5).f(7).f(9) > 0$ III. $f(7).f(8) < 0$ IV. $f(0) + f(1) + f(9) + f(10) > 0$	0+ page CAT 2021 Preparation Guide ents must be true?
(a) 1	(b) 2
(a) 2	(4) 1

2. When working alone A, B and C can complete a piece of work in 8, 12 and 30 days respectively. At the most only two people can work on each day and nobody works for more than two consecutive days. What is the minimum number of days that they will take to finish the work?

(a) 4 4/29	(b) 6 4/25
(c) 6 6/29	(d) 12 4/25

3. ABCD is a rectangle with BC = a units and DC = $\sqrt{3}$ a units. The perpendicular dropped from point A meets BD at point F. The diagonals AC and BD intersect at point G. What is the area (in square units) of \hat{a} +AFG?

a)
$$\sqrt{3}a^2/12$$
 (b) $\sqrt{3}a^2/6$ (c) $\sqrt{3}a^2/10$ (d) $\sqrt{3}a^2/8$

4. The question given below is followed by two statements, A and B. Mark the answer using the following instructions:

Mark (a) if the question can be answered by using one of the statements alone, but cannot be answered by using the other statement alone.

Mark (b) if the question can be answered by using both the statements together, but cannot be answered by using either statement alone.

Mark (c) if the question can be answered by using either statement alone.

Mark (d) if the question cannot be answered even by using both the statements together.

Q. K is an integer and a, b are positive real numbers. Is a +K/b + K > a/b?

A.a > b

B. a > 7, b > 10

5.
$$f(x) = x^2 + bx + c$$

The equation f(x) = 0 has two distinct roots which are from the set $\{-3, -2, -1, 0, 1, 2, 3\}$. How many different expressions of f(x) are possible such that f(0) is non-negative?

6. From a solution that has milk and water in the ratio 5: 3, 'x' percent is removed and replaced with water. The concentration of milk in the resulting soution lies between 30% and 50%. Which of the following best describes the value of 'x'?

(a)
$$25 < x < 50$$

(b)
$$20 < x < 52$$

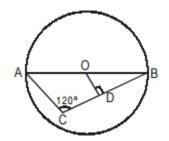
(c)
$$20 < x < 48$$

(d)
$$25 < x < 60$$

7. Four boxes are labeled as A, B, C and D. Each box contains three balls - one red, one blue and one green. In how many ways can a person pick 2 red and 3 blue balls?

(c)
$$8$$

8. In the given figure AB is the diameter of a circle with center 'O'. C is any point in the circle such that ∠ACB = 120°. OD is perpendicular to BC and the length of OD is 1.5 cm



What is the length of AC (in cm)?â€c

(a) $3\sqrt{2}/2$

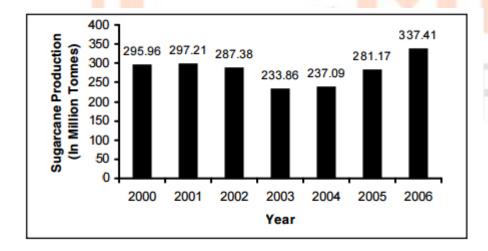
(c) $2\sqrt{3}$

9. Fourteen fruits and twenty two flowers are to be distributed among 10 people in such a way that each person gets something. Anyone who gets more than two flowers cannot get more than one fruit and anyone who gets more than one fruit cannot get more than three flowers. What is the maximum number of flowers that one can get?

10. The cost price of four articles A, B, C and D are 'a', 'b', 'c' and 'd' respectively. A, B, C and D are sold at profits of 10%, 20%, 30% and 40% respectively. If the net profit on the sale of these four articles is 25%, 'a', 'b', 'c' and 'd' cannot be in the ratio

Directions for questions 17 to 19:

Answer the questions on the basis of the information given below: The annual sugarcane production (in million tonnes) in Meethagaon for the period 2000-2006 is shown in the bar graph given below



11. What is the approximate average annual sugarcane production (in million tonnes) in Meethagaon for the period 2000-2005?

- a) 281.4 (b) 326.5
- (c) 272.1 (d) 328.3

12. The sugarcane production in Meethagaon in the year 2007 increases by 15% over the year 2006. What is the approximate compounded annual growth rate of sugarcane production in Meethagaon over the period 2004-2007?

(d)
$$18\%$$

13. Out of the following, which year has shown the highest percentage increase in sugarcane production in Meethagaon compared to the previous year?

(b)
$$2004$$

(c)
$$2005$$

(d)
$$2006$$

14.
$$x^2 - 3y^2 = 1376$$

How many integer solutions exist for the given equation?

(a) One

(b) Two

(c) Four

(d) Zero

15. A and B are two points on a co-ordinate plane. All the points, in the same plane as A and B, whose distance from B is twice that from A lie on

- (a) a straight line intersecting AB at a point O such (b) a circle with center at a point O on AB that 2AO = BO.
 - such that AO = 2BO.
- (c) a circle with center at a point O on AB extended (d) None of these. such that 4AO = BO

16. 677 has exactly 5 digits when converted into base 'n' from the decimal system. What is the minimum possible value of 'n'?

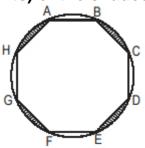
(a) 3

(b) 5

(c) 4

(d) 6

17. In the figure given below, ABCDEFGH is a regular octagon of side 'a' units inscribed in a circle of radius 'r' units. If $a^2 = 2 - \sqrt{2}$, what is the area (in square units) of the shaded region?



(a)
$$\pi - 2 \sqrt{2}$$

(b)
$$(\pi - \sqrt{2}) / 8(2 - \sqrt{2})$$

(c)
$$(\pi - \sqrt{2}) / 2(2 - \sqrt{2})$$

(d)
$$(\pi - 2\sqrt{2}) / 2$$

18. 'M' and 'N' are natural numbers such that by M = (5N - 4) (5N + 1). If $1 \le N \le 200$, what is the harmonic mean of all the possible values of M?

(a) $200^2/1001$

(b) 1001

(c) $1001/200^2$

(d) 1/1001

$$(x-7)^{\left(\frac{x^2-29x+154}{x^2-12x+32}\right)} = 1$$

19.

How many real values of 'x' satisfy the given equation?

(a) 4

(b) 3

(c) 2

(d) None of these

20. India and Brazil play the Soccer World Cup final in which India defeats Brazil 4 – 2. In how many different ways could the goals have been scored given that Brazil never had a lead over India during the match?

(a) 9

(b) 10

(c) 8

(d) None of these

21. A faulty clock gains 10 minutes every hour. If the time is set correctly at 12 Noon on 1st Jan 2010, then how many times will its minute-hand and hour-hand meet in the next 24 hours?

(a) 22

(b) 26

(c) 24

(d) 25

22. $a_1 = 1$, $a_2 = 2$ and $a_{n+2} = a_n(a_{n+1} - 1)$, where n is a natural number. What is the value of a_{1000} ?

(c) 0(d) 1 23. If S = 1/100 + 1/101 + 1/102 + + 1/1000, then (a) $S \le 1/3$ (b) $1/3 < S \le 2/3$ (d) S > 1(c) 2/3 < S < 124. Three boys A, B and C start running at constant speeds from the same point P along the circumference of a circular track. The speeds of A, B and C are in the ratio 5:1:1. A and B run clockwise while C runs in the anticlockwise direction. Each time A meets B or C on the track he gives them a card. What is the difference in the number of cards received by B and C if A distributes 33 cards in all? (b) 7 (a) 3 (c) 5 (d) 11 25. The invention of "Newspeak" refers to which of the following ideas? (a) The lack of coherence between the (b) The inability of the language used by state language and conception of ideas. machinery to depict reality with honesty (c) Deliberate censorship of language by the (d) To highlight the oppression of the masses by state in order to stifle the opposition against its state machinery using language as a medium of authority. thought control. 26. Acco<mark>rding to the author Eric Blair's choice of pen name is odd because</mark> (a) the name does not align well with (b) a person of Blair's politico-social ideology is unlikely to Blair's progressive views on society have a name rooted in English tradition. and politics. (c) a person of Blair's beliefs isn't (d) although Blair was a person of progressive, socialist views, his pen name does not express his indifference assumed to be appreciative of English tradition. towards English tradition and countryside. 27. Which of the following can be inferred from the passage? (a) Orwell was a better journalist than novelist. (b) Orwell is the best exponent of the English essay (c) Orwell considers imperialism and communism (d) None of these equally unacceptable.

(a) 2

(b) -1

28. The word given below has been used in sentences in four different ways. Choose the option corresponding to the sentence in which the usage of the word is incorrect or inappropriate.

Make

(a) May I make so bold as to suggest that you curtsy when the queen enters?	(b) Gillian decided to make over her estate to the orphanage where she grew up.
(c) Alice could not make up the meaning of the paradox	(d) Some time ago the two brothers fought, but their father forced them to make up.

29. The word given below has been used in sentences in four different ways. Choose the option corresponding to the sentence in which the usage of the word is incorrect or inappropriate.

Keep

(a) She makes it a point to keep in with all the right people.	(b) She decided to keep back her identity form her colleagues.
(c) The police decided not to keep tabs on him any more.	(d) His mentor advised him to always keep up to the rules.

- 30. The question given below is followed by two statements, A and B. Mark the answer using the following instructions:
- Mark (a) if the question can be answered by using one of the statements alone, but cannot be answered by using the other statement alone.
- Mark (b) if the question can be answered by using either statement alone.
- Mark (c) if the question cannot be answered even by using both the statements together.
- Mark (d) if the question can be answered by using both the statements together, but cannot be answered by using either statement alone.
- Q. What is the age of Mohan (in completed years) on 31st December, 2000?
- A. Mohan was born after 1950 and the last two digits of the birth year of Mohan form a prime number.
- B. Mohan's son is 24 years younger than Mohan and the last two digits of his birth year form a prime number.

Directions for questions 41 to 43: Answer the questions on the basis of the information given below: Twelve people Aashu, Abhishek, Feroz, Himanshu, Jatin, Manoj, Mohit, Sajid, Saral, Shivku, Tarun and Vijay are sitting at a

rectangular table. The table has 12 chairs numbered from 1 to 12 (see figure) and each chair is occupied by one of the 12 people (not necessarily in the same order). Some additional information is given below:

- (1) Manoj, sitting at chair number 1, is diagonally opposite Feroz who is sitting opposite Himanshu.
- (2) Jatin is sitting opposite Saral who is the only person sitting between Abhishek and Vijay.
- (3) Aashu is sitting opposite Tarun who is the only person sitting between Feroz and Shivku.

31.	If Shivku is	not sitting	opposite	Vijay,	then wh	o is	sitting	next to	Mano	j?

(a) Abhishek	(b) Jatin
(c) Vijay	(d) Either Jatin or Vijay

32. How many different seating arrangements are possible if Manoj is not sitting next to Vijay?

(a) Two	(b) Three
(c) Four	(d) Six

33. If Sajid is sitting at one of the corner seats, then who is sitting opposite him?

(a) Manoj	(b) Jatin
(c) Himanshu	(d) Aashu

- 34. Five sentences are given below, labeled A, B, C, D and E. They need to be arranged in a logical order to form a coherent paragraph/passage. From the given options, choose the most appropriate option.
- A. The recent communal violence in Hyderabad and in Bareilly a month ago has remained on the sidelines of national attention.
- B. In both cities, the present round of violence was preceded by mobilisations and speeches, primarily by Hindu fundamentalist groups.
- C. Fortunately, there was no death in the violence in Bareilly, while in Hyderabad only three people were killed.
- D. Yet, the scale, planning and causes behind the riots indicate a certain change in the morphology of the typical riot, a change which needs to be identified and understood if we want to keep religious sectarianism and violence in check.
- E. Communal violence has become so endemic to the polity of India that it has ceased to attract much attention outside its immediate area of impact, or unless it crosses very high levels of fatality and barbarity

(a) EACDB (b) ABEDC
(c) EABCD (d) ABCDE

- 35. Five sentences are given below, labeled A, B, C, D and E. They need to be arranged in a logical order to form a coherent paragraph/passage. From the given options, choose the most appropriate option.
- A. That too was historic.
- B. The word that immediately rolled off of every tongue after the presidential election was "historic"; and rightly so.
- C. It would have been unimaginable forty years ago.
- D. The fact that the country has become civilized enough to accept this outcome is a considerable tribute to the activism of the 1960s and its aftermath.
- E. The two candidates in the Democratic primary were a woman and an African-American.

(a) BCDAE (b) BCDEA (c) BEDAC (d) BEACD

- 36. Five sentences are given below, labeled A, B, C, D and E. They need to be arranged in a logical order to form a coherent paragraph/passage. From the given options, choose the most appropriate option.
- A. The revolution began as an attack on despotism.
- B. Already by 1762 Rousseau was implying in his "Social Contract" that there was no meaningful difference between the authority of a despot and that of a monarch
- C. As usual, regular usage soon diluted the original rigor of the expression's meaning.
- D. Montesquieu has defined its spirit as "The rule of one, according to no law".
- E. Obeying no law, authority was arbitrary and its animating spirit was fear.

(a) ABDCE (b) AEDCB

(c) ADECB (d) ADEBC

- 37. Five sentences are given below, labeled A, B, C, D and E. They need to be arranged in a logical order to form a coherent paragraph/passage. From the given options, choose the most appropriate option.
- A. Some think the limits of body i.e. surface; line, point, and unit are substances more so than body or the solid.
- B. Substance is thought to belong most obviously to bodies.

- C. But whether these alone are substances, or there are also others, or only some of these, or others as well, or none of these but only some other things, are substances, must be considered.
- D. Even things that are either parts of these or composed of these, eg. the physical universe and its parts, stars, moon and sun are considered substances.
- E. So we say that not only animals and plants and their parts are substances, but also natural bodies such as fire and water and earth and everything of the sort.

(a) BADCE (b) ABEDC (d) BEADC

- 38. Five sentences are given below, labeled A, B, C, D and E. They need to be arranged in a logical order to form a coherent paragraph/passage. From the given options, choose the most appropriate option.
- A. As it expanded, it would have borrowed energy from the gravitational field, to create matter.
- B. The universe expanded and borrowed at an ever-increasing rate.
- C. Fortunately, the debt of gravitational energy will not have to be repaid until the end of the universe.
- D. According to the no boundary proposal, the universe would have expanded in a smooth way from a single point. E. As any economist could have predicted, the result of all that borrowing, was inflation

(a) DAEBC (b) DABCE (c) CDAEB (d) CDABE

Directions for questions 49 and 50: Answer the questions on the basis of the information given below. Sharma Jee wants to buy a book and is confused between four novels of different genres - mystery, horror, comedy and thriller. The novels are written by Lalu, Monu, Nonu and Ovattio and published by Purshottam, Quattchori, Rajveer and Sarkar, not necessarily in the same order. The horror novel is published by Quattchori and the thriller novel is written by Nonu. Each novel is written by a different author and published by a different publisher. It is also known that Lalu and Monu get their books published by Purshottam or Quattchori only

39. If the mystery novel is written by Ovattio then who can be the publisher of the comedy novel?

(a) Purshottam or Quattchori(b) Only Purshottam(c) Purshottam or Rajveer(d) Purshottam or Rajveer or Sarkar

40. How many combinations of publisher and author are possible for the mystery novel?

(a) 6 (b) 3 (c) 4 (d) 5

Directions for questions 41 to 43: The passage given below is followed by a set of three questions. Choose the most appropriate answer to each question.

Bruce Robbins's excellent article points up the paradox of cosmopolitanism - that it seems 'perpetually torn between an empirical dimension and a normative dimension'. For Robbins, the paradox of cosmopolitanism is rooted in the limited empirical sense of political community. For genuine democracy people need to belong to the same 'community of fate', and there is at present little evidence of such a sense of cosmopolitan consciousness. Although leading (Western) governments make claims in support of cosmopolitan human rights established by virtue of membership of a common humanity, their practice is often limited by the 'communitarian' reality. The lack of 'shared fate' leads to inequalities in practice as governments are often reluctant to sacrifice either treasury resources or military lives in the cause of others, and citizens appear unwilling to shoulder the tax burdens involved in any potential cosmopolitan redistribution of wealth and opportunities.

Robbins suggests that it would be wrong to use the empirical limits to cosmopolitan practices as an argument against normative cosmopolitan claims. He asserts that there is 'no possibility of simply choosing the actual over the normative' and instead suggests that we should accept that the 'contradiction' exists. A solution to the problem lies in political change which seeks 'to bring abstraction and actuality together'. A 'Left cosmopolitanism' is one that denies 'the past authority over the present' - the empirical reality that 'there is as yet little evidence of transnational solidarity' should be the justification for engagement and struggle on the side of the progressive cosmopolitan cause. This campaigning perspective is advocated by several cosmopolitan theorists who, in different ways, seek to develop ideas and mechanisms whereby global civil society can encourage and further cosmopolitan practices against the communitarian inclinations of national governments and their electorates.

This article suggests that the 'cosmopolitan paradox' - the gap between universal aspiration and hierarchical practice - is not merely one of cosmopolitan

'consciousness' lagging behind an immanent cosmopolitan 'reality'. Rather, the paradox is rooted in the essence of the cosmopolitan thesis itself. The limitations of abstract normative cosmopolitan conceptions of 'rights' and 'responsibilities', in a world structured by economic and social inequalities, raise major questions over the progressive claims made by cosmopolitan theorists. In fact, rather than challenging existing international structures of power, there is a real danger that the cosmopolitan impulse will legitimize a much more hierarchical set of international relationships.

Whether the cosmopolitan aspiration takes the form of Robbins's call for a transnational welfare safety net or claims for the protection and promotion of a more extensive range of human rights, all cosmopolitan perspectives reflect the increasing prominence of individual rights claims in the international sphere. Leading cosmopolitan theorists seek to challenge the restrictions of the UN Charter framework, imposed by the major powers in the aftermath of the Second World War, which formally prioritized the 'state-based' principles of sovereignty and non-intervention. They argue that these principles need to be replaced by a new set of cosmopolitan principles, which make the universal individual rights of members of 'global society' the primary focus.

41. Which of the following is a part of 'the empirical dimension' in the passage?

(a) Shared fate

(b) Universal Aspiration

(c) Inequalities in practices

(d) The cosmopolitan paradox

42. Which of the following can be inferred from the passage?

- (a) Cosmopolitan theorists seek to legitimize a much more hierarchical set of international relationships
- (b) Cosmopolitan theorists feel that the principles of sovereignty and non-intervention need to be implemented at a global level.
- (c) The theories and conceptions of cosmopolitanism are responsible for the cosmopolitan paradox.
- (d) Cosmopolitan consciousness does not really lag behind an immanent cosmopolitan reality.

43. The author is primarily concerned with

- (a) exploring the Cosmopolitan paradox and solutions and reasons for the same
- (b) exploring the tussle between the advocates of nationalism and cosmopolitanism.
- (c) arguing that the Cosmopolitan paradox will continue to exist.
- (d) enthusing that 'empirical reality' is not an excuse to do away with Cosmopolitan aspirations.

44. A paragraph is given below from which the last sentence has been deleted. From the given options, choose the one that completes the paragraph in the most appropriate way.

Individuals owed their existence to their parents; without their countless sacrifices, they would never survive nor grow into sane human beings. They realised their potential in a stable and peaceful society, made possible by the efforts of thousands of anonymous men and women. They became rational, reflective and moral beings within a rich civilisation created by scores of sages, saints, savants and scientists.

- (a) Even a whole lifetime was not enough to pay back what they owed their parents, let alone all the others
- (b) In short, every human being owed his humanity to others and benefitted from a world, to the creation of which he had not contributed anything.
- (c) To talk about 'repaying' the debts did not therefore make sense except in a clumsy and metaphorical way of describing one's response to unsolicited but indispensable gifts
- (d) Every individual is born with a debt, which is beyond his capacity to repay
- 45. A paragraph is given below from which the last sentence has been deleted. From the given options, choose the one that completes the paragraph in the most appropriate way.

A century and a half ago, Charles Darwin detailed his theory of evolution by natural selection in his book 'On the Origin of Species'. How does this remarkably successful theory apply to life on our planet? How have the scientists of subsequent generations built on Darwin's ideas?

- (a) Darwin's general theory presumes the development of life from non-life and stresses a purely naturalistic (undirected) "descent with modification"
 - (b) And can Darwin's theory of Evolution be aligned with the evolutionary worldview, which is as old as antiquity?
- (c) Natural selection is the preservation of a functional advantage that enables a species to compete better in the wild
- (d) And does revisiting the original theory shed new light on the remaining puzzles?
- 46. There are two gaps in the sentence/paragraph given below. From the pairs of words given, choose the one that fills the gaps most appropriately.

The increasing interest in animal emotions seems like an important first step in changing _____ about our relationship with other species. But this does not necessarily mean that we should resign our critical faculties or fail to _____ flaws in how the evidence is presented

(a) consciousness, interrogate

(b) awareness, discover

(c) trends, examine

(d) knowledge, catechize

47. There are two gaps in the sentence/paragraph given below. From the pairs of words given, choose the one that fills the gaps most appropriately.

And so, in order to ensure that, on the one hand, Greece was not in any way tempted into the Soviet camp, and on the other, that following the 1974 war in Cyprus, it did not descend into conflict with Turkey, it was deemed ______ to bring it as rapidly as possible into the western ______.

(a) practical, dominion(b) expedient, fold(c) convenient, arrangement(d) appropriate, flock

Directions for questions 58 to 60: The passage given below is followed by a set of three questions. Choose the most appropriate answer to each question.

The development underlines the great danger we face from the extension of antiterrorist measures and methods into normal life – the policing of our streets, for example, and the hounding of football fans and climate change protestors.

Just as disturbing is the line of questioning by the police of those who made freedom of information requests before the alleged hacking of computers last year. In a letter to the Financial Times, Sebastian Nokes, a climate change sceptic and businessman, said he was interviewed by an officer who "wanted to know what computer I used, my internet service provider, and also to which political parties I have belonged, what I feel about climate change and what my qualifications in climate science are. He questioned me at length about my political and scientific opinions".

The police have a duty to investigate the alleged crime, but this kind of questioning smacks of something far more sinister because a person's political and scientific views are being weighed to assess his likely criminality in the eyes of the police officer.

Now you might ask how else the police are going to establish who is a suspect. After all, you would certainly ask people about their views if you investigating a string of racist attacks. But this is not a violent crime or a terrorist matter: moreover, Nokes had simply sent "an FOI request to the university's climate unit asking whether scientists had received training in the disclosure rules and asking for copies of any emails in which they suggested ducking their obligations to disclose data".

On that basis the police felt entitled to examine Nokes on his views. These days it's surprising that they haven't found a way to seize his computer and mobile phone, which is what routinely happens to those involved in climate change protests. Limits need to be set in the policing and investigation of people's legitimate beliefs. Any future government must take a grip on the tendency of the police to watch, search, categorise and retain the personal details of those who express the political, religious or scientific beliefs. We should never forget that under this government the police have used forward intelligence teams to photograph people emerging from a climate change meeting in a cafe in Brighton; have used the ANPR system to track the movement of

vehicles belonging to people travelling to demonstrations; have prevented press photographers from carrying out their lawful right to cover news events; and have combed the computers and searched the premises of an MP legitimately engaged in the business of opposition and holding the government to account.

What this adds up to is a failure of understanding in the police force that one of its primary duties is to protect the various and sometimes inconvenient manifestations of a democracy, not to suppress them. That is why they have to be ultra-careful deploying specialist terrorist intelligence units and treating people's opinions as evidence.

48. Which one of these best expresses the author's attitude towards Sebastian Nokes?

- symptom of a bigger malaise.
- (a) The author considers Nokes' situation as a (b) The author supports Nokes and protests against the treatment meted out to him.
- Nokes.
- (c) The author questions the legality of the (d) The author worries about the moral implications actions carried out by the police against of the involvement of the police in such cases.

49. What is the central theme explored by the author in the passage?

- (a) The role of police in a (b) The extension of the special powers of the police to questionable territory. democracy.
- (c) The abuse of power by the police.
- (d) The use of the police to stem opposition to the government's ideas.

50. The author is least likely to support which of the following?

- (a) Tracking the movements of a person accused (b) Seizing the computer or mobile of an alleged of corporate fraud.
 - terrorist.
- (c) Analysing the political beliefs of a person involved in a racist attack.
- (d) Banning media coverage of an event because it is likely to get violent.

Answers

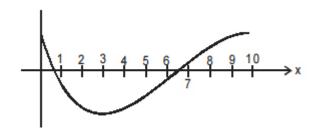
1. B

- f(0) > 0 and f(1) < 0 implies that one root for f(x) = 0 lies between x = 0 and x = 1.
- f(6) + f(8) = 0 implies that f(6) and f(8) are of opposite sign but same absolute value. Hence another root for f(x) = 0 must lie between x = 6 and x = 8. As f(1) < 0, f(6) must also be less than zero, otherwise we'll have more than 2 roots for f(x) = 0. Hence f(8)> 0 and f(6) < 0.

Further f(7).f(9) > 0 implies that both f(7) and f(9) are greater than zero.

So the second root for f(x) = 0 must lie between x = 6 and x = 7.

So f(x) would look like:



As f(1), f(2) and f(3) are less than zero, f(1).f(2).f(3) < 0 is true.

As f(3), f(5) < 0 and f(7), f(9) > 0, f(3).f(5).f(7).f(9) > 0 is true.

As f(7), f(8) > 0, f(7).f(8) < 0 is false.

f(0), f(9), f(10) > 0 and f(1) < 0, but since we don't know the magnitude of any of these four we cannot judge if f(0) + f(1) + f(9) + f(10) is greater than zero or not.

2. b

The maximum total work done for three consecutive days will be when A, B and C work in distinct pairs (for example 'A and B', 'B and C' and 'C and A'). Hence on these three days fraction of total work done will be:

$$2(1/8 + 1/12 + 1/30) = 58/120$$

Maximum possible work done in the first 6 days

$$2(1/8 + 1/12 + 1/30) = 2(58/120) = 116/120$$

The remaining 4/120 fraction of work can be done in least amount of time if A and B work together on the 7th day.

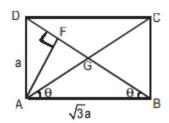
A and B together can do 1/8 + 1/12 = 5/24 fraction of work in a day

So, they will complete the 4/120 fraction of work in

$$4/120 \div 5/24 = 4/25$$
 day

Answer (in days) =
$$6 + 4/25 = 64/25$$

3. d



By Pythagoras theorem :

$$AC = \sqrt{AB^2 + BC^2} = 2a$$

Since diagonals of a rectangle are equal and bisect each other:

$$AG = DG = AC/2 = a$$

Hence, \hat{a} †DGA is equilateral and since AF is perpendicular to the base DG we can say that AF must divide \hat{a} †DGA into two equal halves.

Area of equilateral \hat{a} +DGA = $\sqrt{3}/4$ \hat{a} square units Area of \hat{a} +AFG = $1/2(\sqrt{3}/4$ \hat{a} 2) = $\sqrt{3}/8$ \hat{a} 2 square units

4. d

From Statement A:

This statement is clearly insufficient. The answer can given only when exact values of a, b and K are known.

For example let (a, b) = (4, 2) or a/b = 2

Case 1: K = 0

$$(a+k)/(b+k) = a/b$$

Case 2: K = 2

$$(a+k)/(b+k) = 6/4 = 3/2 < a/b$$

Case 3: K = -1

$$(a+k)/(b+k) = 3/1 = 3 > a/b$$

From Statement B:

As explained above for Statement A, this statement is also insufficient to answer without knowing the exact values of a, b and K.

Combining Statement A and Statement B:

Even the two statments combined cannot give a unique answer.

5. c

If f(0) is non-negative, roots of f(x) = 0 cannot be of opposite signs.

So the possibilities for the two roots are (0, 3), (0, 2), (0, 1), (1, 2), (1, 3), (2, 3), (0, -3), (0, -2), (0, -1), (-1, -2), (-1, -3) and (-2, -3).

Hence the required answer is 12.

6. b

Let the quantity of total solution be 800 units. So, quantity of milk is 500 units and water is 300 units. Now x percent of 800 = 8x units mixture is removed. The quantity (in units) of milk and water removed is 5x and 3x respectively.

Final concentration of milk (in percentage) is:

(500-5x)/800 x100

So,
$$30 < 500 - 5x/8 < 50$$

$$\Rightarrow$$
 240 < 500 - 5x < 400

$$\Rightarrow$$
20< x < 52.

7. b

Required number of ways ${}^4C_2 \times {}^4C_6 = 6 \times 4 = 24$.

For questions 11 to 13:

Let us analyse the scores of Match-1 first:

Runs scored by Bimal, Dinu and Elan = 88 + 72 + 60 = 220 Hence, runs scored by Arpit and Chatur = 270 - 220 = 50 Also 10% of 270 = 27

So, both Arpit and Chatur can score a maximum of 27 runs but the sum of their scores should be 50

Arpit's score's range in Match-1 is 23–27 and subsequently Chatur's score's range in Match-1 is 27–23.

Similarly Chatur and Dinu scored 30 runs each in Match-2.

In Match-3 even though 10% of 240 = 24, as Dinu scored 20 runs, both Arpit and Bimal can score a maximum of 19 runs, but the sum of their scores should be 32.

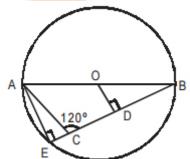
In Match-4, Chatur and Elan combined scored 200 - 53 - 52 - 56 = 39 runs. As 10% of 200 = 20, one of Chatur or Elan scores 20 runs and the other scores 19 runs.

The table can be re-written as:

		Match-1 Match-2		Match-3	Match-4	
	Arpit	27–23	100	19–13	53	
Runs scored by player	Bimal	88	65	13–19	52	
	Chatur	23–27	30	110	19–20	
	Dinu	72	75	20	56	
	Elan	60	30	78	20-19	
Total		270	300	240	200	

8. c

Construction: Extend BC to cut the circle at E and join AE.



â^†AEB is right angled at E. (Angle in a semicircle is a right angle).

Hence, both AE and OD are perpendicular to EB. By AA property:

â^†AEB- â^†ODB

Hence, OB/AB = OD/AE OR OD/AE = 1/2

 \Rightarrow AE = 2OD = 3cm.

In right a^+AEC:

 $\angle ACE = 180^{\circ} - \angle ACB = 180^{\circ} - 120^{\circ} = 60^{\circ}$

and AC = AE/sin60°

 $=3 (2 / \sqrt{3}) = 2 \sqrt{3}$ cm.

9. d

All the flowers can be given to one person and then the fruits distributed among all others in such a way that all of them get at least one fruit.

10. d

As per the information given in the question, we can conclude that

$$0.1a + 0.2b + 0.3c + 0.4d /a + b + c + d = 0.25$$

$$\Rightarrow$$
 0.05c + 0.15d = 0.05b + 0.15a

$$\Rightarrow$$
 c + 3d = b + 3a

The ratio 5 : 2 : 7 : 3 does not satisfy the given relation.

11. c

Average =
$$(295.96 + 297.21 + 287.38 + 233.86 + 237.09 + 281.17)/6$$

$$= 272.11$$

12. d

Sugarcane production in 2007

$$= 337.41 \times 115/100 = 388.02 \text{ million tonnes}$$

Let the required value be x%

$$\therefore \frac{\text{Production in 2007}}{\text{Production in 2004}} = \left(\frac{100 + x}{100}\right)^3$$

$$\Rightarrow \left(\frac{100 + x}{100}\right)^3 = \frac{388.02}{237.09} = 1.64$$

$$\Rightarrow x = 17.85$$

13. d

For 2001, % change

For 2004, % change

For 2005, % change

For 2006, % change

14. d

$$3y^2 = x^2 - 1376$$

As we can see L.H.S. is definitely a multiple of 3 and in R.H.S. 1376 leaves a remainder of 2 when divided by 3.

There are three possibilities for x in R.H.S:

- (i) If x is multiple of 3, so is x^2 , and R.H.S. will leave a remainder of 1 when divided by 3.
- (ii) If x is of the form 3m + 1, x^2 will be of the form 3n + 1 and R.H.S will leave a remainder of 2. m, n N
- (iii) If x is of the form 3m + 2, x^2 will be of the form 3n + 1 and R.H.S. will leave a remainder of 2. m, n N

So R.H.S. can never be a multiple of 3, while L.H.S. is always a multiple of 3. Hence no real solution exists.

15. b

Let the co-ordinates of A and B be (0,0) and (a,0) respectively.

Let the co-ordinates of point C be (h, k).

Given:

$$2AC = BC$$

$$\Rightarrow 2\sqrt{h^2 + k^2} = \sqrt{(h - a)^2 + k^2}$$

$$\Rightarrow 4(h^2 + k^2) = (h - a)^2 + k^2$$

$$\Rightarrow 4h^2 + 4k^2 = h^2 + k^2 + a^2 - 2ah$$

$$\Rightarrow h^2 + k^2 + \frac{2a}{3}h - \frac{a^2}{3} = 0$$

$$\Rightarrow \left(h + \frac{a}{3}\right)^2 + k^2 = \left(\frac{2a}{3}\right)^2$$

The equation written above is that of a circle with center (say O) at (-a/3, 0) and radius 2a/3.

The center O (-a/3, 0) divides AB externally such that 4AO = BO.

16. c

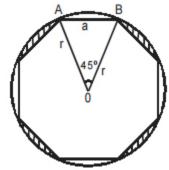
We need to check for a base where 677 must have 5 digits if converted.

We also know that in Base 3, the decimal value of a 5-digit number must lie between 80 and 243 (as '81 signifies 10000' and '242 signifies 22222' – the minimum and maximum possible 5-digit number in base 3). So, the base cannot be 3.

Next we check for Base 4. The decimal value of a 5-digit number must lie between 255 and 1024. As $256 \le 677 \le 1023$, this must be the minimum possible value of n.

RNFR

17. d



Applying cosine rule,

$$\cos 45^\circ = \frac{r^2}{r^2} + \frac{r^2}{r^2} + \frac{a^2}{2r^2}$$

$$=> 1/\sqrt{2} = 2r^2 - a^2/2r^2$$

$$=>r^2=a^2/2-\sqrt{2}=1$$

Area of shaded region

= 1/2[Area of circle - Area of octagon]

=
$$1/2 [\pi r^2 - 8(1/2 \times r^2 \times \sin 45^\circ)]$$

=
$$1/2$$
 (π - 4 x $1\sqrt{2}$)

$$= \pi - 2\sqrt{2/2}$$

18. b

When
$$N = 1$$
 $M = 1 \times 6$

$$N = 2$$
 $M = 6 \times 11$

$$N = 200$$
 $M = 996 \times 1001$

Harmonic mean =
$$\frac{200}{\frac{1}{1 \times 6} + \frac{1}{6 \times 11} + \cdots + \frac{1}{996 \times 1001}}$$

$$= \frac{200}{\frac{1}{5} \left[1 - \frac{1}{6} \right] + \frac{1}{5} \left[\frac{1}{6} - \frac{1}{11} \right] + \dots + \frac{1}{5} \left[\frac{1}{996} - \frac{1}{1001} \right]}$$

$$=\frac{200}{\frac{1}{5}\left[1-\frac{1}{1001}\right]}=\frac{200}{\frac{1}{5}\times\frac{1000}{1001}}=1001$$

19. c

$$(x-7)^{\left(\frac{x^2-29x+154}{x^2-12x+32}\right)} = 1$$

$$\Rightarrow (x-7)\frac{(x-7)(x-22)}{(x-8)(x-4)} = 1$$

Let P(x) =
$$(x - 7)$$
 and Q(x) = $\frac{(x - 7)(x - 22)}{(x - 8)(x - 4)}$

Case-1

P(x) = 1 and Q(x) may be anything.

$$\therefore (x-7)=1$$

or
$$x = 8$$

But, for x = 8, Q(x) is not defined.

Case-2

P(x) = -1 and Q(x) is an even exponent.

$$(x-7) = -1$$
 or $x = 6$

For x = 6, Q(x) = -4, which satisfies the given equation.

Case-3

$$Q(x) = 0$$
 and $P(x) \neq 0$

$$\therefore$$
 (x-7) (x-22)/(x-8)(x-4) = 0

$$\Rightarrow$$
 x = 7 or x = 22

But, for x = 7, P(x) = 0, for which the given equation is not defined.

So the given equation is satisfied for two values of 'x' (6 and 22).

20. a

If Brazil never gets a lead over India, the first goal of the match should be scored by India. At this stage India leads by 1 - 0, and the only way in which Brazil can take a lead is by scoring the next two goals i.e. a scoring pattern like IBBIII. In all other cases Brazil would never be able to lead India.

Total cases where India scores the first goal = 5!/3!2! = 10

Different scoring patterns possible = 10 - 1 = 9

21.d

The minute-hand of a normal clock covers $360/60 = 6^{\circ}$ per minute. The hour-hand of a normal clock covers $30/60 = 1/2^{\circ}$ per minute. So once they are together, in every minute the minute hand gains $6-1/2 = 11^{\circ}/2$ over the hour hand.

So, time between two meetings = 360/11/2 = 720/11 minutes.

So, in any clock the hour-hand and the minute-hand meet after every 720/11 minutes.

If 60 minutes have passed in a normal clock then time passed in the faulty clock is 70 minutes.

If 24 hrs (or 24×60 minutes) have passed in a normal clock then time passed in the faulty clock must be $24 \times 70 = 1680$ minutes.

Number of times the hands meet -1680/720/11 = 25.67 = 25

22. c

$$a_1 = 1$$

$$a_2 = 2$$

$$a_3 = 1 (1) = 1$$

$$a_4 = 2(0) = 0$$

$$a_5 = 1 (-1) = -1$$

$$a_6 = 0 (-2) = 0$$

$$a_7 = -1 (-1) = 1$$

$$a_8 = 0 (0) = 0$$

$$a_9 = 1 (-1) = -1$$

After a₁ and a₂, there is a cyclicity of '4' in the remaining terms

$$a_{1000} = a_{2+4 \times 249+2} = 0.$$

23. d

$$S = \frac{1}{100} + \frac{1}{101} + \frac{1}{102} + \dots + \frac{1}{998} + \frac{1}{999} + \frac{1}{1000}$$

$$= \left(\frac{1}{100} + \frac{1}{1000}\right) + \left(\frac{1}{101} + \frac{1}{999}\right) + \dots + \frac{1}{550}$$

$$= \frac{1000 + 100}{100 \times 1000} + \frac{999 + 101}{101 \times 999} + \dots + \frac{1}{550}$$

$$= \frac{1100}{100 \times 1000} + \frac{1100}{101 \times 999} + \dots + \frac{1}{550}$$

In the first 450 terms, the sum of the two numbers in the denominator is constant. Thus, their product will be maximum when they are equal

$$\therefore S > \underbrace{\frac{1100}{550 \times 550} + \frac{1100}{550 \times 550} + \dots}_{\text{'450'terms}} + \underbrace{\frac{1}{550}}_{\text{}}$$

or
$$S > 450 \left(\frac{1100}{550 \times 550} \right) + \frac{1}{550} > 1$$

24. b

Let the speed of A, B and C be 5v, v and v respectively.

Let the circumference of the track be 12vt.

Instance when A meets:

$$B - 3t$$
, $6t$, $9t$, $12t$, $15t$, $18t$

$$C - 2t$$
, 4t, 6t, 8t, 10t, 12t

In every 6t units of time A meets B twice while A meets C thrice. So in 36t A would give:

$$B-2 \times 6 = 12$$
 cards

$$C - 3 \times 6 = 18$$
 cards. (total 30)

Now, at 38t A gives C a card (his 31st) at 39t A gives B a card (his 32nd) and at 40t A gives C a card (his last)

So the required difference = (18 + 2) - (12 + 1) = 7.

25. c

Option (a) discusses the lack of coherence between language and how ideas get generated, which is beyond the scope of the passage. Option (b) is incorrect as it refers to language of the "state machinery" whereas "Newspeak" refers to language imposed by the state machinery. Option (c) is the correct answer as it captures the idea of deliberate editing and modification of language, imposed by the state to suppress opposition against the state. Option (d) is incorrect as it talks about the "oppression of the masses" by the state, which is not explicitly mentioned in the passage.

26. b

The line in the passage "perhaps surprisingly for a writer with progressive, socialist views, he chose a pen name that stressed his deep and life-long affection for the English tradition and countryside" implies that Eric Blair's politico-social ideology makes it unlikely for him to pick a name that is derived from English tradition. This improbability of picking such a name makes the choice surprising. Hence, option (b) is the right answer. Option (a) talks about Blair's progressive views on society and politics which are not the same as "progressive, socialist views" as mentioned in the line above. Option (c) is incorrect as the reasons for the choice becoming surprising are Blair's "progressive, socialist views" and not his entire body of beliefs. Option (d) is incorrect as it states that Blair was indifferent towards English tradition and countryside, which is false.

27. d

Option (a) can't be the answer because the passage nowhere compares Blair's strengths as a journalist and a novelist. Orwell is called the "foremost architect of the English essay since Hazlitt" and not the best ever. Hence option (b) is also incorrect. Option (c) comes close, however in the passage we don't get any comparative assessment of Blair's views on Imperialism and Communism. Thus, none of these options can be inferred and the answer is option (d).

28. c

Option (c) is incorrect as the correct sentence be "Alice could not make out the meaning of the paradox". This sentence conveys the right meaning as 'make out' means 'to understand or decipher'.

29. d

Option (d) is incorrect as the correct sentence should be "always keep to the rules". This sentence conveys the right meaning as 'keep to' means 'conform to' or 'adhere to'.

30. c

To find Mohan's age on 31st December, 2000 we need to find his year of birth.

From Statement A:

There are multiple possibilities for the year of birth of Mohan - 1953, 1959, 1971 etc.

Hence, Statement I alone is insufficient to answer

From Statement B:

There are multiple possibilities for the year of birth of Mohan's son - 1953, 1971, 1997 etc.

Hence, Statement II alone is insufficient to answer.

Combining Statement A and Statement B:

Possible years of birth for Mohan and his son are '1959 and 1983' or '1973 and 1997'. It is still not possible to get a unique solution.

Hence the question cannot be answered even by using both the statements together.

For questions 41 to 43:

Statement 1 indicates that Feroz and Himanshu are at seat number 7 and 6 respectively.

Tarun is the only person between Feroz and Shivku while Aashu is opposite Tarun (Statement 3). Hence, Aashu, Tarun and Shivku must be at seat number 5, 8 and 9 respectively. From Statement 2 we get the following figures that depict the possible seating arrangements for the 12 people:



Figure 1 (Total 2 x 2 = 4 possible seating arrangements)

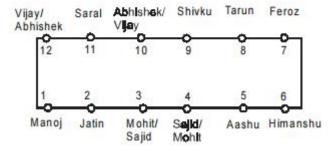


Figure 2 (Total 2 × 2 = 4 possible seating arrangements)

31. d

If Shivku is not sitting opposite Vijay then either Vijay (from figure 1) or Jatin (from figure 2) is sitting next to Manoj.

32. d

If Manoj is not sitting next to Vijay then there are six possible arrangements (2 from figure 1 and 4 from figure 2).

33. a

Manoj, Feroz and Himanshu occupy three of the four corner seats and it is known that Feroz is sitting opposite Himanshu. Hence, Sajid can only sit opposite Manoj. This can also be seen from figure 1.

34. a

The essential clue to solving this lies in the pair of D-B. Statement D starts with 'yet'. It brings out the contrast that although the casualties in these riots were few 'planning and causes behind the riots indicate a certain change' B then goes into the causes and planning 'the present round of violence was preceded by mobilisations and speeches'. No other option has this combination

35. d

Statement B is the starting sentence and it talks about the presidential election being 'historic'. Sentence A also talks about something else being historic. Clearly here the

precedent for the statement A has to be E (the fact that out of the two democratic candidates one was a woman and one an African American). CD has to come after this as it describes the possible causes of this outcome.

36. c

The paragraph begins with statement A. Statements D and E discuss the definition and hence have to come together. Similarly, B describes the idea which begins in C. The 'dilution' in C is followed by B which gives an example of this dilution. 'Already by 1762...... there was no meaningful difference between the authority of a despot and that of a monarch'

37. d

The paragraph has B-E as the mandatory pair. B introduces the term "bodies" E discusses in detail all things that can be classified as bodies. C must come before A as it changes the track of the paragraph in the direction of A, which discusses the idea of "limits of body". Only option (d) has both B-E as a mandatory pair and C-A in proper alignment.

38. a

The crucial link here is A-E. The 'all that borrowing' in E is a reference to A. Statement C brings in a new pointthe fact that the debt of gravitational energy will not have to be repaid. This has to come after the 'debt' has been established. If we combine these two, the only possible choice is option (a).

39. bIf the mystery novel is written by Ovattio then the arrangement looks like:

Genre	Mystery	Horror	Comedy	Thriller
Publisher	Rajveer/ Sarkar	Quattchor	Purshottam	Sarkar/ Rajveer
Author	Ovattio	Lalu/Monu	Monu/Lalu	Nonu

40. c

The author of the mystery novel can be Lalu or Monu or Ovattio.

If the author is either Lalu or Monu then the publisher can be Purshottam only.

If the author is Ovattio then the publisher can be either Rajveer or Sarkar

41.c

Refer to the initial lines of the passage "Bruce Robbins's excellent article points up the paradox of cosmopolitanism - that it seems 'perpetually torn between an empirical dimension and a normative dimension'. For Robbins, the paradox of cosmopolitanism is rooted in the limited empirical sense of political community". Empirical dimension in the passage is synonymous with the empirical realities which contradict the normative dimension / cosmopolitan aspirations. Options (a) and (b) are parts of the 'normative dimension'. Option (d) is a paradox arising due to both dimensions. Option (c) is the correct answer as 'the lack of shared fate leads to inequalities in practice', which is an empirical reality.

42. c

Option (a) is incorrect. It is a fear expressed by the author at the end of paragraph 3 and not an inference from the passage. Option (b) is incorrect as it can be seen from the last paragraph that Cosmopolitan theorists are challenging these principles and seek to replace them. Option (4) is the reverse of what the author feels. Refer to the lines in paragraph 3 - "This article suggests that the 'cosmopolitan paradox' - the gap between universal aspiration and hierarchical practice - is not merely one of cosmopolitan 'consciousness' lagging behind an immanent cosmopolitan 'reality'. Rather, the paradox is rooted in the essence of the cosmopolitan thesis itself. The limitations of abstract normative cosmopolitan conceptions of 'rights' and 'responsibilities'. It is clear that there is a lag between the cosmopolitan consciousness and reality. Option (c) can be inferred as the author says that the paradox is rooted in the thesis and its conception itself.

43. a

The passage does not directly mention the advocates of nationalism. So, option (b) is not the author's primary concern. Option (c) is incorrect, as the author's opinion on whether the paradox will continue cannot be determined from the passage. Option (d) is what Robbin feels in the initial lines of paragraph 2. The author has not made this his primary concern. Option (a) correctly describes the author's primary concern in the passage. The author explores the Cosmopolitan paradox, which is talked about in an article, and goes on with solutions and reasons for the same

44. b

The sentences before the blank talk about the various ways in which 'individuals' owed their existence to others. The passage discusses how a human being grows and develops through the contribution of others. Option (b) sums it up best. The other

options discuss "repayment of debts". These 'debts' are not clearly established in the given paragraph.

45. d

In the given paragraph, the author questions the relevance and veracity of Darwin's theory. Option (d) takes it forward. Option (b) is incorrect as it shifts the focus of the paragraph from the relevance of Darwin's theory to its alignment with the evolutionary worldview. Options (a) and (c) merely explain the theory.

46.a

This question can be solved by completing the first blank. 'Consciousness' is the most appropriate as it means 'A sense of one's personal or collective identity, including the attitudes, beliefs, and sensitivities held by or considered characteristic of an individual or group'. 'Awareness' means knowledge or cognizance and it is thus inappropriate to 'change' awareness, whereas beliefs and attitudes can be changed. 'Trends' would also be inappropriate as 'trends about' will be idiomatically incorrect.

47. b

'Expedient' which means 'characterized by concern with what is opportune; especially governed by selfinterest', fits the first blank. 'Fold', which means 'a group of people or institutions that share a common faith, belief, activity, or enthusiasm', fits the second blank. Flock may seem appropriate but does not fit the tone of the passage as it is an informal word. Moreover, the correct idiomatic expression is 'to bring into the fold'. Use of 'flock' in the blank would be idiomatically incorrect.

48. a

The author discusses Sebastian Nokes, but only as an example. He wants the readers to focus on the bigger problems that his case highlights. Option (b) can be eliminated, as the passage does not mention if the author supports Nokes. Option (c) can be ruled out, as the actions of the police are not questioned with regard to their being legal or illegal. Option (d) is also incorrect as the 'moral implications' of the actions is not being discussed in the passage rather the author is questioning whether the police should have been involved in the first place.

49. b

Option (a) is too general to explain the theme of the passage as is option (c). The author is fundamentally concerned with the idea that special powers, which are supposed to be exercised only in extreme cases, are being used where they are not

warranted. This makes option (b) correct. Option (d) although present in the passage 'searched the premises of an MP legitimately engaged in the business of opposition and holding the government to account' is not the main theme.

50. d

In all the other instances a crime has been committed and therefore the police is justified in carrying out various tasks to nab the person or convict him or her. However, option (d) is not something that the author would support. In the passage it is mentioned that 'one of its primary duties is to protect the various and sometimes inconvenient manifestations of a democracy, not to suppress them.'

