CAT 2023 Slot 1 Memory Based Paper with Solution

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1. **The passage below is accompanied by four questions. Based on the passage, choose the best answer for each question.**

   For early postcolonial literature, the world of the novel was often the nation. Postcolonial novels were usually [concerned with] national questions. Sometimes the whole story of the novel was taken as an allegory of the nation, whether India or Tanzania. This was important for supporting anti-colonial nationalism, but could also be limiting - land-focused and inward-looking.

   My new book "Writing Ocean Worlds" explores another kind of world of the novel: not the village or nation, but the Indian Ocean world. The book describes a set of novels in which the Indian Ocean is at the centre of the story. It focuses on the novelists Amitav Ghosh, Abdulrazak Gurnah, Lindsey Collen and Joseph Conrad [who have] centred the Indian Ocean world in the majority of their novels. . . . Their work reveals a world that is outward-looking - full of movement, border-crossing and south-south interconnection. They are all very different - from colonially inclined (Conrad) to radically anti-capitalist (Collen), but together draw on and shape a wider sense of Indian Ocean space through themes, images, metaphors and language. This has the effect of remapping the world in the reader's mind, as centred in the interconnected global south. . . .

   The Indian Ocean world is a term used to describe the very long-lasting connections among the coasts of East Africa, the Arab coasts, and South and East Asia. These connections were made possible by the geography of the Indian Ocean. For much of history, travel by sea was much easier than by land, which meant that port cities very far apart were often more easily connected to each other than to much closer inland cities. Historical and archaeological evidence suggests that what we now call globalisation first appeared in the Indian Ocean. This is the interconnected oceanic world referenced and produced by the novels in my book. . . .

   For their part Ghosh, Gurnah, Collen and even Conrad reference a different set of histories and geographies than the ones most commonly found in fiction in English. Those [commonly found ones] are mostly centred in Europe or the US, assume a background of Christianity and whiteness, and mention places like Paris and New York. The novels in [my] book highlight instead a largely Islamic space, feature characters of colour and centralise the ports of Malindi, Mombasa, Aden, Java and Bombay. . . . It is a densely imagined, richly sensory image of a southern cosmopolitan culture which provides for an enlarged sense of place in the world. This

remapping is particularly powerful for the representation of Africa. In the fiction, sailors and travellers are not all European. . . . African, as well as Indian and Arab characters, are traders, nakhodas (dhow ship captains), runaways, villains, missionaries and activists. This does not mean that Indian Ocean Africa is romanticised. Migration is often a matter of force; travel is portrayed as abandonment rather than adventure, freedoms are kept from women and slavery is rife. What it does mean is that the African part of the Indian Ocean world plays an active role in its long, rich history and therefore in that of the wider world.

A. **Which one of the following statements is not true about migration in the Indian Ocean world?**

A

The Indian Ocean world's migration networks connected the global north with the global south.

B

Geographical location rather than geographical proximity determined the choice of destination for migrants.

C

The Indian Ocean world's migration networks were shaped by religious and commercial histories of the region.

D Migration in the Indian Ocean world was an ambivalent experience.

Solution

The passage focuses on the interconnectedness within the global south in the context of the Indian Ocean world's migration networks. It emphasizes historical connections between the coasts of East Africa, the Arab coasts, and South and East Asia. The passage does not specifically highlight

migration networks connecting the Indian Ocean world with the global north. Instead, it underscores the significance of geographical location, religious histories, and commercial interactions within the region, pointing to a more localized and regional perspective on migration. Therefore, Option A is not true according to the passage. Additionally, the passage mentioned the Indian Ocean as “a term used to describe the very long-lasting connections among the coasts of East Africa, the Arab coasts, and South and East Asia.” and not north and south.

Option B is correct as the passage mentions that for much of history, travel by sea in the Indian Ocean was easier than by land, emphasizing the importance of geographical location.

Option C is correct as the passage indicates that the novels in the book draw on and shape a wider sense of Indian Ocean space through themes, images, metaphors, and language, including religious and commercial aspects.

Option D is correct as the passage notes that migration is often portrayed as abandonment rather than adventure, indicating a complex and ambivalent nature of the migration experience in the Indian Ocean world.

B. **On the basis of the nature of the relationship between the items in each pair below, choose the odd pair out:**

A Indian Ocean novels : Outward-looking

B Postcolonial novels : Border-crossing

C	Indian Ocean world : Slavery
D	Postcolonial novels : Anti-colonial nationalism

Solution

Options A, C and D have the following format World/Novels : Characteristic of that particular world/novel. Option B is the odd one out as the characteristic of Border-crossing does not belong to the Postcolonial novels world.

From the passage, we can infer that the Indian Ocean novels were "outward-looking - full of movement, bordercrossing and south-south interconnection". At the same time, they showcased elements of the global south like Slavery, Forced Migration etc. Hence, A and C showcase valid elements of the Indian Ocean Novels World.

On the other hand, postcolonial novels were usually [concerned with] national questions, land-focused and inward-looking. They featured anti-colonial nationalism. Hence, option D is also a valid Theme:Characteristic combination.

However, we note that Border-crossing is an element of the Indian Ocean novel world and not the Postcolonial novel world. Hence, option B is not a valid combination and thus is the odd one out.

C. **All of the following statements, if true, would weaken the passage's claim about the relationship between mainstream English-language fiction and Indian Ocean novels EXCEPT:**

A

the depiction of Africa in most Indian Ocean novels is driven by a postcolonial nostalgia for an idyllic past

B

the depiction of Africa in most Indian Ocean novels is driven by an Orientalist imagination of its cultural crudeness.

C

very few mainstream English-language novels have historically been set in American and European metropolitan centres.

D

most mainstream English-language novels have historically privileged the Christian, white, male experience of travel and adventure.

Solution

“For their part Ghosh, Gurnah, Collen and even Conrad reference a different set of histories and geographies than the ones most commonly found in fiction in English. Those [commonly found ones] are mostly centred in Europe or the US, assume a background of Christianity and whiteness, and mention places like Paris and New York. “

The passage argues that the novels discussed in "Writing Ocean Worlds" diverge from the common representations found in English fiction, which often center on Europe or the US, assume a background of Christianity and whiteness, and mention places like Paris and New York. If Option D were true, it would support the passage's claim rather than weaken it. Therefore, Option D is the correct answer.

Through the passage, the author claims that the Indian Ocean novels provide a more realistic picture of the Indian Ocean space, particularly in the representation of Africa. The author claims that the depiction is more authentic and free from Eurocentricity that is seen in other novels.

Option A weakens the passage by contradicting these claims and suggesting that the depiction of Africa is influenced by postcolonial nostalgia.

Option B weakens the passage by suggesting a potential bias or negative stereotyping in the portrayal of Africa in Indian Ocean novels.

Option C weakens the author's claim by disputing that there is eurocentric perspective in other novels.

D. **All of the following claims contribute to the "remapping" discussed by the passage, EXCEPT:**

A

Indian Ocean novels have gone beyond the specifics of national concerns to explore rich regional pasts.

B

the world of early international trade and commerce was not the sole domain of white Europeans.

C

cosmopolitanism originated in the West and travelled to the East through globalisation.

D

the global south, as opposed to the global north, was the first centre of globalisation.

Solution

Option C is the correct answer because it contradicts the idea of "remapping" discussed in the passage. The passage emphasizes that the novels under consideration challenge the common representations found in English fiction, particularly those centered in the West. Option C, suggesting that cosmopolitanism originated in the West and traveled to the East through globalization, aligns with the conventional Western-centric narrative rather than the passage's argument of reshaping perspectives and centralizing the interconnected global south, particularly the Indian Ocean world, as a key space in the reimagined literary landscape.

Option A aligns with the passage's discussion of the novels focusing on the Indian Ocean world, contributing to the "remapping" beyond national concerns.

Option B aligns with the passage's emphasis on the interconnected Indian Ocean world, challenging the Eurocentric perspective on trade and commerce.

Option D supports the passage's claim that historical evidence suggests that globalization first appeared in the Indian Ocean, contributing to the "remapping" of the world's historical and geographical perspectives.

2. **The passage below is accompanied by four questions. Based on the passage, choose the best answer for each question.**

Many human phenomena and characteristics - such as behaviors, beliefs, economies, genes, incomes, life expectancies, and other things - are influenced both by geographic factors and by non-geographic factors. Geographic factors mean physical and biological factors tied to geographic location, including climate, the distributions of wild plant and animal species, soils, and topography. Non-geographic factors include those factors subsumed under the term culture, other factors subsumed under the term history, and decisions by individual people. . . .

[T]he differences between the current economies of North and South Korea . . . cannot be attributed to the modest environmental differences between [them] . . . They are instead due entirely to the different [government] policies . . . At the opposite extreme, the Inuit and other traditional peoples living north of the Arctic Circle developed warm fur clothes but no agriculture, while equatorial lowland peoples around the world never developed warm fur clothes but often did develop agriculture. The explanation is straightforwardly geographic, rather than a cultural or historical quirk unrelated to geography. . . . Aboriginal Australia remained the sole continent occupied only by hunter/gatherers and with no indigenous farming or herding . . . [Here the] explanation is biogeographic: the Australian continent has no domesticable native animal species and few domesticable native plant species. Instead, the crops and domestic animals that now make Australia a food and wool exporter are all non-native (mainly Eurasian) species such as sheep, wheat, and grapes, brought to Australia by overseas colonists.

Today, no scholar would be silly enough to deny that culture, history, and individual choices play a big role in many human phenomena. Scholars don't react to cultural, historical, and individual-agent explanations by denouncing "cultural determinism," "historical determinism," or "individual determinism," and then thinking no further. But many scholars do react to any explanation invoking some geographic role, by denouncing "geographic determinism" . . .

Several reasons may underlie this widespread but nonsensical view. One reason is that some geographic explanations advanced a century ago were racist, thereby causing all geographic explanations to become tainted by racist associations in the minds of many scholars other than geographers. But many genetic, historical,

psychological, and anthropological explanations advanced a century ago were also racist, yet the validity of newer non-racist genetic etc. explanations is widely accepted today.

Another reason for reflex rejection of geographic explanations is that historians have a tradition, in their discipline, of stressing the role of contingency (a favorite word among historians) based on individual decisions and chance. Often that view is warranted . . . But often, too, that view is unwarranted. The development of warm fur clothes among the Inuit living north of the Arctic Circle was not because one influential Inuit leader persuaded other Inuit in 1783 to adopt warm fur clothes, for no good environmental reason.

A third reason is that geographic explanations usually depend on detailed technical facts of geography and other fields of scholarship . . . Most historians and economists don't acquire that detailed knowledge as part of the professional training.

A. **All of the following are advanced by the author as reasons why non-geographers disregard geographic influences on human phenomena EXCEPT their:**

A

lingering impressions of past geographic analyses that were politically offensive.

B

belief in the central role of humans, unrelated to physical surroundings, in influencing phenomena.

C

disciplinary training which typically does not include technical knowledge of geography.

D

dismissal of explanations that involve geographical causes for human behaviour.

Solution

Option D is not explicitly presented by the author as a reason why non-geographers disregard geographic influences. The author suggests that scholars often react negatively to explanations involving a geographic role by denouncing "geographic determinism." However, the specific idea of dismissal is not explicitly outlined in the passage.

The other options on the other hand, can be inferred from the passage:

Option A can be inferred from the following lines: “ One reason is that some geographic explanations advanced a century ago were racist, thereby causing all geographic explanations to become tainted.”

Option B can be inferred from the following lines: “Another reason for reflex rejection of geographic explanations is that historians have a tradition, in their discipline, of stressing the role of contingency (a favorite word among historians) based on individual decisions and chance.”

Option C can be inferred from the last paragraph of the passage:” Geographic explanations usually depend on detailed technical facts of geography and other fields of scholarship . . . Most historians and economists don’t acquire that detailed knowledge as part of the professional training.

B. The author criticises scholars who are not geographers for all of the following reasons EXCEPT:

A

their rejection of the role of biogeographic factors in social and cultural phenomena.

B

their outdated interpretations of past cultural and historical phenomena.

C

the importance they place on the role of individual decisions when studying human phenomena

D their labelling of geographic explanations as deterministic.

Solution

The passage does not explicitly mention the criticism of scholars for having outdated interpretations of past cultural and historical phenomena. The primary focus of the author's criticism, as discussed in the passage, centers on scholars' tendencies to dismiss geographic factors, label geographic explanations as deterministic, and associate geographic analyses with past racism.Therefore Option B is the correct answer.

C. **All of the following can be inferred from the passage EXCEPT:**

A

individual dictat and contingency were not the causal factors for the use of fur clothing in some very cold climates.

B

agricultural practices changed drastically in the Australian continent after it was colonised.

C

while most human phenomena result from culture and individual choice, some have bio-geographic origins.

D

several academic studies of human phenomena in the past involved racist interpretations

Solution

Option C cannot be directly inferred from the passage. The passage does discuss the influence of both geographic factors (such as biogeography) and non-geographic factors (culture, history, individual decisions) on human phenomena. However, the passage does not explicitly quantify or compare the prevalence of these influences by stating that "most human phenomena result from culture and individual choice."

Option A: The author discusses the development of warm fur clothes among the Inuit living north of the Arctic Circle and asserts that it was not due to a specific individual decision or historical contingency in 1783 but rather a response to environmental factors.

Option B: The author discusses the current state of agricultural practices in Australia, stating that the crops and domestic animals that make Australia a food and wool exporter today are all non-native species (mainly Eurasian)

brought to Australia by overseas colonists. The use of the term "non-native" implies a change in agricultural practices from what was originally present in the Australian continent.

Option D: The author mentions that some geographic explanations advanced a century ago were racist, causing all geographic explanations to become tainted by racist associations in the minds of many scholars.

D. The examples of the Inuit and Aboriginal Australians are offered in the passage to show:

A
human resourcefulness across cultures in adapting to their surroundings.

B
how physical circumstances can dictate human behaviour and cultures.

C
that despite geographical isolation, traditional societies were self-sufficient and adaptive.

D
how environmental factors lead to comparatively divergent paths in livelihoods and development.

Solution

Option B is the correct answer because the passage uses examples like the Inuit and Aboriginal Australians to illustrate the influence of physical circumstances, particularly environmental factors, on human behavior and cultural practices. The discussion about the development of warm fur

clothes among the Inuit due to the Arctic environment and the absence of indigenous farming in Aboriginal Australia because of the lack of domesticable native species underscores how physical circumstances dictate certain aspects of human behavior and shape cultural adaptations. Therefore, Option B accurately captures the main idea conveyed by the examples provided in the passage.

Option A is not explicitly emphasized in the passage; the focus is more on how environmental factors influence behavior and cultures.

Option C: The passage doesn't explicitly highlight self-sufficiency but rather the impact of specific environmental factors on the development of societies.

Option D is not entirely incorrect, but Option B more precisely captures the emphasis on physical circumstances dictating human behavior and cultures in the context of the examples provided in the passage.

3. **The passage below is accompanied by four questions. Based on the passage, choose the best answer for each question.**

RESIDENTS of Lozère, a hilly department in southern France, recite complaints familiar to many rural corners of Europe. In remote hamlets and villages, with names such as Le Bacon and Le Bacon Vieux, mayors grumble about a lack of local schools, jobs, or phone and internet connections. Farmers of grazing animals add another concern: the return of wolves. Eradicated from France last century, the predators are gradually creeping back to more forests and hillsides. “The wolf must be taken in hand,” said an aspiring parliamentarian, Francis Palombi, when pressed by voters in an election campaign early this summer. Tourists enjoy visiting a wolf park in Lozère, but farmers fret over their livestock and their livelihoods. . . .

As early as the ninth century, the royal office of the Luparii—wolf-catchers—was created in France to tackle the predators. Those official hunters (and others) completed their job in the 1930s, when the last wolf disappeared from the mainland. Active hunting and improved technology such as rifles in the 19th century, plus the use of poison such as strychnine later on, caused the population collapse. But in the early 1990s the animals reappeared. They crossed the Alps from Italy, upsetting sheep farmers on the French side of the border. Wolves have since spread to areas such as Lozère, delighting environmentalists, who see the predators’ presence as a sign of wider ecological health. Farmers, who say the wolves cause the deaths of thousands of sheep and other grazing animals, are less cheerful. They grumble that green activists and politically correct urban types have allowed the return of an old enemy.

Various factors explain the changes of the past few decades. Rural depopulation is part of the story. In Lozère, for example, farming and a once-flourishing mining industry supported a population of over 140,000 residents in the mid-19th century. Today the department has fewer than 80,000 people, many in its towns. As humans withdraw, forests are expanding. In France, between 1990 and 2015, forest cover increased by an average of 102,000 hectares each year, as more fields were given over to trees. Now, nearly one-third of mainland France is covered by woodland of some sort. The decline of hunting as a sport also means more forests fall quiet. In the mid-to-late 20th century over 2m hunters regularly spent winter weekends tramping in woodland, seeking boars, birds and other prey. Today the Fédération Nationale des Chasseurs, the national body, claims 1.1m people hold hunting licences, though the number of active hunters is probably lower. The mostly protected status of the wolf in

Europe—hunting them is now forbidden, other than when occasional culls are sanctioned by the state— plus the efforts of NGOs to track and count the animals, also contribute to the recovery of wolf populations.

As the lupine population of Europe spreads westwards, with occasional reports of wolves seen closer to urban areas, expect to hear of more clashes between farmers and those who celebrate the predators' return. Farmers' losses are real, but are not the only economic story. Tourist venues, such as parks where wolves are kept and the animals' spread is discussed, also generate income and jobs in rural areas.

A. **Which one of the following has NOT contributed to the growing wolf population in Lozère?**

A A decline in the rural population of Lozère.

B An increase in woodlands and forest cover in Lozère.

C **The shutting down of the royal office of the Luparii.**

D The granting of a protected status to wolves in Europe.

Solution

The passage mentions that as early as the ninth century, the royal office of the Luparii, or wolf-catchers, was created in France to tackle the predators. However, this office became redundant as it had finished it's job (kill the last wolf). So the resurgence of the wolfs can't be attributed to it shutting down. The other options on the other hand, can be clearly inferred.

Option A: “Various factors explain the changes of the past few decades. Rural depopulation is part of the story. In Lozère, for example, farming and a once-flourishing mining industry supported a population of over 140,000 residents in the mid-19th century. Today the department has fewer than 80,000 people, many in its towns. “

Option B: “As humans withdraw, forests are expanding. In France, between 1990 and 2015, forest cover increased by an average of 102,000 hectares each year, as more fields were given over to trees. Now, nearly one-third of mainland France is covered by woodland of some sort. “

Option D: “The mostly protected status of the wolf in Europe—hunting them is now forbidden, other than when occasional culls are sanctioned by the state—plus the efforts of NGOs to track and count the animals, also contribute to the recovery of wolf populations.”

B. **The inhabitants of Lozère have to grapple with all of the following problems, EXCEPT:**

A lack of educational facilities.

B poor rural communication infrastructure.

C livestock losses.

D decline in the number of hunting licences.

Solution

Considering the first paragraph: “RESIDENTS of Lozère, a hilly department in southern France, recite complaints familiar to many rural corners of Europe. In remote hamlets and villages, with names such as Le Bacon and Le Bacon Vieux, mayors grumble about a lack of local schools, jobs, or phone and internet connections. Farmers of grazing animals add another concern: the return of wolves. Eradicated from France last century, the predators are gradually creeping back to more forests and hillsides. “The wolf must be taken in hand,” said an aspiring parliamentarian, Francis Palombi, when pressed by voters in an election campaign early this summer. Tourists enjoy visiting a wolf park in Lozère, but farmers fret over their livestock and their livelihoods. .”

Options A, B and C can be clearly inferred from the highlighted part.

The passage mentions that the number of people holding hunting licenses is still high but the number of people who still actively hunt is low. So Option D which states that there is decline in the number of hunting licences is incorrect.

C. **Which one of the following statements, if true, would weaken the author’s claims?**

A

Having migrated out in the last century, wolves are now returning to Lozère.

B Unemployment concerns the residents of Lozère.

C **Wolf attacks on tourists in Lozère are on the rise.**

D

The old mining sites of Lozère are now being used as grazing pastures for sheep.

Solution

The author's claims seem to be focused on the conflicts between farmers and the return of wolves, the economic implications, and the coexistence challenges. If wolf attacks on tourists were on the rise, it might shift the narrative and suggest a broader safety concern beyond the impact on farmers, potentially weakening the author's emphasis on the positive economic aspects of wolf-related tourism. Therefore Option C, if true, would weaken the author’s argument.

Option A supports the author's claims about the return of wolves to Lozère.

Option B is not directly related to the author's claims about conflicts between farmers and wolves or the economic implications of wolf-related tourism.

Option D , if true, would not necessarily weaken the author's claims but might be seen as providing additional information about land use in Lozère.

D. The author presents a possible economic solution to an existing issue facing Lozère that takes into account the divergent and competing interests of:

A politicians and farmers.

B environmentalists and politicians.

C **farmers and environmentalists.**

D tourists and environmentalists.

Solution

“As the lupine population of Europe spreads westwards, with occasional reports of wolves seen closer to urban areas, expect to hear of more clashes between farmers and those who celebrate the predators’ return. Farmers’ losses are real, but are not the only economic story. Tourist venues, such as parks where wolves are kept and the animals’ spread is discussed, also generate income and jobs in rural areas.”

The passage mentions that farmers in Lozère are concerned about the return of wolves causing losses in livestock. On the other hand, environmentalists view the presence of wolves as a sign of wider ecological health. The suggested economic solution involves tourist venues related to wolves, such as parks, which not only address the economic concerns of farmers by generating income but also align with the interests of environmentalists who appreciate the return of the predators. Therefore, Option C accurately captures the collaboration between farmers and environmentalists in the proposed solution.

4. **The passage below is accompanied by four questions. Based on the passage, choose the best answer for each question.**

[Fifty] years after its publication in English [in 1972], and just a year since [Marshall] Sahlins himself died—we may ask: why did [his essay] "Original Affluent Society" have such an impact, and how has it fared since? . . . Sahlins's principal argument was simple but counterintuitive: before being driven into marginal environments by colonial powers, hunter?gatherers, or foragers, were not engaged in a desperate struggle for meager survival.

Quite the contrary, they satisfied their needs with far less work than people in agricultural and industrial societies, leaving them more time to use as they wished. Hunters, he quipped, keep bankers' hours. Refusing to maximize, many were "more concerned with games of chance than with chances of game." . . . The so-called Neolithic Revolution, rather than improving life, imposed a harsher work regime and set in motion the long history of growing inequality . . .

Moreover, foragers had other options. The contemporary Hadza of Tanzania, who had long been surrounded by farmers, knew they had alternatives and rejected them. To Sahlins, this showed that foragers are not simply examples of human diversity or victimhood but something more profound: they demonstrated that societies make real choices. Culture, a way of living oriented around a distinctive set of values, manifests a fundamental principle of collective self-determination. . . .

But the point [of the essay] is not so much the empirical validity of the data—the real interest for most readers, after all, is not in foragers either today or in the Paleolithic—but rather its conceptual challenge to contemporary economic life and bourgeois individualism. The empirical served a philosophical and political project, a thought experiment and stimulus to the imagination of possibilities.

With its title's nod toward The Affluent Society (1958), economist John Kenneth Galbraith's famously skeptical portrait of America's postwar prosperity and inequality, and dripping with New Left contempt for consumerism, "The Original Affluent Society" brought this critical perspective to bear on the contemporary world. It did so through the classic anthropological move of showing that radical alternatives to the readers' lives really exist. If the capitalist world seeks wealth through ever greater material production to meet infinitely expansive desires, foraging societies follow "the Zen road to affluence": not by getting more, but by wanting less. If it

seems that foragers have been left behind by “progress,” this is due only to the ethnocentric self-congratulation of the West. Rather than accumulate material goods, these societies are guided by other values: leisure, mobility, and above all, freedom. . . .

Viewed in today’s context, of course, not every aspect of the essay has aged well. While acknowledging the violence of colonialism, racism, and dispossession, it does not thematize them as heavily as we might today. Rebuking evolutionary anthropologists for treating present-day foragers as “left behind” by progress, it too can succumb to the temptation to use them as proxies for the Paleolithic. Yet these characteristics should not distract us from appreciating Sahlins’s effort to show that if we want to conjure new possibilities, we need to learn about actually inhabitable worlds.

A. We can infer that Sahlins's main goal in writing his essay was to:

A

put forth the view that, despite egalitarian origins, economic progress brings greater inequality and social hierarchies.

B

highlight the fact that while we started off as a fairly contented egalitarian people, we have progressively degenerated into materialism.

C

hold a mirror to an acquisitive society, with examples of other communities that have chosen successfully to be non-materialistic

D

counter Galbraith’s pessimistic view of the inevitability of a capitalist trajectory for economic growth.

Solution

The passage emphasizes that Marshall Sahlins's main goal in writing his essay was to hold a mirror to an acquisitive society (contemporary economic life and bourgeois individualism). The essay accomplishes this by providing examples of foraging societies that made real choices to prioritize values such as leisure, mobility, and freedom over material accumulation. Sahlins contrasts the Zen road to affluence, where affluence is achieved by wanting less, with the capitalist pursuit of wealth through material production and consumerism. Therefore, Sahlins's goal, as portrayed in the passage, aligns with the idea of presenting examples of communities that have successfully chosen non-materialistic paths as a critique of acquisitive societies. So, Option C is the correct answer.

Option A: While Sahlins's essay acknowledges growing inequality and social hierarchies resulting from the Neolithic Revolution, it is more focused on contrasting foraging societies with contemporary economic life.

Option B: The primary emphasis is on showcasing foraging societies' choices and values rather than asserting a progressive degeneration of society.

Option C: Even though Sahlins's essay critiques aspects of contemporary economic views, its primary focus is not explicitly countering Galbraith's pessimistic view but rather presenting alternative possibilities through examples of non-materialistic societies.

B. The author mentions Tanzania’s Hadza community to illustrate:

A

that hunter-gatherer communities’ subsistence-level techniques equipped them to survive well into contemporary times.

B

how pre-agrarian societies did not hamper the emergence of more advanced agrarian practices in contiguous communities.

C

that forager communities' lifestyles derived not from ignorance about alternatives, but from their own choice.

D

how two vastly different ways of living and working were able to coexist in proximity for centuries.

Solution

Option C is the correct answer because the passage uses the example of Tanzania's Hadza community to illustrate that forager communities, like the Hadza, do not conform to a simple narrative of human diversity or victimhood. Instead, they actively make choices about their way of life. The passage mentions that the Hadza, despite being surrounded by farmers, knew they had alternatives and consciously rejected them. This example serves to emphasize that forager communities are not constrained by ignorance about alternatives; rather, their lifestyles derive from their own choices. Therefore, Option C accurately captures the essence of the Hadza illustration in the passage.

Option A: The passage doesn't specifically highlight the survival techniques of hunter-gatherer communities into contemporary times, but rather emphasizes their choices and values.

Option B: The passage doesn't discuss the Hadza community in the context of agrarian practices in contiguous communities, making this option irrelevant to the illustration.

Option D: The passage does not suggest that the Hadza community coexisted with vastly different ways of living and working for centuries

C. **The author of the passage mentions Galbraith's "The Affluent Society" to:**

A

show how Galbraith's theories refute Sahlins's thesis on the contentment of pre-hunter?gatherer communities.

B

contrast the materialist nature of contemporary growth paths with the pacifist content ways of living among the foragers.

C

document the influence of Galbraith's cynical views on modern consumerism on Sahlins's analysis of pre-historic societies.

D

show how Sahlins's views complemented Galbraith's criticism of the consumerism and inequality of contemporary society.

Solution

The passage explicitly mentions that Sahlins's essay, "The Original Affluent Society," brought a critical perspective to contemporary consumerism and inequality, echoing the themes found in John Kenneth Galbraith's work, "The Affluent Society." The passage notes that Sahlins's

essay contrasts the values of foraging societies with the capitalist pursuit of wealth, and it suggests that the essay complements Galbraith's skeptical portrait of postwar prosperity and inequality. Therefore, Option D accurately reflects the information presented in the passage regarding the relationship between Sahlins's views and Galbraith's criticism of contemporary society.

The passage does not suggest that Galbraith’s theories refute Sahlins’s thesis but rather highlights their complementarity (Option A) nor does it focus on contrasting foragers' ways of living with Galbraith's views on contemporary growth paths (Option B).

The passage does not document the influence of Galbraith’s views on Sahlins’s analysis; instead, it emphasizes how Sahlins's essay complements Galbraith’s critical perspective on contemporary society. Therefore Option C is incorrect too.

D. The author of the passage criticises Sahlins’s essay for its:

A **cursory treatment of the effects of racism and colonialism on societies.**

B

outdated values regarding present-day foragers versus ancient foraging communities.

C

critique of anthropologists who disparage the choices of foragers in today’s society

D failure to supplement its thesis with robust empirical data.

Solution

"Viewed in today’s context, of course, not every aspect of the essay has aged well. While acknowledging the violence of colonialism, racism, and dispossession, it does not thematize them as heavily as we might today."

Option A is the correct answer because the passage explicitly mentions that, when viewed in today's context, not every aspect of Sahlins's essay has aged well, and it acknowledges that the essay does not thematize issues like racism, colonialism, and dispossession as heavily as might be expected today. The term "cursory treatment" suggests that the essay provides only a brief or superficial examination of the effects of racism and colonialism on societies, and the passage criticizes this aspect of the essay for not giving these important issues more comprehensive attention.

5. **Study the following information carefully and answer the given questions.**

There is a sentence that is missing in the paragraph below. Look at the paragraph and decide where (option 1, 2, 3, or 4) the following sentence would best fit.

A. **Sentence: The discovery helps to explain archeological similarities between the Paleolithic peoples of China, Japan, and the Americas.**

Paragraph: The researchers also uncovered an unexpected genetic link between Native Americans and Japanese people. *(1)*. During the deglaciation period, another group branched out from northern coastal China and travelled to Japan. *(2)*. "We were surprised to find that this ancestral source also contributed to the Japanese gene pool, especially the indigenous Ainus," says Li. *(3)*. They shared similarities in how they crafted stemmed projectile points for arrowheads and spears. *(4)*. "This suggests that the Pleistocene connection among the Americas, China, and Japan was not confined to culture but also to genetics," says senior author Qing-Peng Kong, an evolutionary geneticist at the Chinese Academy of Sciences.

A Option 2

B Option 3

C Option 1

D Option 4

Solution

The sentence best fits in Blank 3 because it logically follows the mention of the unexpected genetic link between Native Americans and Japanese people mentioned in the sentence preceding Blank 3. After establishing this genetic connection, the sentence provides additional context by explaining the archaeological implications of the discovery. It suggests that the shared genetic link has archaeological manifestations, leading to similarities in the Paleolithic peoples of China, Japan, and the Americas. Placing the sentence here helps to connect the genetic findings to broader archaeological and cultural aspects.

Blank 1: The sentence before Blank 1 introduces the unexpected genetic link between Native Americans and Japanese people. Placing this sentence in Blank 1 would disrupt the logical progression of information, as Blank 1 should provide information that directly connects with or follows from the mention of the unexpected genetic link, and the sentence is more relevant to explaining the broader context after the genetic link has been introduced.

Blank 2: Putting the sentence here makes no sense as there has been no mention of any discovery before.

Blank 4: Placing the sentence here would disrupt the flow of the passage as before Blank 4 the passage mentions how there were similarities between them and After Blank 4, the passage states " This suggests..". "This" clearly refers to the similarities mentioned before Blank 4.

B. **Sentence: This philosophical cut at one's core beliefs, values, and way of life is difficult enough.**

Paragraph: The experience of reading philosophy is often disquieting. When reading philosophy, the values around which one has heretofore organised one's life may come to look provincial, flatly wrong, or even

evil. *(1)*. When beliefs previously held as truths are rendered implausible, new beliefs, values, and ways of living may be required. *(2)*. What's worse, philosophers admonish each other to remain unsutured until such time as a defensible new answer is revealed or constructed. Sometimes philosophical writing is even strictly critical in that it does not even attempt to provide an alternative after tearing down a cultural or conceptual citadel. *(3)*. The reader of philosophy must be prepared for the possibility of this experience. While reading philosophy can help one clarify one's values, and even make one self-conscious for the first time of the fact that there are good reasons for believing what one believes, it can also generate unremediated doubt that is difficult to live with. *(4)*.

A Option 1

B Option 4

C Option 3

D **Option 2**

Solution

The sentence best fits in Blank 2 because it provides a continuation and elaboration on the disquieting experience mentioned before Blank 2. Before Blank 2, the passage introduces the disquieting nature of reading philosophy, and the sentence builds on that by explaining that the philosophical examination challenges the values around which one has

organized their life, making them appear provincial, flatly wrong, or even evil. The sentence in question serves to articulate the difficulty and discomfort associated with this profound philosophical scrutiny, logically following the initial statement about the disquieting experience of reading philosophy.

We can also see that the sentence ends with "...and way of life is difficult enough." This is immediately followed by the passage highlighting what's worse "What's worse, philosophers admonish each other to remain unsutured until such time as a defensible new answer is revealed or constructed.". So we can see that Sentence 2 serves as a preceding sentence to this.

6. **Study the following information carefully and answer the given questions.**

Five jumbled up sentences (labelled 1, 2, 3, 4 and 5), related to a topic, are given below. Four of them can be put together to form a coherent paragraph. Identify the odd sentence and key in the number of that sentence as your answer.

A. **1. Having an appreciation for the workings of another person's mind is considered a prerequisite for natural language acquisition, strategic social interaction, reflexive thought, and moral judgment.**

2. It is a 'theory of mind' though some scholars prefer to call it 'mentalizing' or 'mindreading', which is important for the development of one's cognitive abilities.

3. Though we must speculate about its evolutionary origin, we do have indications that the capacity evolved sometime in the last few million years.

4. This capacity develops from early beginnings in the first year of life to the adult's fast and often effortless understanding of others' thoughts, feelings, and intentions.

5. One of the most fascinating human capacities is the ability to perceive and interpret other people's behaviour in terms of their mental states.

A Sentence 1

B Sentence 2

C Sentence 3

D Sentence 4

Solution

Sentence 2 is the odd one out because it introduces a term, "theory of mind," and discusses scholars' preferences for alternative terms like "mentalizing" or "mindreading." Unlike the other sentences, which focus on explaining and elaborating on the concept of understanding others' mental states, sentence 2 provides more of a meta-discussion about the terminology used to describe this capacity rather than directly contributing to the explanation of the topic. The other sentences contribute to the substantive discussion of the capacity to perceive and interpret other people's behavior in terms of their mental states, making sentence 2 the odd one out in the context of forming a coherent paragraph.

B.

1. **In English, there is no systematic rule for the naming of numbers; after ten, we have "eleven" and "twelve" and then the teens: "thirteen", "fourteen", "fifteen" and so on.**
2. **Even more confusingly, some English words invert the numbers they refer to: the word "fourteen" puts the four first, even though it appears last.**
3. **It can take children a while to learn all these words, and understand that "fourteen" is different from "forty".**
4. **For multiples of 10, English speakers switch to a different pattern: "twenty", "thirty", "forty" and so on.**
5. **If you didn't know the word for "eleven", you would be unable to just guess it - you might come up with something like "one-teen".**

A Sentence 1

B Sentence 2

C **Sentence 3**

D Sentence 4

Solution

Sentence 3 is the odd one out because it introduces a different topic compared to the other sentences. While the other sentences focus on the naming patterns of numbers in English, especially the irregularities and variations in the system, sentence 3 shifts the focus to the learning process of children and their understanding of the differences between numbers like "fourteen" and "forty." The other sentences contribute to the discussion about the intricacies of English number naming, making sentence 3 less aligned with the central theme of the paragraph.

7. **Study the following information carefully and answer the given questions:**

The four sentences (labelled 1, 2, 3 and 4) given below, when properly sequenced, would yield a coherent paragraph. Decide on the proper sequencing of the order of the sentences and key in the sequence of the four numbers as your answer.

A. **1. What precisely are the "unusual elements" that make a particular case so attractive to a certain kind of audience? 2 . It might be a particularly savage or unfathomable level of depravity, very often it has something to do with the precise amount of mystery involved.**
2. Unsolved, and perhaps unsolvable cases offer something that "ordinary" murder doesn't.
3. Why are some crimes destined for perpetual re-examination and others locked into permanent obscurity?

A **4-1-2-3**

B 4-2-1-3

C 1-2-3-4

D 3-2-1-4

Solution

The correct order is 4-1-2-3.

Sentence 4 introduces the central question about the enduring fascination with certain crimes and the perpetual re-examination of some cases.

Sentence 1 builds on this question by specifically asking about the "unusual elements" that make a particular case attractive to a certain audience, providing a more focused inquiry.

Sentence 2 follows by suggesting possible reasons, such as a particularly savage or unfathomable level of depravity, and the role of mystery in drawing attention to these cases.

Sentence 3 then generalizes the idea, stating that unsolved and perhaps unsolvable cases offer something unique that "ordinary" murder cases don't, emphasizing the enduring allure of unresolved mysteries in the realm of crime.

B.

1. **Algorithms hosted on the internet are accessed by many, so biases in AI models have resulted in much larger impact, adversely affecting far larger groups of people.**
2. **Though “algorithmic bias” is the popular term, the foundation of such bias is not in algorithms, but in the data; algorithms are not biased, data is, as algorithms merely reflect persistent patterns that are present in the training data.**
3. **Despite their widespread impact, it is relatively easier to fix AI biases than human-generated biases, as it is simpler to identify the former than to try to make people unlearn behaviors learnt over generations.**
4. **The impact of biased decisions made by humans is localised and geographically confined, but with the advent of AI, the impact of such decisions is spread over a much wider scale.**

A 4-2-1-3

B **4-1-2-3**

C 1-2-3-4

D 4-3-2-1

Solution

4-1-2-3 is the correct order.

Sentence 4 introduces the idea that biased decisions made by humans have a localized impact, but with AI's emergence, the impact scale becomes much broader. This sets the context for the discussion to be followed.

Now, if we consider Sentences 1 and 2 we can see that Sentence 1 is expanding on the impact of biased decisions in the context of AI, highlighting that algorithms hosted on the internet, accessed by many, result in more significant adverse effects on larger groups of people.Sentence 2 is providing a clarification on the term "algorithmic bias," emphasizing that the foundation of bias lies in the data rather than the algorithms themselves. It explains that algorithms reflect persistent patterns present in the training data. Therefore we can say that Sentence 2 must be following 1.

Sentence 3 is pointing out that despite the widespread impact of AI biases, it is comparatively easier to fix them than human-generated biases, as it is simpler to identify and address biases in algorithms than to make people unlearn behaviors learned over generations. This logically follows the point made in Sentence 2. Therefore Sentence 3 must be following Sentence 2.

Therefore the correct order is 4-1-2-3.

8. **Study the following information carefully and answer given questions:**

The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

A. **Manipulating information was a feature of history long before modern journalism established rules of integrity. A record dates back to ancient Rome, when Antony met Cleopatra and his political enemy Octavian launched a smear campaign against him with "short, sharp slogans written upon coins." The perpetrator became the first Roman Emperor and "fake news had allowed Octavian to hack the republican system once and for all". But the 21st century has seen the weaponization of information on an unprecedented scale. Powerful new technology makes the fabrication of content simple, and social networks amplify falsehoods peddled by States, populist politicians, and dishonest corporate entities. The platforms have become fertile ground for computational propaganda, 'trolling' and 'troll armies'.**

A

Disinformation, which is mediated by technology today, is not new and has existed since ancient times.

B

People need to become critical of what they read, since historically, weaponization of information has led to corruption.

C

Use of misinformation for attaining power, a practice that is as old as the Octavianera, is currently fueled by technology.

D

Octavian used fake news to manipulate people and attain power and influence, just as people do today

Solution

The passage discusses the historical use of misinformation for political purposes, dating back to ancient Rome with Octavian's smear campaign against Antony. It then highlights how the 21st century has seen an unprecedented scale of information weaponization, facilitated by powerful technology and amplified through social networks. Option C effectively conveys the continuity of using misinformation for power throughout history, now fueled by modern technology. Therefore, Option C is the correct answer.

Option A: While the passage acknowledges the historical aspect of disinformation, it emphasizes the unprecedented scale in the 21st century, which is not captured in this option.

Option B focuses on the need for critical reading without explicitly highlighting the historical context and the weaponization of information for power.

Option D does not emphasize the broader historical and contemporary context of misinformation for political purposes.

B. **Colonialism is not a modern phenomenon. World history is full of examples of one society gradually expanding by incorporating adjacent territory and settling its people on newly conquered territory. In the sixteenth century, colonialism changed decisively because of technological developments in navigation that began to connect more remote parts of the world. The modern European colonial project emerged when it became possible to move large**

numbers of people across the ocean and to maintain political control in spite of geographical dispersion. The term colonialism is used to describe the process of European settlement, violent dispossession and political domination over the rest of the world, including the Americas, Australia, and parts of Africa and Asia.

A

As a result of developments in navigation technology, European colonialism, led to the displacement of indigenous populations and global political changes in the 16th century.

B

Colonialism, conceptualized in the 16th century, allowed colonizers to expand their territories, establish settlements, and exercise political power.

C

Technological advancements in navigation in the 16th century, transformed colonialism, enabling Europeans to establish settlements and exert political dominance over distant regions.

D

Colonialism surged in the 16th century due to advancements in navigation, enabling British settlements abroad and global dominance.

Solution

Option C is the correct answer because it accurately captures the main idea of the passage. It highlights how technological advancements in navigation during the sixteenth century transformed colonialism by enabling Europeans to establish settlements and exert political dominance over distant regions, including the Americas, Australia, and parts of Africa and Asia.

Option A focuses on the displacement of indigenous populations, which is not the central point of the passage.

While Option B mentions the expansion of territories and political power, it does not emphasize the technological advancements in navigation.

Option D introduces the concept of British settlements, which is narrower than the broader context of European colonialism discussed in the passage.

9. **Study the following information carefully and answer the given questions:**

A visa processing office (VPO) accepts visa applications in four categories - US, UK, Schengen, and Others. The applications are scheduled for processing in twenty 15-minute slots starting at 9:00 am and ending at 2:00 pm. Ten applications are scheduled in each slot. There are ten counters in the office, four dedicated to US applications, and two each for UK applications, Schengen applications and Others applications. Applicants are called in for processing sequentially on a firstcome-first-served basis whenever a counter gets freed for their category. The processing time for an application is the same within each category. But it may vary across the categories. Each US and UK application requires 10 minutes of processing time. Depending on the number of applications in a category and time required to process an application for that category, it is possible that an applicant for a slot may be processed later. On a particular day, Ira, Vijay and Nandini were scheduled for Schengen visa processing in that order. They had a 9:15 am slot but entered the VPO at 9:20 am. When they entered the office, exactly six out of the ten counters were either processing applications, or had finished processing one and ready to start processing the next. Mahira and Osman were scheduled in the 9:30 am slot on that day for visa processing in the Others category.

The following additional information is known about that day.

1. All slots were full.
2. The number of US applications was the same in all the slots. The same was true for the other three categories.
3. 50% of the applications were US applications.
4. All applicants except Ira, Vijay and Nandini arrived on time.
5. Vijay was called to a counter at 9:25 am.

A. **How many UK applications were scheduled on that day?**

A **0**

B 10

C 5

D 15

Solution

It is given that the applications are scheduled for processing in twenty 15-minute slots starting at 9:00 am and ending at 2:00 pm. Ten applications are scheduled in each slot.

Hence, the total number of applicants = $20 \times 10 = 200$. It is also known that 50% of the applications were US applications, and the number of US applications was the same in all the slots. The same was true for the other three categories.

Hence, the number of total number of US applicants = (200*50%) = 100, and the number of US applicants in each slot = $\frac{100}{20} = 5$

It is also known that Ira, Vijay, and Nandini were scheduled for Schengen visa processing in that order. They had a 9:15 am slot. Since the number of Schengen applicants was the same in all the slots, it implies the number of Schengen applicants in each slot is at least 3.

Similarly, it is given that Mahira and Osman were scheduled in the 9:30 am slot on that day for visa processing in the Others category, which implies the number of other category applicants in each slot is at least 2.

Since the number of total applicants in each slot is 10, this implies the number of Schengen and other applicants in each slot is 3, and 2, respectively. Hence, the number of UK applicants is 0 in each slot.

It is also known that the number of total counters is 10, among which four are dedicated to US applications, and two each for UK applications, Schengen applications, and Others applications. It is given that each US and UK application requires 10 minutes of processing time, and Vijay was called to a counter at 9:25 am. (Who is 5th in the queue). It can only be possible when the processing time of Schengen applications is 12.5 minutes.

US (10 min)				Schengen (12.5 min)		Others (5 min process)	
End Time				End Time		End Time	
C1	C2	C3	C4	C1	C2	C1	C2
9.10	9.10	9.10	9.10	9.12.30	9.12.30	9.05	9.05
9.20	9.25	9.25	9.25	9.25	9.32.30	9.20	9.20
9.30	9.35	9.40	9.40	9.37.30	9.45	9.35	9.35
9.40	9.45	9.50	9.55				
9.55	9.55	10.00	10.05				
10.10	10.10	10.10	10.15				
10.20							

On a particular day, Ira, Vijay, and Nandini were scheduled for Schengen visa processing in that order. They had a 9:15 am slot but entered the VPO at 9:20 am. When they entered the office, exactly six out of the ten counters were either processing applications, or had finished processing one and ready to start processing the next. Hence, at 9.20 am, there are exactly four free counters. Out of these 4, 2 is the UK counter, and the other two are other counters. (Since the US counters and Schengen Counters were either processing applications, or had finished processing one and were ready to start processing the next.)

From the table, we can say that the total number of UK applicants in each slot is zero, Hence, the total number of applicants is zero.

B. **What is the maximum possible value of the total time (in minutes, nearest to its integer value) required to process all applications in the Others category on that day?**

A 150

B 200

C 100

D 250

Solution

It is given that the applications are scheduled for processing in twenty 15-minute slots starting at 9:00 am and ending at 2:00 pm. Ten applications are scheduled in each slot.

Hence, the total number of applicants = $20 \times 10 = 200$. It is also known that 50% of the applications were US applications, and the number of US applications was the same in all the slots. The same was true for the other three categories.

Hence, the number of total number of US applicants = (200*50%) = 100, and the number of US applicants in each slot = $\frac{100}{20} = 5$

It is also known that Ira, Vijay, and Nandini were scheduled for Schengen visa processing in that order. They had a 9:15 am slot. Since the number of Schengen applicants was the same in all the slots, it implies the number of Schengen applicants in each slot is at least 3.

Similarly, it is given that Mahira and Osman were scheduled in the 9:30 am slot on that day for visa processing in the Others category, which implies the number of other category applicants in each slot is at least 2. Since the number of total applicants in each slot is 10, this implies the number of Schengen and other applicants in each slot is 3, and 2, respectively. Hence, the number of UK applicants is 0 in each slot.

It is also known that the number of total counters is 10, among which four are dedicated to US applications, and two each for UK applications, Schengen applications, and Others applications. It is given that each US and UK application requires 10 minutes of processing time, and Vijay was called to a counter at 9:25 am. (Who is 5th in the queue). It can only be possible when the processing time of Schengen applications is 12.5 minutes.

US (10 min)				Schengen (12.5 min)		Others (5 min process)	
End Time				End Time		End Time	
C1	C2	C3	C4	C1	C2	C1	C2
9.10	9.10	9.10	9.10	9.12.30	9.12.30	9.05	9.05
9.20	9.25	9.25	9.25	9.25	9.32.30	9.20	9.20
9.30	9.35	9.40	9.40	9.37.30	9.45	9.35	9.35
9.40	9.45	9.50	9.55				
9.55	9.55	10.00	10.05				
10.10	10.10	10.10	10.15				
10.20							

On a particular day, Ira, Vijay, and Nandini were scheduled for Schengen visa processing in that order. They had a 9:15 am slot but entered the VPO at 9:20 am. When they entered the office, exactly six out of the ten counters were either processing applications, or had finished processing one and ready to start processing the next. Hence, at 9.20 am, there are exactly four free counters. Out of these 4, 2 is the UK counter, and the other two are other counters. (Since the US counters and Schengen Counters were either processing applications, or had finished processing one and were ready to start processing the next.)

For the other applicants, the time taken to process one application is at most 5 minutes, which implies the total time taken to process 40 applications is at most $40 \times 5 = 200$ minutes.

C. **Which of the following is the closest to the time when Nandini's application process got over?**

A 9:50 am

B 9:37 am

C 9:35 am

D 9:45 am

Solution

It is given that the applications are scheduled for processing in twenty 15-minute slots starting at 9:00 am and ending at 2:00 pm. Ten applications are scheduled in each slot.

Hence, the total number of applicants = $20 \times 10 = 200$. It is also known that 50% of the applications were US applications, and the number of US applications was the same in all the slots. The same was true for the other three categories.

Hence, the number of total number of US applicants = (200*50%) = 100, and the number of US applicants in each slot = $\frac{100}{20} = 5$

It is also known that Ira, Vijay, and Nandini were scheduled for Schengen visa processing in that order. They had a 9:15 am slot. Since the number of Schengen applicants was the same in all the slots, it implies the number of Schengen applicants in each slot is at least 3.

Similarly, it is given that Mahira and Osman were scheduled in the 9:30 am slot on that day for visa processing in the Others category, which implies the number of other category applicants in each slot is at least 2. Since the number of total applicants in each slot is 10, this implies the number of Schengen and other applicants in each slot is 3, and 2, respectively. Hence, the number of UK applicants is 0 in each slot.

It is also known that the number of total counters is 10, among which four are dedicated to US applications, and two each for UK applications, Schengen applications, and Others applications. It is given that each US and UK application requires 10 minutes of processing time, and Vijay was called to a counter at 9:25 am. (Who is 5th in the queue). It can only be possible when the processing time of Schengen applications is 12.5 minutes.

US (10 min)				Schengen (12.5 min)		Others (5 min process)	
End Time				End Time		End Time	
C1	C2	C3	C4	C1	C2	C1	C2
9.10	9.10	9.10	9.10	9.12.30	9.12.30	9.05	9.05
9.20	9.25	9.25	9.25	9.25	9.32.30	9.20	9.20
9.30	9.35	9.40	9.40	9.37.30	9.45	9.35	9.35
9.40	9.45	9.50	9.55				
9.55	9.55	10.00	10.05				
10.10	10.10	10.10	10.15				
10.20							

On a particular day, Ira, Vijay, and Nandini were scheduled for Schengen visa processing in that order. They had a 9:15 am slot but entered the VPO at 9:20 am. When they entered the office, exactly six out of the ten counters were either processing applications, or had finished processing one and ready to start processing the next. Hence, at 9.20 am, there are exactly four free counters. Out of these 4, 2 is the UK counter, and the other two are other counters. (Since the US counters and Schengen Counters were either processing applications, or had finished processing one and were ready to start processing the next.)

Nandini's position was sixth in the queue in the Schengen Applications. From the table, we can see that her process will end at 9.45 am. The correct option is D

D. **Which of the following statements is false?**

A The application process of Osman was completed before 9:45 am.

B The application process of Mahira started after Nandini's.

C The application process of Osman was completed before Vijay's.

D The application process of Mahira was completed before Nandini's.

Solution

It is given that the applications are scheduled for processing in twenty 15-minute slots starting at 9:00 am and ending at 2:00 pm. Ten applications are scheduled in each slot.

Hence, the total number of applicants = $20 \times 10 = 200$. It is also known that 50% of the applications were US applications, and the number of US applications was the same in all the slots. The same was true for the other three categories.

Hence, the number of total number of US applicants = (200*50%) = 100, and the number of US applicants in each slot = $\frac{100}{20} = 5$

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It is also known that the number of total counters is 10, among which four are dedicated to US applications, and two each for UK applications, Schengen applications, and Others applications. It is given that each US and UK application requires 10 minutes of processing time, and Vijay was called to a counter at 9:25 am. (Who is 5th in the queue). It can only be possible when the processing time of Schengen applications is 12.5 minutes.

US (10 min)				Schengen (12.5 min)		Others (5 min process)	
End Time				End Time		End Time	
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9.20	9.25	9.25	9.25	9.25	9.32.30	9.20	9.20
9.30	9.35	9.40	9.40	9.37.30	9.45	9.35	9.35
9.40	9.45	9.50	9.55				
9.55	9.55	10.00	10.05				
10.10	10.10	10.10	10.15				
10.20							

On a particular day, Ira, Vijay, and Nandini were scheduled for Schengen visa processing in that order. They had a 9:15 am slot but entered the VPO at 9:20 am. When they entered the office, exactly six out of the ten counters were either processing applications, or had finished processing one and ready to start processing the next. Hence, at 9.20 am, there are exactly four free counters. Out of these 4, 2 is the UK counter, and the other two are other counters. (Since the US counters and Schengen Counters were either processing applications, or had finished processing one and were ready to start processing the next.)

Let's check the options. Option A: The application process of Osman was completed before 9:45 am. => True (Since he is 5th in the queue, his process will end at 9.35 am)

Option B: The application process of Mahira started after Nandini's. => The application process for Mahira starts at 9.30 am, and the application process for Nandini starts at 9.32.30 am => False. The correct option is B

E. **When did the application processing for all US applicants get over on that day?**

A **2:05 pm**

B 2:25 pm

C 2:00 pm

D 3:40 pm

Solution

It is given that the applications are scheduled for processing in twenty 15-minute slots starting at 9:00 am and ending at 2:00 pm. Ten applications are scheduled in each slot.

Hence, the total number of applicants = $20 \times 10 = 200$. It is also known that 50% of the applications were US applications, and the number of US applications was the same in all the slots. The same was true for the other three categories.

Hence, the number of total number of US applicants = (200*50%) = 100, and the number of US applicants in each slot = $\frac{100}{20} = 5$

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It is also known that the number of total counters is 10, among which four are dedicated to US applications, and two each for UK applications, Schengen applications, and Others applications. It is given that each US and UK application requires 10 minutes of processing time, and Vijay was called to a counter at 9:25 am. (Who is 5th in the queue). It can only be possible when the processing time of Schengen applications is 12.5 minutes.

US (10 min)				Schengen (12.5 min)		Others (5 min process)	
End Time				End Time		End Time	
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9.20	9.25	9.25	9.25	9.25	9.32.30	9.20	9.20
9.30	9.35	9.40	9.40	9.37.30	9.45	9.35	9.35
9.40	9.45	9.50	9.55				
9.55	9.55	10.00	10.05				
10.10	10.10	10.10	10.15				
10.20							

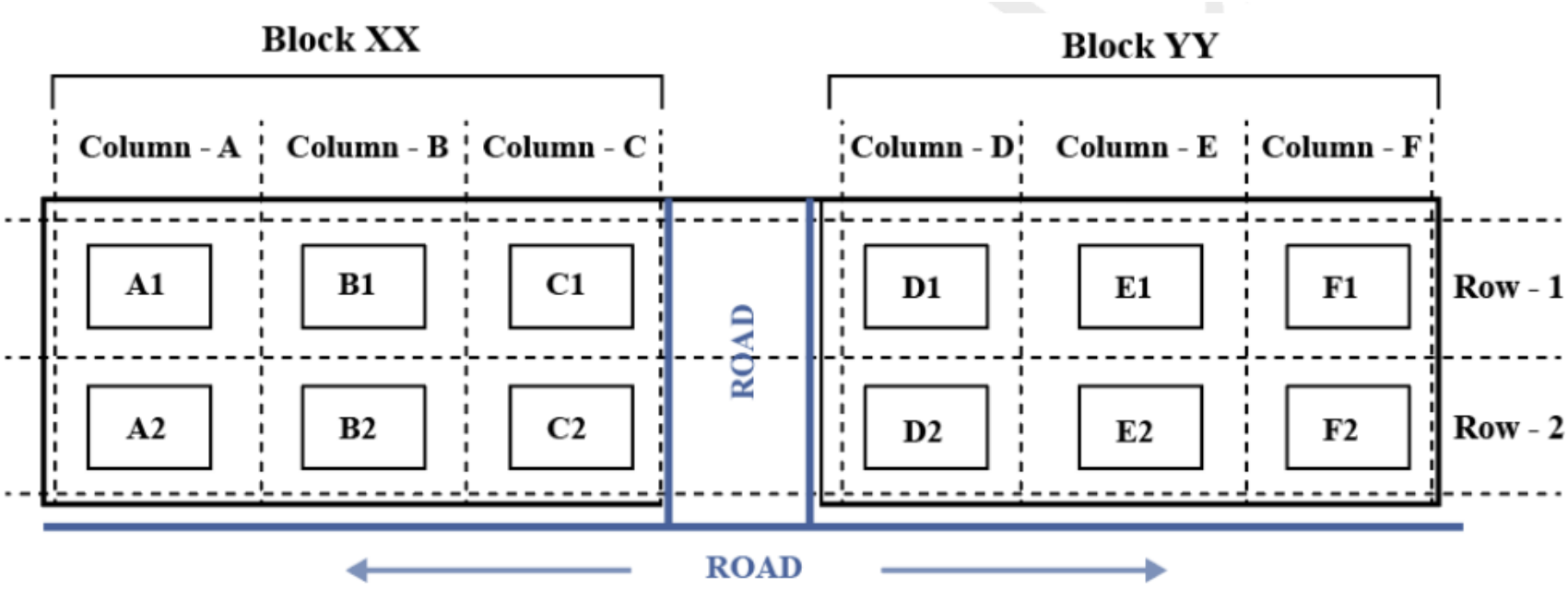
On a particular day, Ira, Vijay, and Nandini were scheduled for Schengen visa processing in that order. They had a 9:15 am slot but entered the VPO at 9:20 am. When they entered the office, exactly six out of the ten counters were either processing applications, or had finished processing one and ready to start processing the next. Hence, at 9.20 am, there are exactly four free counters. Out of these 4, 2 is the UK counter, and the other two are other counters. (Since the US counters and Schengen Counters were either processing applications, or had finished processing one and were ready to start processing the next.)

From the table, we can see that the first slot takes 20 minutes to complete, and after that remaining 19 slots take 15 minutes each to complete the US application process.

Hence, the total time taken $=20 + 15 \times 19 = 305$ minutes = 5 hrs 5 minutes. Hence, the time will be (9 am + 5 hrs 5 minutes) = 2.05 pm The correct option is A

10.

The schematic diagram below shows 12 rectangular houses in a housing complex. House numbers are mentioned in the rectangles representing the houses. The houses are located in six columns - Column-A through Column-F, and two rows - Row-1 and Row-2. The houses are divided into two blocks - Block XX and Block YY. The diagram also shows two roads, one passing in front of the houses in Row-2 and another between the two blocks.



Some of the houses are occupied. The remaining ones are vacant and are the only ones available for sale. The road adjacency value of a house is the number of its sides adjacent to a road. For example, the road adjacency values of C2, F2, and B1 are 2, 1, and 0, respectively. The neighbour count of a house is the number of sides of that house adjacent to occupied houses in the same block. For example, E1 and C1 can have the maximum possible neighbour counts of 3 and 2, respectively. The base price of a vacant house is Rs. 10 lakhs if the house does not have a parking space, and Rs. 12 lakhs if it does. The quoted price (in lakhs of Rs.) of a vacant house is calculated as (base price) + 5 × (road adjacency value) + 3 × (neighbour count). The following information is also known.

1. The maximum quoted price of a house in Block XX is Rs. 24 lakhs. The minimum quoted price of a house in block YY is Rs. 15 lakhs, and one such house is in Column-E.
2. Row-1 has two occupied houses, one in each block.
3. Both houses in Column-E are vacant. Each of Column-D and Column-F has at least one occupied house.
4. There is only one house with parking space in Block YY.

A. **How many houses are vacant in Block XX?**

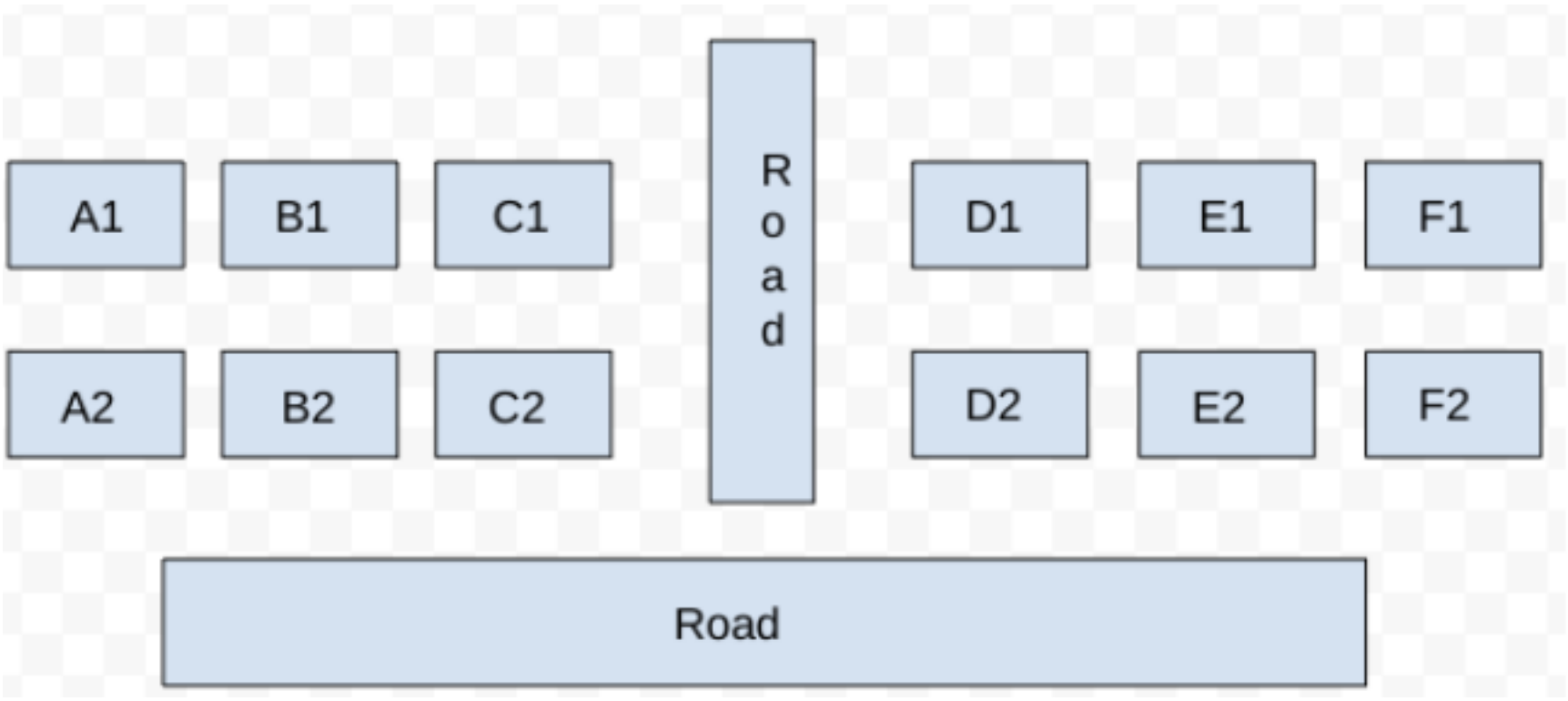
A 1

B 2

C **3**

D 4

Solution



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=> 12+5a+3b = 24 => 5a+3b = 12 (a = road adjacency value, b= neighbor count)

The only value for which the equation satisfies is (a = 0, and b=4). But the value of b can't be 4 because the maximum neighbor count can be at most 3.

Hence, case 1 is invalid.

Case 2: House without parking space:

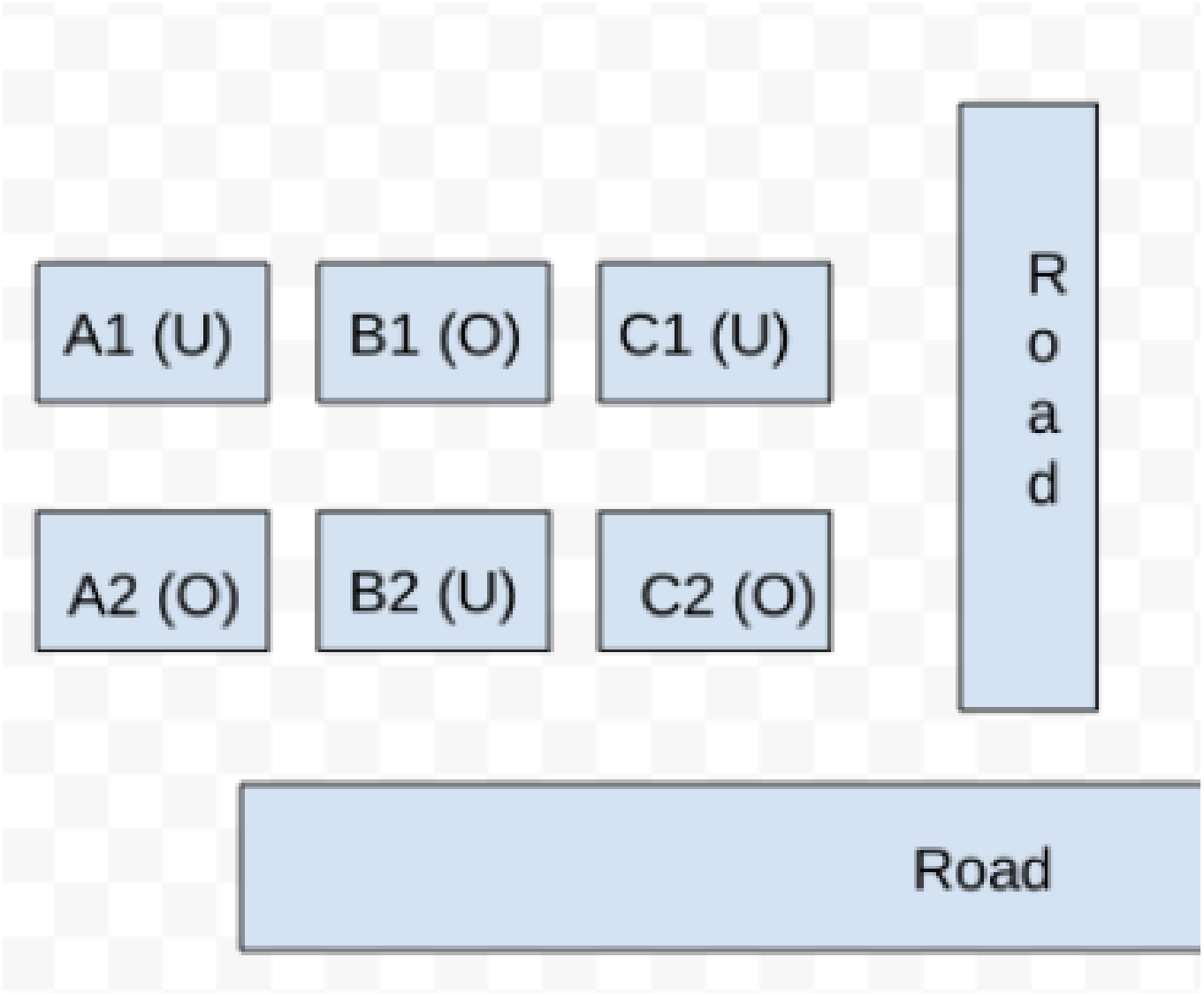
=> 10+5a+3b = 24 => 5a+3b = 14

=> (a, b) = (1, 3)

Hence, the house must have 3 neighbors and 1 road connected to it. Hence, the only possible case is B2.

Therefore, the neighbor houses of B2, which are (B1, A2, and C2) are also occupied. It is known that Row 1 has two occupied houses, one in each block. Since B1 is already occupied, it implies A1, and C1 are vacant.

Hence, the configuration of block XX is given below: (Where U = Unoccupied/ Vacant, and U = Occupied)



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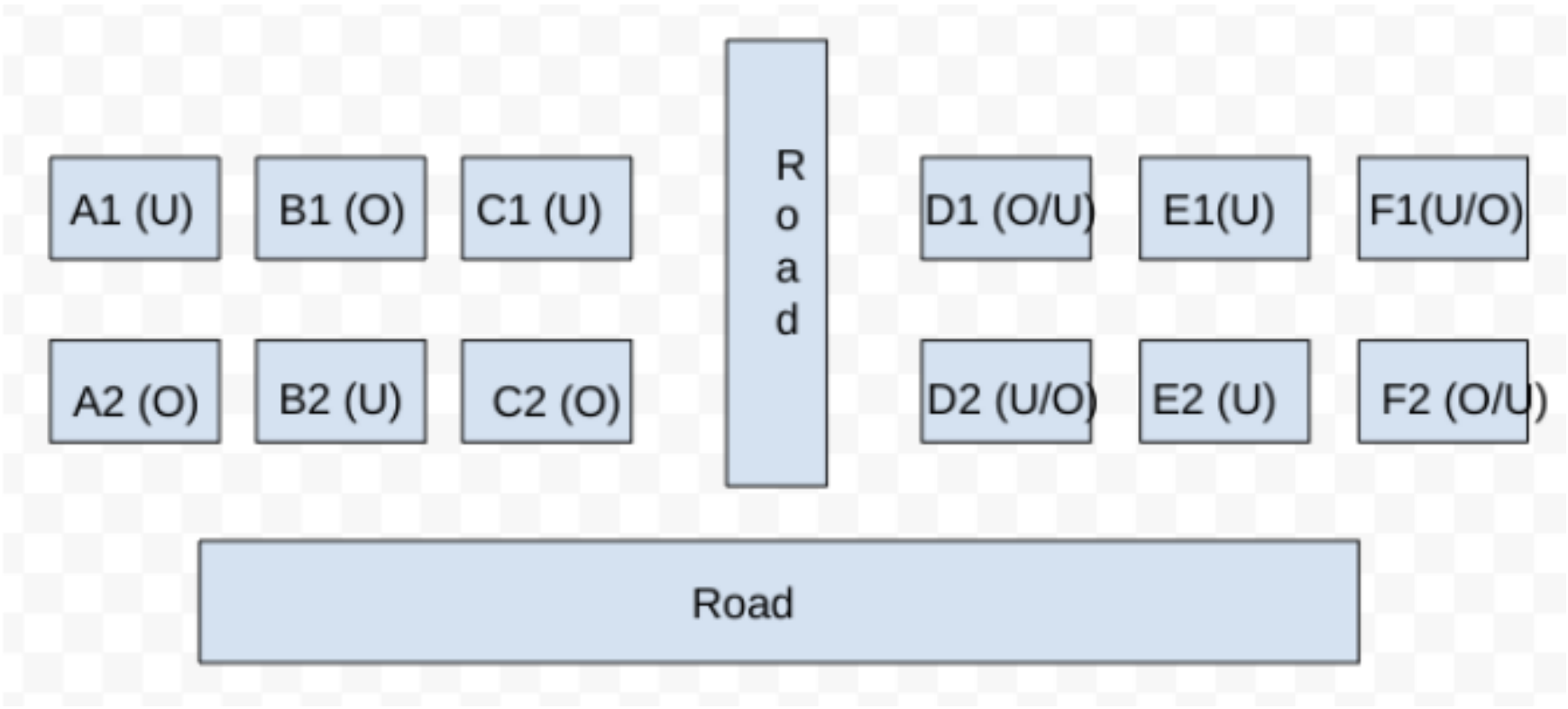


From the diagram, we can see that 3 houses are vacant in block XX

B. Which of the following houses is definitely occupied?

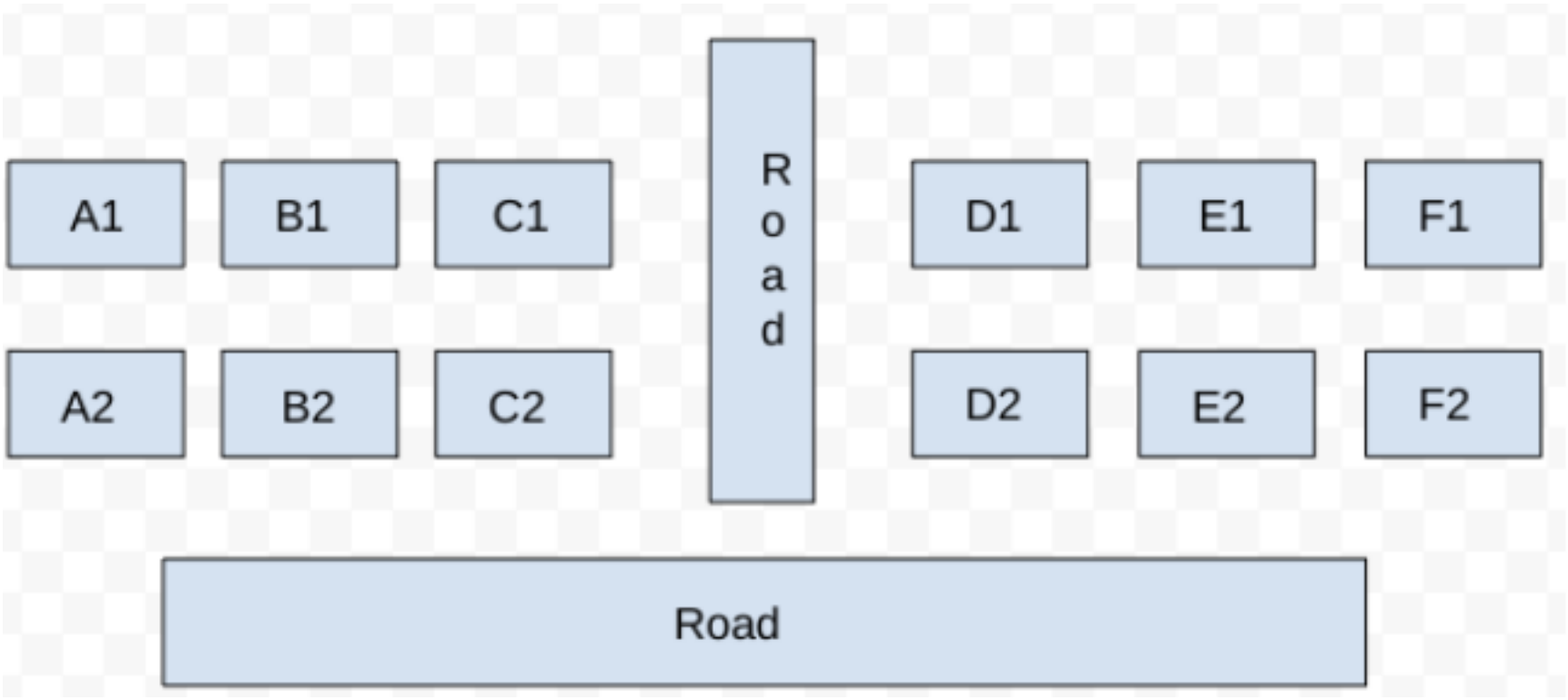
A A1

B D2

C **B1**

D F2

Solution



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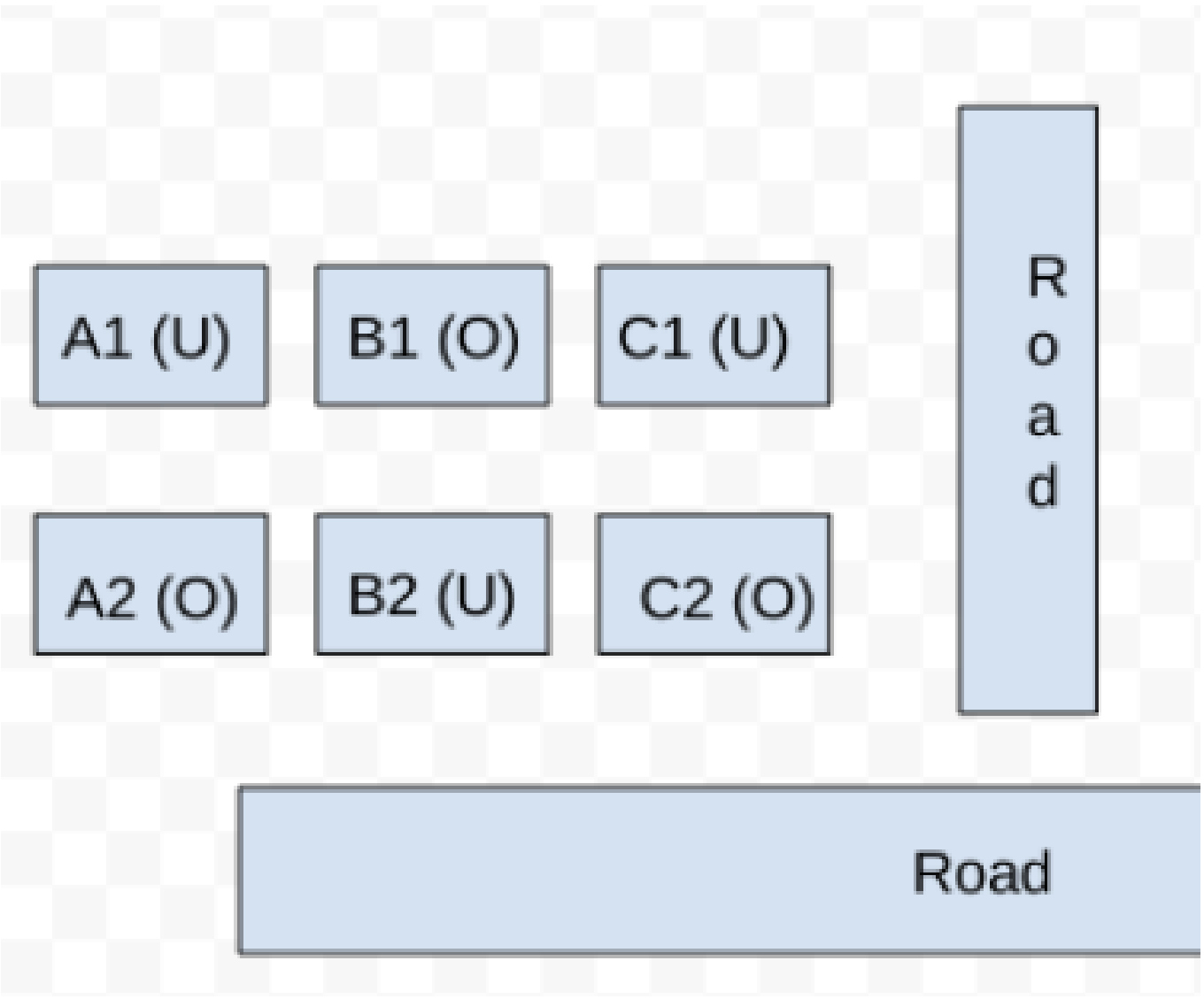

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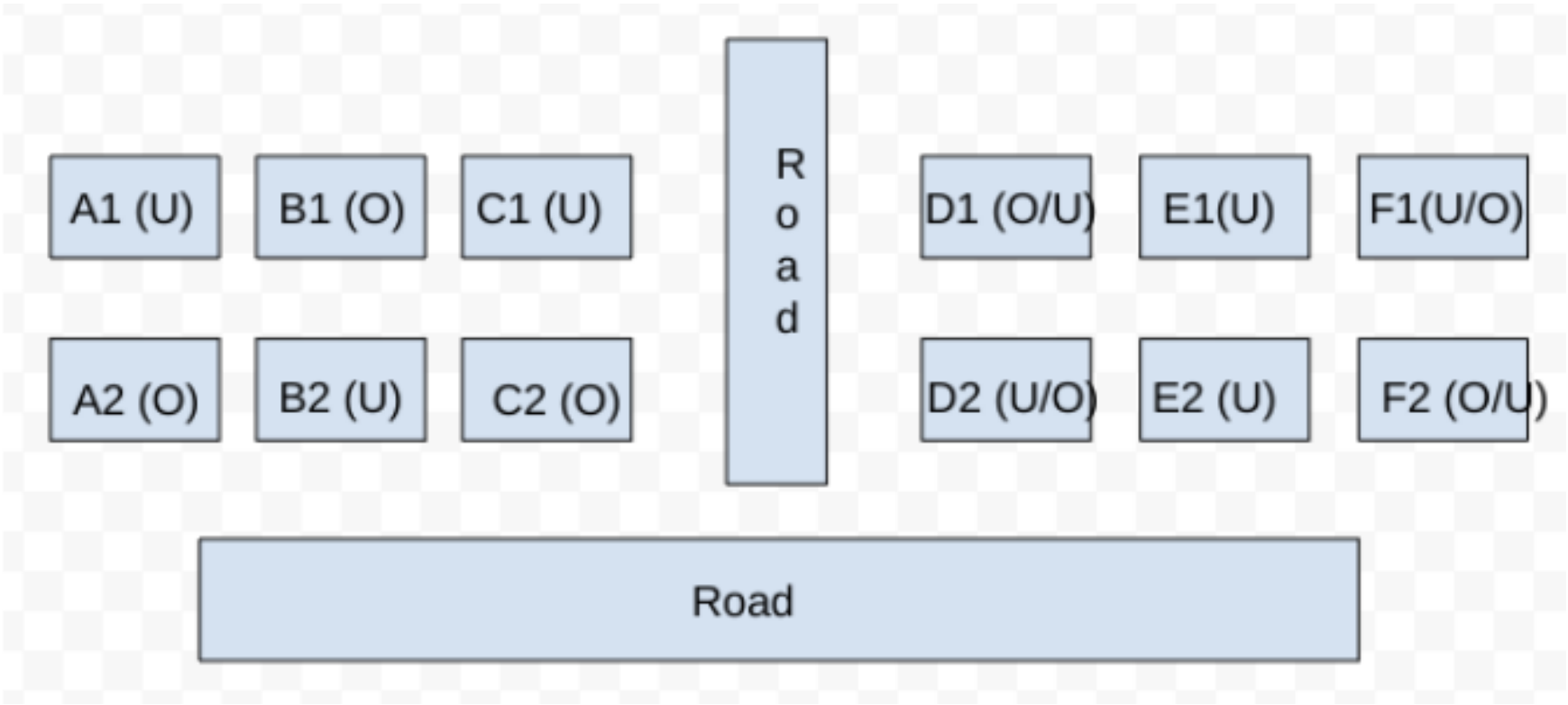


From the diagram, we can see that B1 is definitely occupied. The rest opinions are not definitely correct.

C. **Which of the following options best describes the number of vacant houses in Row-2?**

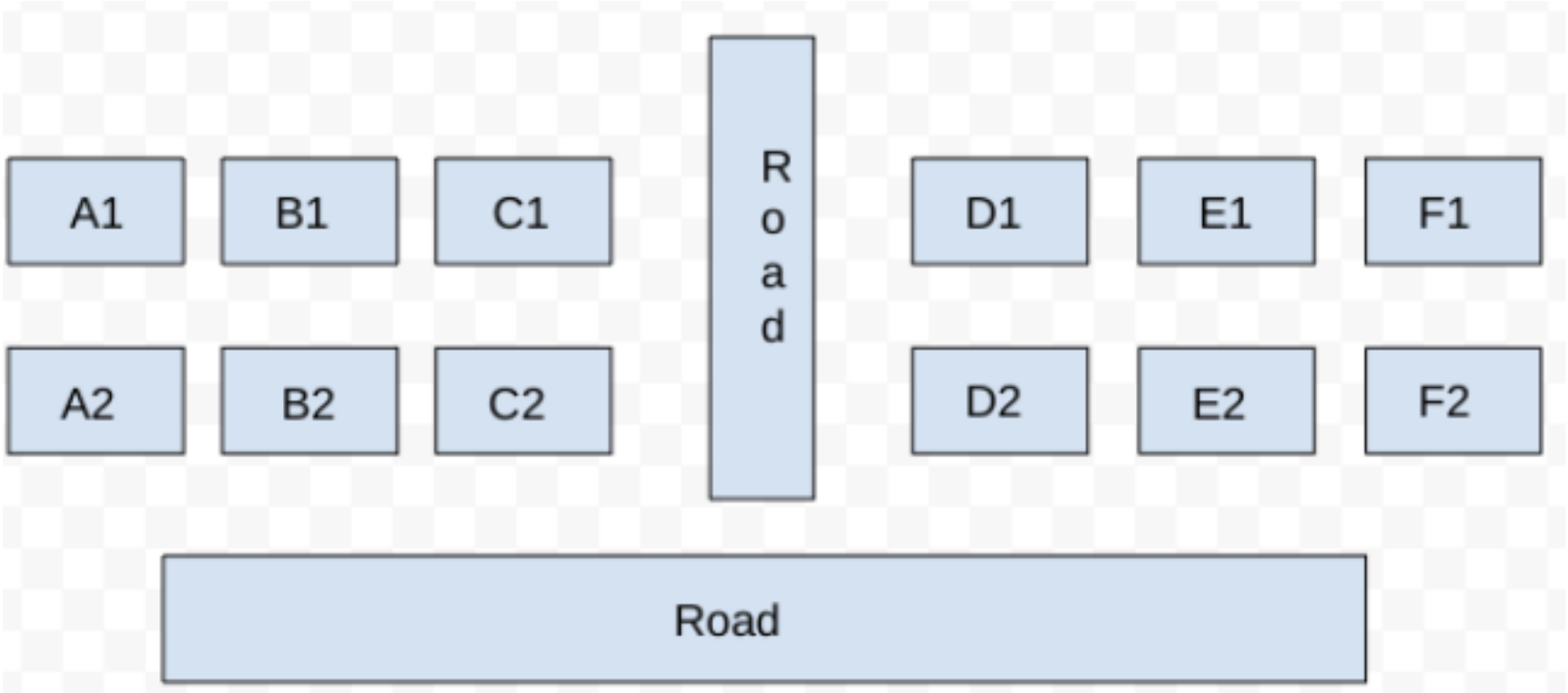
A Exactly 3

B Either 3 or 4

C Exactly 3

D Either 2 or 3

Solution



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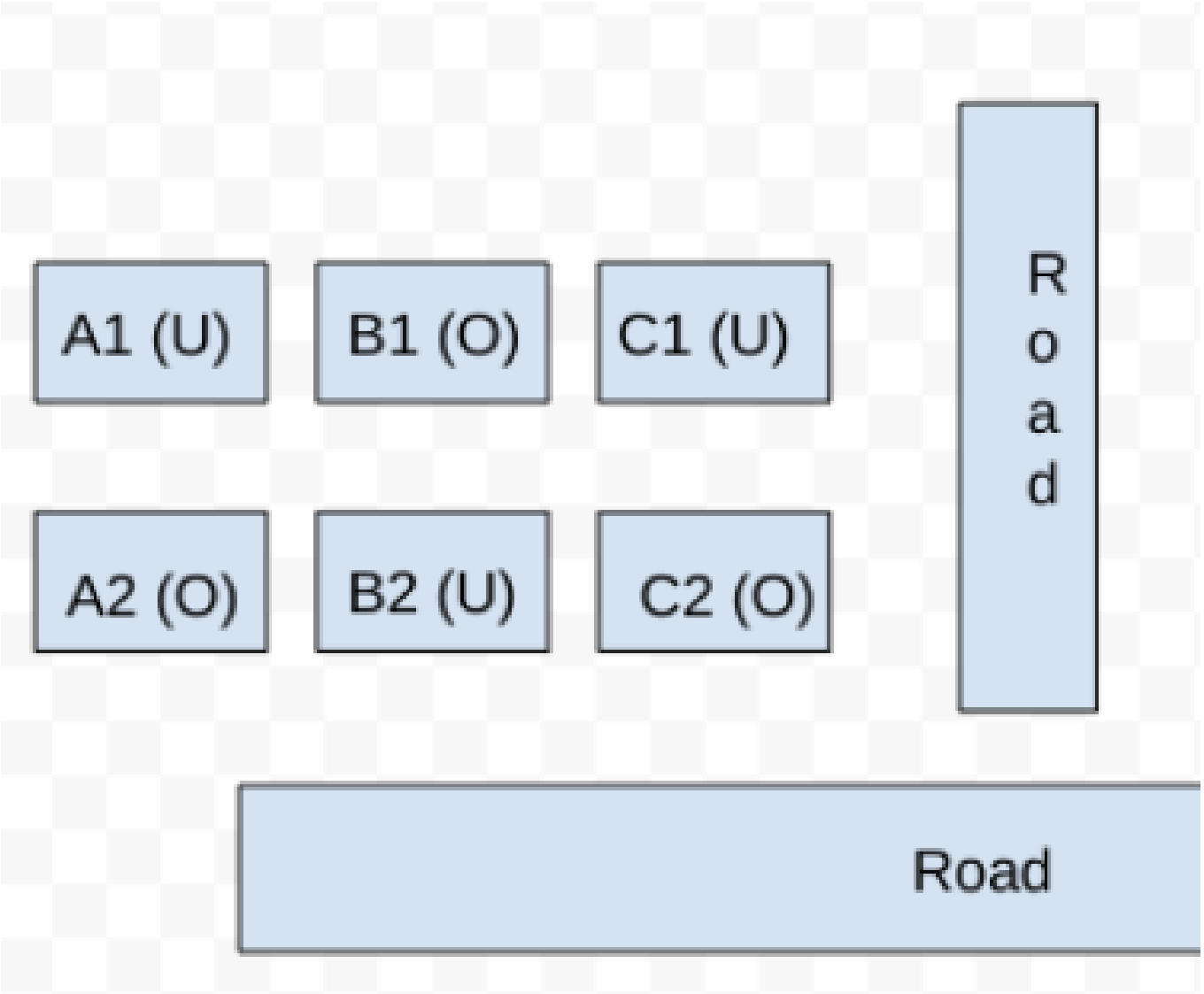

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Hence, the house has no parking space $\Rightarrow 10+5*1+3b = 15 \Rightarrow b = 0$

b = 0 implies all the neighbor house of E2 is vacant, which are (E1, D2,

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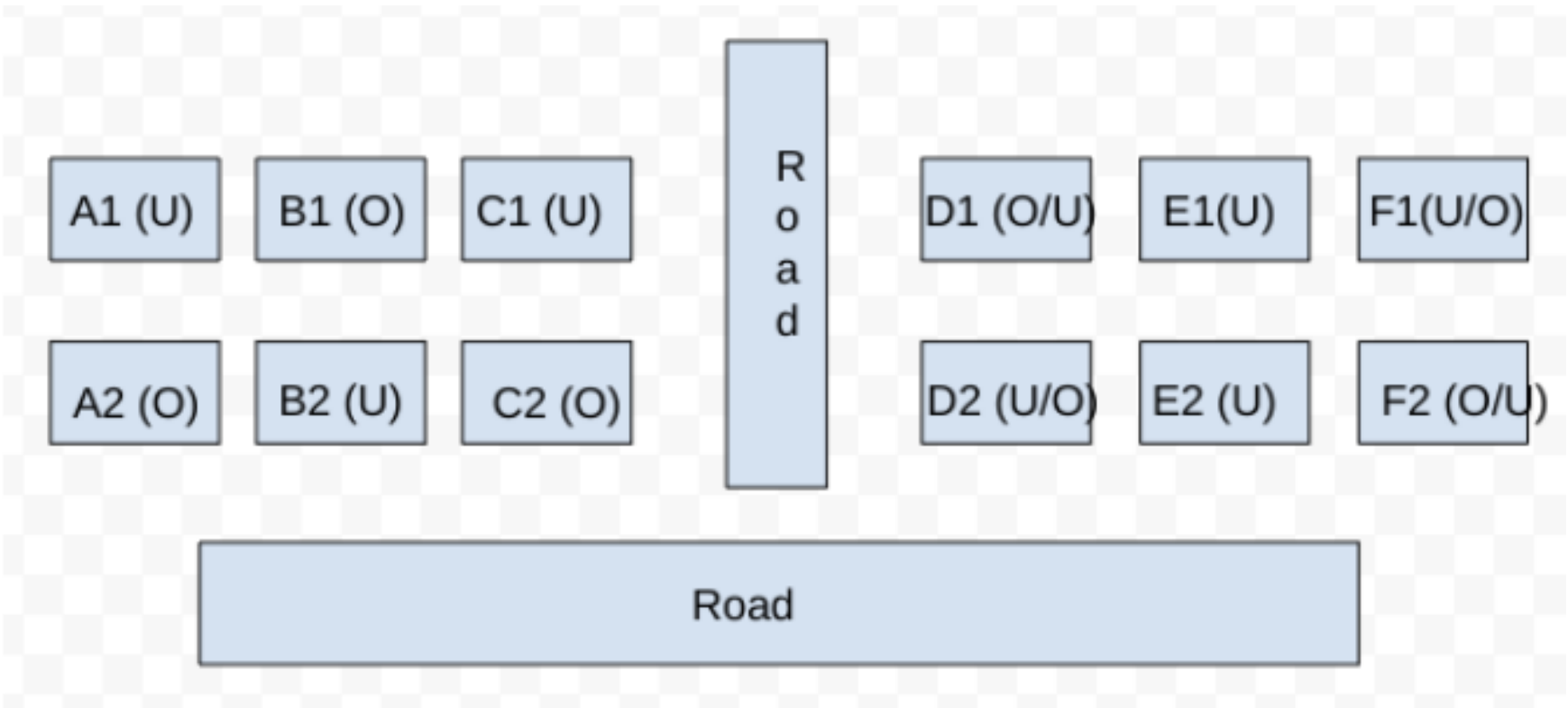


From the diagram, we can say that the number of vacant houses in Row 2 in Block XX is 1, and the number of vacant houses in Row 2 in Block YY is either 1 or 2.

Hence, the total number of vacant houses is either 2 or 3

D. **What is the maximum possible quoted price (in lakhs of Rs.) for a vacant house in Column-E?**

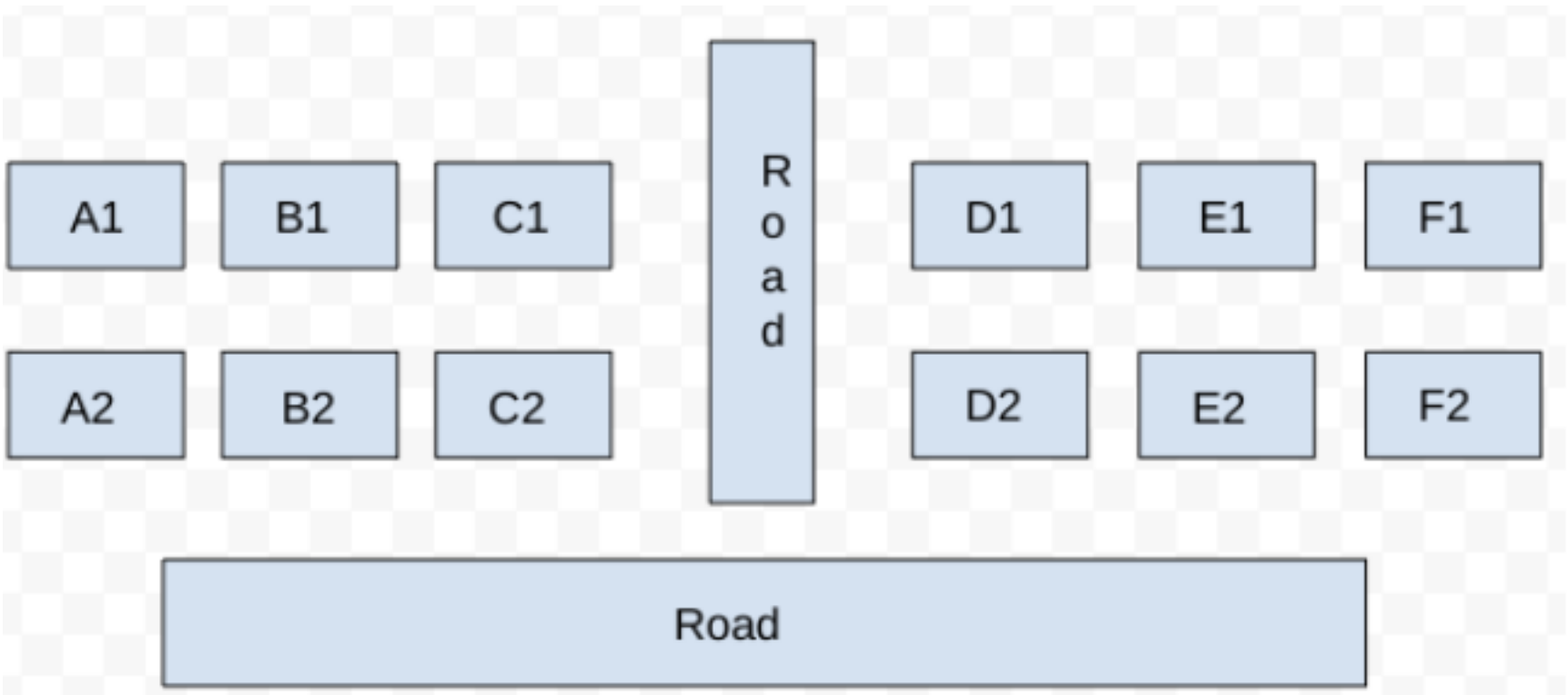
A 21

B 25

C 20

D 17

Solution



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Hence, the house must have 3 neighbors and 1 road connected to it. Hence, the only possible case is B2.

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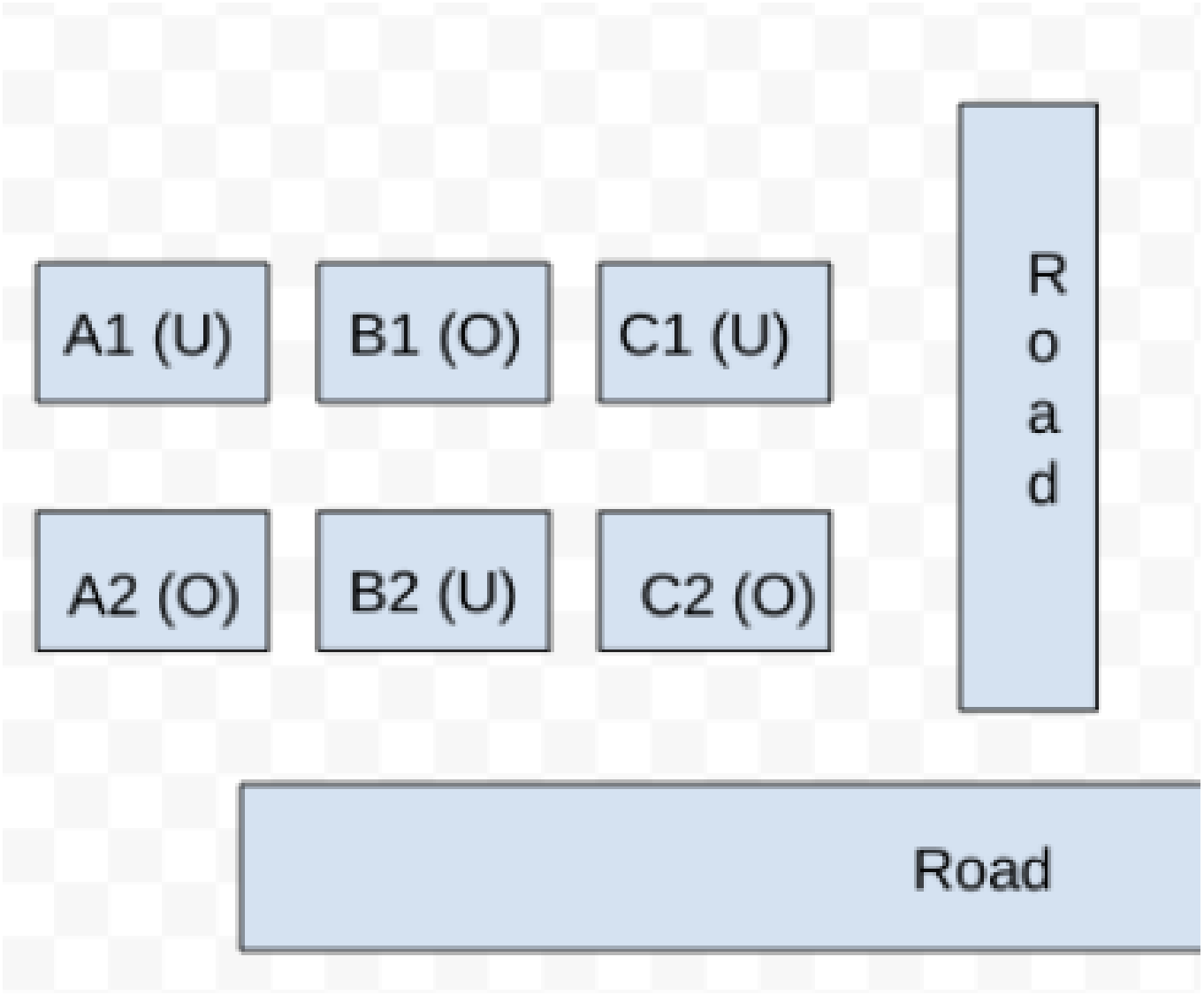

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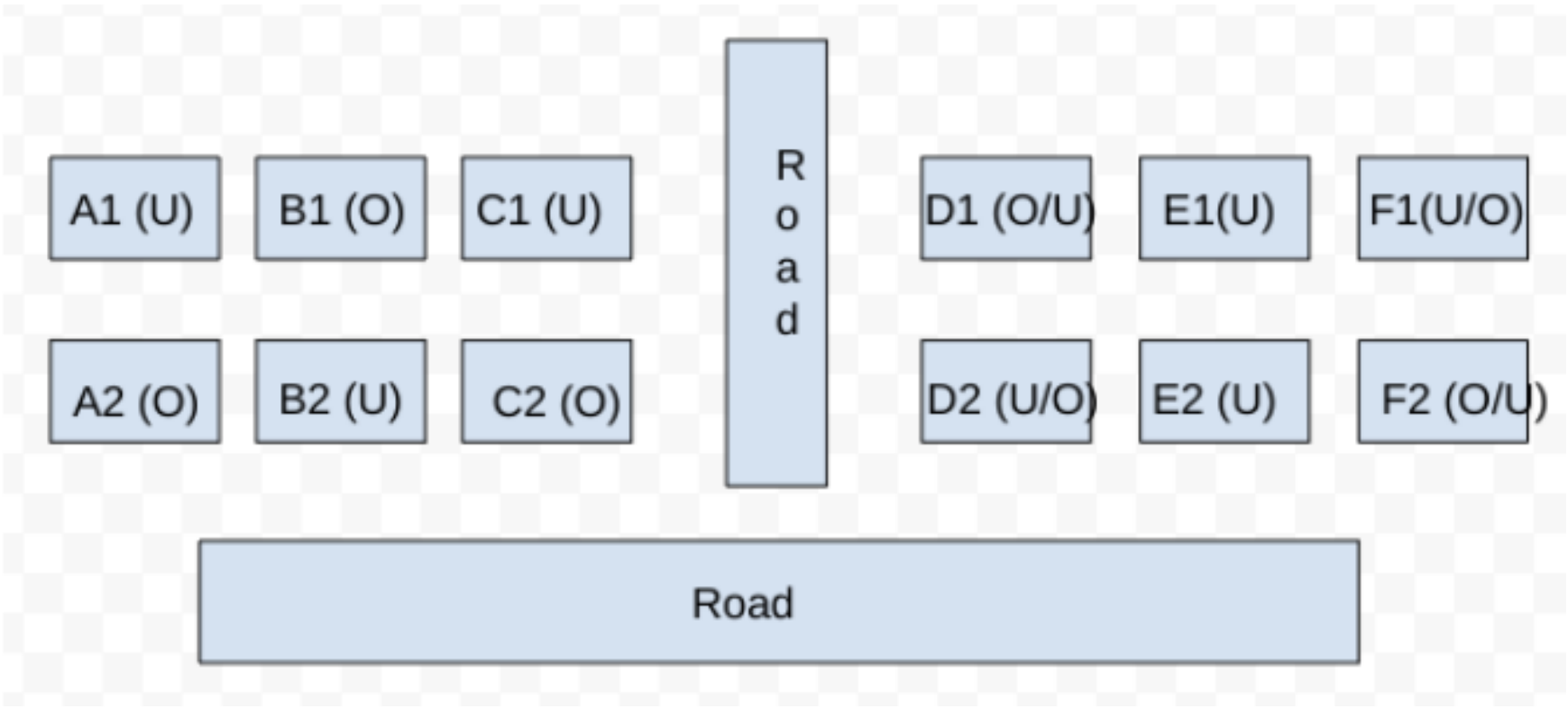


From the diagram, the vacant house with the maximum possible quoted price in column E is E2 when both D2 and F2 are occupied.

The maximum possible quoted price of E2 is $10 + 5 \times 1 + 3 \times 2 = 21$ Lacs. (E2 has no parking space because E1 has the parking space and it is given that there is only one house with parking space in Block YY.)

E. Which house in Block YY has parking space?

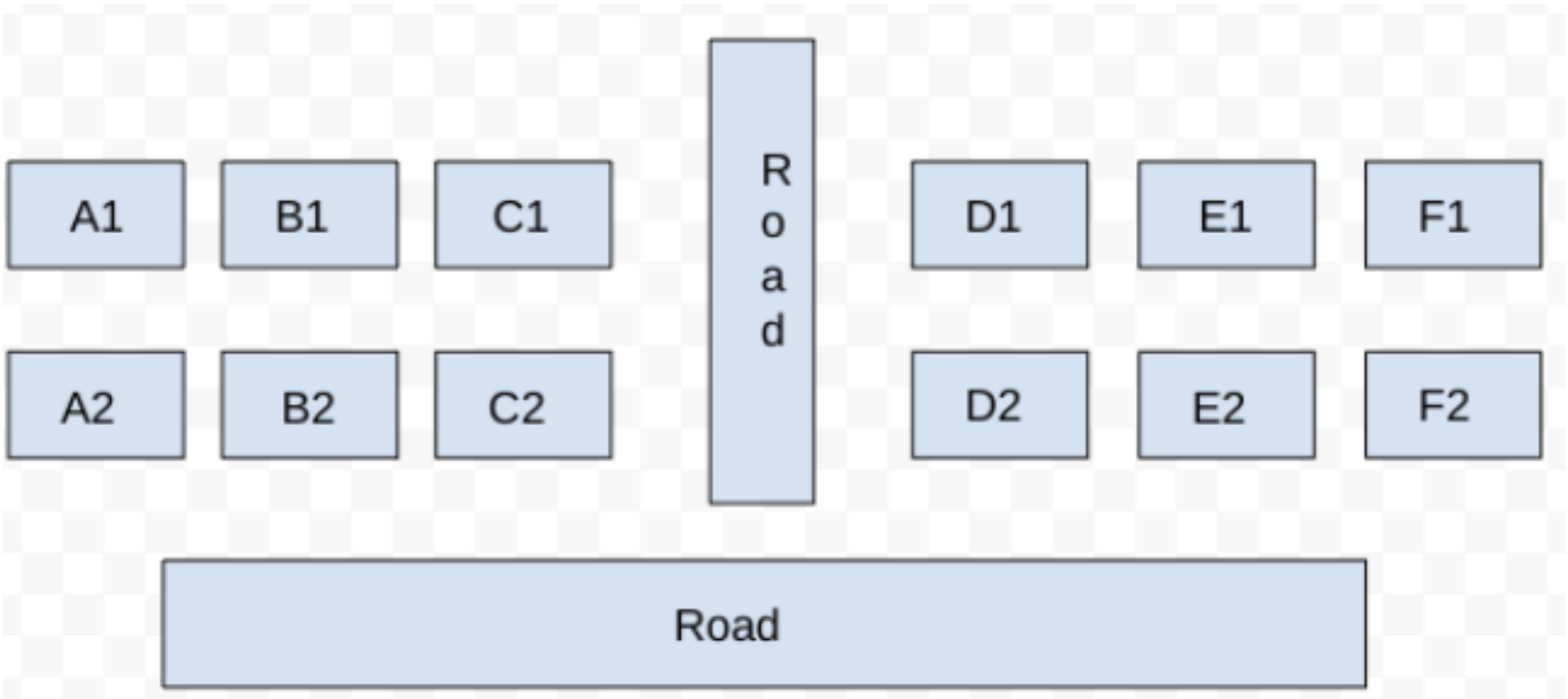
A E1

B F2

C E2

D F1

Solution



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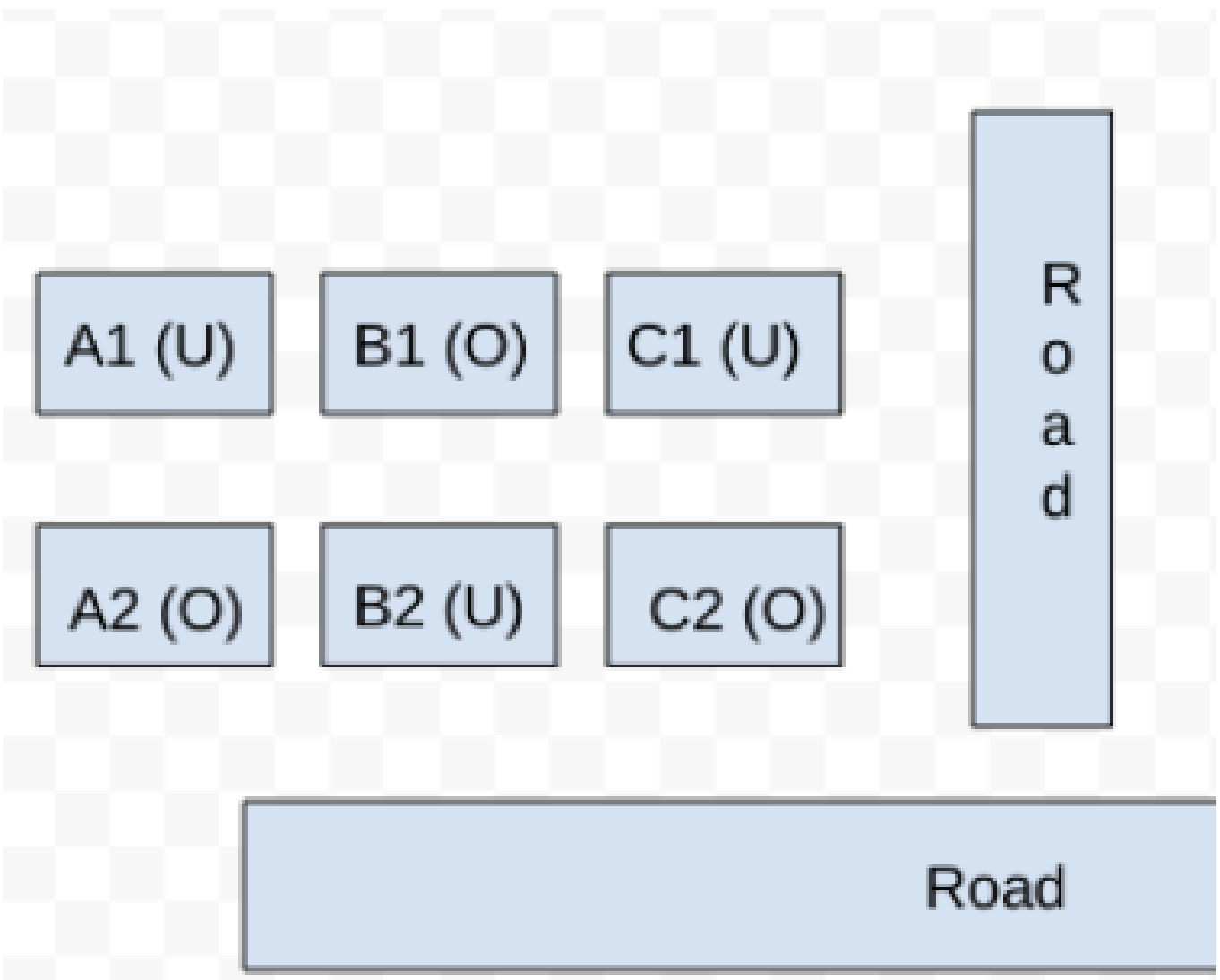

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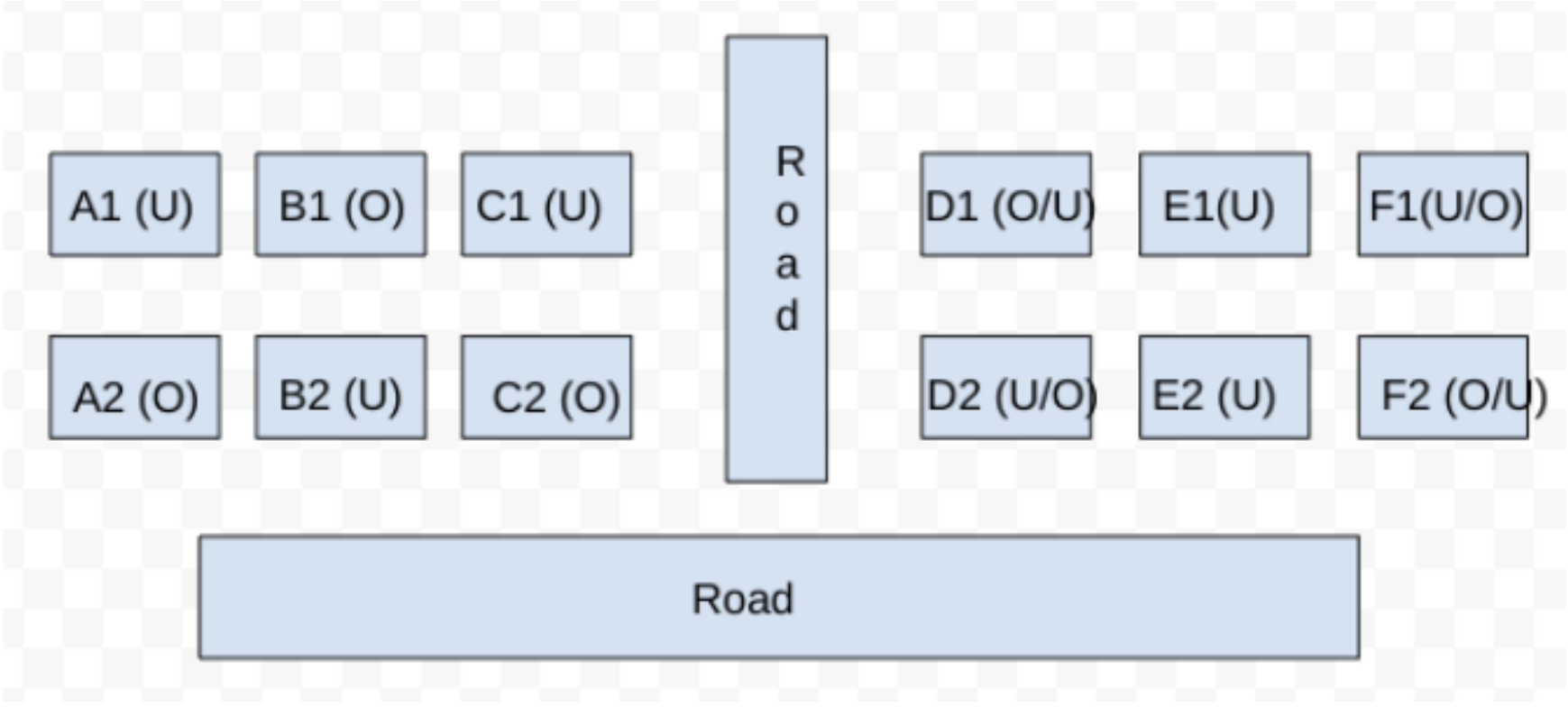


From the diagram, we can see that E1 has the parking space (case 2).

11.

Study the following information carefully and answer the given questions:

Five restaurants, coded R1, R2, R3, R4 and R5 gave integer ratings to five gig workers - Ullas, Vasu, Waman, Xavier and Yusuf, on a scale of 1 to 5. The means of the ratings given by R1, R2, R3, R4 and R5 were 3.4, 2.2, 3.8, 2.8 and 3.4 respectively. The summary statistics of these ratings for the five workers is given below.

	Ullas	Vasu	Waman	Xavier	Yusuf
Mean rating	2.2	3.8	3.4	3.6	2.6
Median rating	2	4	4	4	3
Modal rating	2	4	5	5	1 and 4
Range of rating*	3	3	4	4	3

- Range of ratings is defined as the difference between the maximum and minimum ratings awarded to a worker.

The following is partial information about ratings of 1 and 5 awarded by the restaurants to the workers

(a) R1 awarded a rating of 5 to Waman, as did R2 to Xavier, R3 to Waman and Xavier, and R5 to Vasu.

(b) R1 awarded a rating of 1 to Ullas, as did R2 to Waman and Yusuf, and R3 to Yusuf.

A. **How many individual ratings cannot be determined from the above information?**

A **0**

B 1

C 2

D 3

Solution

Given that the means of the ratings given by R1, R2, R3, R4 and R5 were 3.4, 2.2, 3.8, 2.8 and 3.4 respectively.

=> The sum of ratings given by R1, R2, R3 R4, R5 are 5*means = 17, 11, 19, 14, and 17 respectively.*

Similarly the sum of ratings received by U, V, W, X and Y are 5means = 11, 19, 17, 18, and 13 respectively.

Also capturing the absolute data given in the partial information (a) and (b) and representing as a table, we get:

	R1	R2	R3	R4	R5	Total
U	1					11
V					5	19
W	5	1	5			17
X		5	5			18
Y		1	1			13
Total	17	11	19	14	17	

Now,

Consider U

Given median = 2, mode = 2 and range = 3

=> His ratings should be of the form 1, a , 2, b, 4 => 1 + 2 + 4 + a + b = 11

=> a + b = 4. For mode = 2 => a = b = 2

=> U's ratings are 1, 2, 2, 2, 4.

Consider V

Given median = 4, mode = 4 and range = 3

=> His ratings should be of the form 2, a, 4, b, 5 => 2 + 4 + 5 + a + b = 19

=> a + b = 8 => For mode = 4 => a = b = 4

=> V's ratings are 2, 4, 4, 4, 5.

Consider W

Given median = 4, mode = 5 and range = 4

=> His ratings should be of the form 1, a, 4, 5, 5 => 1 + a + 4 + 5 + 5 = 17

=> a = 2

=> W's ratings are 1, 2, 4, 5, 5.

Consider X

Given median = 4, mode = 5 and range = 4

=> His ratings should be of the form 1, a, 4, 5, 5 => a + 1 + 4 + 5 + 5 = 18

=> a = 3

=> X's ratings are 1, 3, 4, 5, 5

Consider Y

Given median = 3, mode = 1 & 4, Range = 3

=> His ratings are 1, 1, 3, 4, 4.

Capturing this data in the table, we get:

	R1	R2	R3	R4	R5	Total	Entries
U	1					11	2,2,2,4
V					5	19	2,4,4,4
W	5	1	5			17	2,4
X		5	5			18	1,3,4
Y		1	1			13	3,4,4
Total	17	11	19	14	17		

Now, consider column R3 => The two missing entries should add up to 19 - 1 - 5 - 5 = 8, (only possibility is 4 + 4)

=> We can fill the row "U" and 4 in the row "V"

	R1	R2	R3	R4	R5	Total	Missing Entries
U	1	2	4	2	2	11	
V			4		5	19	2,4,4
W	5	1	5			17	2,4
X		5	5			18	1,3,4
Y		1	1			13	3,4,4
Total	17	11	19	14	17		

Now, consider column R2 => Missing entry should be 11 - 2 - 1 - 5 - 1 = 2

Consider column R1, the missing elements should add up to 17 - 5 - 4 - 1 = 7 (3 + 4 or 4 + 3) ----(1)

Consider R5, the missing elements should add up to 10 => 2 + 4 + 4 or 4 + 3 + 3 (not possible) as (1) requires a 3.

Now, we can fill column R1 as 3 + 4 and the remaining in column R4 and we can get the complete table

	R1	R2	R3	R4	R5	Total	Missing Entries
U	1	2	4	2	2	11	
V	4	2	4	4	5	19	
W	5	1	5	4	2	17	
X	3	5	5	1	4	18	
Y	4	1	1	3	4	13	
Total	17	11	19	14	17		

=> All ratings can be determined uniquely => 0.

B. To how many workers did R2 give a rating of 4?

A **0**

B 1

C 2

D 3

Solution

Given that the means of the ratings given by R1, R2, R3, R4 and R5 were 3.4, 2.2, 3.8, 2.8 and 3.4 respectively.

=> The sum of ratings given by R1, R2, R3 R4, R5 are 5*means = 17, 11, 19, 14, and 17 respectively.*

Similarly the sum of ratings received by U, V, W, X and Y are 5means = 11, 19, 17, 18, and 13 respectively.

Also capturing the absolute data given in the partial information (a) and (b) and representing as a table, we get:

	R1	R2	R3	R4	R5	Total
U	1					11
V					5	19
W	5	1	5			17
X		5	5			18
Y		1	1			13
Total	17	11	19	14	17	

Now,

Consider U

Given median = 2, mode = 2 and range = 3

=> His ratings should be of the form 1, a , 2, b, 4 => 1 + 2 + 4 + a + b = 11

=> a + b = 4. For mode = 2 => a = b = 2

=> U's ratings are 1, 2, 2, 2, 4.

Consider V

Given median = 4, mode = 4 and range = 3

=> His ratings should be of the form 2, a, 4, b, 5 => 2 + 4 + 5 + a + b = 19

=> a + b = 8 => For mode = 4 => a = b = 4

=> V's ratings are 2, 4, 4, 4, 5.

Consider W

Given median = 4, mode = 5 and range = 4

=> His ratings should be of the form 1, a, 4, 5, 5 => 1 + a + 4 + 5 + 5 = 17

=> a = 2

=> W's ratings are 1, 2, 4, 5, 5.

Consider X

Given median = 4, mode = 5 and range = 4

=> His ratings should be of the form 1, a, 4, 5, 5 => a + 1 + 4 + 5 + 5 = 18

=> a = 3

=> X's ratings are 1, 3, 4, 5, 5

Consider Y

Given median = 3, mode = 1 & 4, Range = 3

=> His ratings are 1, 1, 3, 4, 4.

Capturing this data in the table, we get:

	R1	R2	R3	R4	R5	Total	Entries
U	1					11	2,2,2,4
V					5	19	2,4,4,4
W	5	1	5			17	2,4
X		5	5			18	1,3,4
Y		1	1			13	3,4,4
Total	17	11	19	14	17		

Now, consider column R3 => The two missing entries should add up to 19 - 1 - 5 - 5 = 8, (only possibility is 4 + 4)

=> We can fill the row "U" and 4 in the row "V"

	R1	R2	R3	R4	R5	Total	Missing Entries
U	1	2	4	2	2	11	
V			4		5	19	2,4,4
W	5	1	5			17	2,4
X		5	5			18	1,3,4
Y		1	1			13	3,4,4
Total	17	11	19	14	17		

Now, consider column R2 => Missing entry should be 11 - 2 - 1 - 5 - 1 = 2

Consider column R1, the missing elements should add up to 17 - 5 - 4 - 1 = 7 (3 + 4 or 4 + 3) ----(1)

Consider R5, the missing elements should add up to 10 => 2 + 4 + 4 or 4 + 3 + 3 (not possible) as (1) requires a 3.

Now, we can fill column R1 as 3 + 4 and the remaining in column R4 and we can get the complete table

	R1	R2	R3	R4	R5	Total	Missing Entries
U	1	2	4	2	2	11	
V	4	2	4	4	5	19	
W	5	1	5	4	2	17	
X	3	5	5	1	4	18	
Y	4	1	1	3	4	13	
Total	17	11	19	14	17		

R2 gave ratings of 1, 1, 2, 2, 5 => He gave 4 to 0 workers => 0 is the answer.

C. **What rating did R1 give to Xavier?**

A 0

B 1

C 2

D **3**

Solution

Given that the means of the ratings given by R1, R2, R3, R4 and R5 were 3.4, 2.2, 3.8, 2.8 and 3.4 respectively.

=> The sum of ratings given by R1, R2, R3 R4, R5 are 5*means = 17, 11, 19, 14, and 17 respectively.*

Similarly the sum of ratings received by U, V, W, X and Y are 5means = 11, 19, 17, 18, and 13 respectively.

Also capturing the absolute data given in the partial information (a) and (b) and representing as a table, we get:

	R1	R2	R3	R4	R5	Total
U	1					11
V					5	19
W	5	1	5			17
X		5	5			18
Y		1	1			13
Total	17	11	19	14	17	

Now,

Consider U

Given median = 2, mode = 2 and range = 3

=> His ratings should be of the form 1, a , 2, b, 4 => 1 + 2 + 4 + a + b = 11

=> a + b = 4. For mode = 2 => a = b = 2

=> U's ratings are 1, 2, 2, 2, 4.

Consider V

Given median = 4, mode = 4 and range = 3

=> His ratings should be of the form 2, a, 4, b, 5 => 2 + 4 + 5 + a + b = 19

=> a + b = 8 => For mode = 4 => a = b = 4

=> V's ratings are 2, 4, 4, 4, 5.

Consider W

Given median = 4, mode = 5 and range = 4

=> His ratings should be of the form 1, a, 4, 5, 5 => 1 + a + 4 + 5 + 5 = 17

=> a = 2

=> W's ratings are 1, 2, 4, 5, 5.

Consider X

Given median = 4, mode = 5 and range = 4

=> His ratings should be of the form 1, a, 4, 5, 5 => a + 1 + 4 + 5 + 5 = 18

=> a = 3

=> X's ratings are 1, 3, 4, 5, 5

Consider Y

Given median = 3, mode = 1 & 4, Range = 3

=> His ratings are 1, 1, 3, 4, 4.

Capturing this data in the table, we get:

	R1	R2	R3	R4	R5	Total	Entries
U	1					11	2,2,2,4
V					5	19	2,4,4,4
W	5	1	5			17	2,4
X		5	5			18	1,3,4
Y		1	1			13	3,4,4
Total	17	11	19	14	17		

Now, consider column R3 => The two missing entries should add up to 19 - 1 - 5 - 5 = 8, (only possibility is 4 + 4)

=> We can fill the row "U" and 4 in the row "V"

	R1	R2	R3	R4	R5	Total	Missing Entries
U	1	2	4	2	2	11	
V			4		5	19	2,4,4
W	5	1	5			17	2,4
X		5	5			18	1,3,4
Y		1	1			13	3,4,4
Total	17	11	19	14	17		

Now, consider column R2 => Missing entry should be 11 - 2 - 1 - 5 - 1 = 2

Consider column R1, the missing elements should add up to 17 - 5 - 4 - 1 = 7 (3 + 4 or 4 + 3) ----(1)

Consider R5, the missing elements should add up to 10 => 2 + 4 + 4 or 4 + 3 + 3 (not possible) as (1) requires a 3.

Now, we can fill column R1 as 3 + 4 and the remaining in column R4 and we can get the complete table

	R1	R2	R3	R4	R5	Total	Missing Entries
U	1	2	4	2	2	11	
V	4	2	4	4	5	19	
W	5	1	5	4	2	17	
X	3	5	5	1	4	18	
Y	4	1	1	3	4	13	
Total	17	11	19	14	17		

=> From the table, we can see that R1 gave a rating of 3 to Xavier.

D. What is the median of the ratings given by R3 to the five workers?

A 2

B 3

C **4**

D 5

Solution

Given that the means of the ratings given by R1, R2, R3, R4 and R5 were 3.4, 2.2, 3.8, 2.8 and 3.4 respectively.

=> The sum of ratings given by R1, R2, R3 R4, R5 are 5*means = 17, 11, 19, 14, and 17 respectively.*

Similarly the sum of ratings received by U, V, W, X and Y are 5means = 11, 19, 17, 18, and 13 respectively.

Also capturing the absolute data given in the partial information (a) and (b) and representing as a table, we get:

	R1	R2	R3	R4	R5	Total
U	1					11
V					5	19
W	5	1	5			17
X		5	5			18
Y		1	1			13
Total	17	11	19	14	17	

Now,

Consider U

Given median = 2, mode = 2 and range = 3

=> His ratings should be of the form 1, a , 2, b, 4 => 1 + 2 + 4 + a + b = 11

=> a + b = 4. For mode = 2 => a = b = 2

=> U's ratings are 1, 2, 2, 2, 4.

Consider V

Given median = 4, mode = 4 and range = 3

=> His ratings should be of the form 2, a, 4, b, 5 => 2 + 4 + 5 + a + b = 19

=> a + b = 8 => For mode = 4 => a = b = 4

=> V's ratings are 2, 4, 4, 4, 5.

Consider W

Given median = 4, mode = 5 and range = 4

=> His ratings should be of the form 1, a, 4, 5, 5 => 1 + a + 4 + 5 + 5 = 17

=> a = 2

=> W's ratings are 1, 2, 4, 5, 5.

Consider X

Given median = 4, mode = 5 and range = 4

=> His ratings should be of the form 1, a, 4, 5, 5 => a + 1 + 4 + 5 + 5 = 18

=> a = 3

=> X's ratings are 1, 3, 4, 5, 5

Consider Y

Given median = 3, mode = 1 & 4, Range = 3

=> His ratings are 1, 1, 3, 4, 4.

Capturing this data in the table, we get:

	R1	R2	R3	R4	R5	Total	Entries
U	1					11	2,2,2,4
V					5	19	2,4,4,4
W	5	1	5			17	2,4
X		5	5			18	1,3,4
Y		1	1			13	3,4,4
Total	17	11	19	14	17		

Now, consider column R3 => The two missing entries should add up to 19 - 1 - 5 - 5 = 8, (only possibility is 4 + 4)

=> We can fill the row "U" and 4 in the row "V"

	R1	R2	R3	R4	R5	Total	Missing Entries
U	1	2	4	2	2	11	
V			4		5	19	2,4,4
W	5	1	5			17	2,4
X		5	5			18	1,3,4
Y		1	1			13	3,4,4
Total	17	11	19	14	17		

Now, consider column R2 => Missing entry should be 11 - 2 - 1 - 5 - 1 = 2

Consider column R1, the missing elements should add up to 17 - 5 - 4 - 1 = 7 (3 + 4 or 4 + 3) ----(1)

Consider R5, the missing elements should add up to 10 => 2 + 4 + 4 or 4 + 3 + 3 (not possible) as (1) requires a 3.

Now, we can fill column R1 as 3 + 4 and the remaining in column R4 and we can get the complete table

	R1	R2	R3	R4	R5	Total	Missing Entries
U	1	2	4	2	2	11	
V	4	2	4	4	5	19	
W	5	1	5	4	2	17	
X	3	5	5	1	4	18	
Y	4	1	1	3	4	13	
Total	17	11	19	14	17		

=> Ratings give by R3 are 1, 4, 4, 5, 5 => Median = 4.

E. **Which among the following restaurants gave its median rating to exactly one of the workers?**

A R2

B R5

C **R4**

D R3

Solution

Given that the means of the ratings given by R1, R2, R3, R4 and R5 were 3.4, 2.2, 3.8, 2.8 and 3.4 respectively.

=> The sum of ratings given by R1, R2, R3 R4, R5 are 5*means = 17, 11, 19, 14, and 17 respectively.*

Similarly the sum of ratings received by U, V, W, X and Y are 5means = 11, 19, 17, 18, and 13 respectively.

Also capturing the absolute data given in the partial information (a) and (b) and representing as a table, we get:

	R1	R2	R3	R4	R5	Total
U	1					11
V					5	19
W	5	1	5			17
X		5	5			18
Y		1	1			13
Total	17	11	19	14	17	

Now,

Consider U

Given median = 2, mode = 2 and range = 3

=> His ratings should be of the form 1, a , 2, b, 4 => 1 + 2 + 4 + a + b = 11

=> a + b = 4. For mode = 2 => a = b = 2

=> U's ratings are 1, 2, 2, 2, 4.

Consider V

Given median = 4, mode = 4 and range = 3

=> His ratings should be of the form 2, a, 4, b, 5 => 2 + 4 + 5 + a + b = 19

=> a + b = 8 => For mode = 4 => a = b = 4

=> V's ratings are 2, 4, 4, 4, 5.

Consider W

Given median = 4, mode = 5 and range = 4

=> His ratings should be of the form 1, a, 4, 5, 5 => 1 + a + 4 + 5 + 5 = 17

=> a = 2

=> W's ratings are 1, 2, 4, 5, 5.

Consider X

Given median = 4, mode = 5 and range = 4

=> His ratings should be of the form 1, a, 4, 5, 5 => a + 1 + 4 + 5 + 5 = 18

=> a = 3

=> X's ratings are 1, 3, 4, 5, 5

Consider Y

Given median = 3, mode = 1 & 4, Range = 3

=> His ratings are 1, 1, 3, 4, 4.

Capturing this data in the table, we get:

	R1	R2	R3	R4	R5	Total	Entries
U	1					11	2,2,2,4
V					5	19	2,4,4,4
W	5	1	5			17	2,4
X		5	5			18	1,3,4
Y		1	1			13	3,4,4
Total	17	11	19	14	17		

Now, consider column R3 => The two missing entries should add up to 19 - 1 - 5 - 5 = 8, (only possibility is 4 + 4)

=> We can fill the row "U" and 4 in the row "V"

	R1	R2	R3	R4	R5	Total	Missing Entries
U	1	2	4	2	2	11	
V			4		5	19	2,4,4
W	5	1	5			17	2,4
X		5	5			18	1,3,4
Y		1	1			13	3,4,4
Total	17	11	19	14	17		

Now, consider column R2 => Missing entry should be 11 - 2 - 1 - 5 - 1 = 2

Consider column R1, the missing elements should add up to 17 - 5 - 4 - 1 = 7 (3 + 4 or 4 + 3) ----(1)

Consider R5, the missing elements should add up to 10 => 2 + 4 + 4 or 4 + 3 + 3 (not possible) as (1) requires a 3.

Now, we can fill column R1 as 3 + 4 and the remaining in column R4 and we can get the complete table

	R1	R2	R3	R4	R5	Total	Missing Entries
U	1	2	4	2	2	11	
V	4	2	4	4	5	19	
W	5	1	5	4	2	17	
X	3	5	5	1	4	18	
Y	4	1	1	3	4	13	
Total	17	11	19	14	17		

=> R2 median rating is 2 => given to 2 workers

=> R5 median rating is 4 => given to 2 workers

=> R4 median rating is 3 => given to only 1 worker.

=> R3 median rating is 4 => given to 2 workers.

12.

Study the following information carefully and answer given questions:

Faculty members in a management school can belong to one of four departments - Finance and Accounting (F&A), Marketing and Strategy (M&S), Operations and Quants (O&Q) and Behaviour and Human Resources (B&H). The numbers of faculty members in F&A, M&S, O&Q and B&H departments are 9, 7, 5 and 3 respectively. Prof. Pakrasi, Prof. Qureshi, Prof. Ramaswamy and Prof. Samuel are four members of the school's faculty who were candidates for the post of the Dean of the school. Only one of the candidates was from O&Q.

Every faculty member, including the four candidates, voted for the post. In each department, all the faculty members who were not candidates voted for the same candidate. The rules for the election are listed below.

1. There cannot be more than two candidates from a single department.
2. A candidate cannot vote for himself/herself.
3. Faculty members cannot vote for a candidate from their own department. After the election, it was observed that Prof. Pakrasi received 3 votes, Prof. Qureshi received 14 votes, Prof. Ramaswamy received 6 votes and Prof. Samuel received 1 vote. Prof. Pakrasi voted for Prof. Ramaswamy, Prof. Qureshi for Prof. Samuel, Prof. Ramaswamy for Prof. Qureshi and Prof. Samuel for Prof. Pakrasi.

A. **Which two candidates can belong to the same department?**

A **Prof. Pakrasi and Prof. Qureshi**

B Prof. Pakrasi and Prof. Samuel

C Prof. Qureshi and Prof. Ramaswamy

D Prof. Ramaswamy and Prof. Samuel

Solution

Now, we know there is only 1 candidate from OQ, which means that the number of non-candidate voters in OQ will be 4.
We also know that the non-candidates in a particular department voted as a block, and we also know that the least number of non-candidate voters in a particular department can be 1 (BH, 3-2 faculty).
Now, we also know that R got 5 votes from non-candidates.
Now we can write 5 as
i)5
ii)4+1
iii)3+2

Considering case (i) 4+1. This is only possible when there is 1 candidate from OQ, and there are 2 candidates from BH. This implies that the number of candidates in FA and MQ is 1. Now, if we consider FA and MQ and put only 1 candidate there, it implies that there are 15 non-candidate voters between them. Now we know this is not possible since the maximum number of non-candidate voters a candidate can get is 13. (Please note that noncandidates of a particular department vote as a block).

On similar grounds, we can eliminate Case (iii) as it also implies there is only 1 candidate in FA and MQ.

Now, considering Case (i), we know that 5+0 will happen only one when there are 5 non-candidates in a single department. This is only possible in MS (Out of 7, there will be 2 candidates and 5 non-candidates).

So we can conclude that MS has 2 candidates and that they voted Prof. R…….(i)

We also know that Prof P got 2 votes from Non-candidates. This is only possible when BH has 1 candidate.

So, we can conclude that the number of professors in FA, MS, OQ, BH is 0,2,1,1

	FA	MS	OQ	BH
Total number of voters	9	7	5	3
Number of candidates	0	2	1	1
Number of non-candidates	9	5	4	2

Thus, we get the following table:

	P	Q	R	S
Total Votes	3	14	6	1
Candidate Vote	1(S)	1(R)	1(P)	1(Q)
Votes from non candidates	2	13	5	0
	BH	FA+OQ	MS	

Now, if we consider Department MS, we know that there are 2 candidates from MS and R can't be one of them as the people in that department voted for him….. (3 rd condition).

So the possible combinations of candidates in MS are (P,Q), (Q,S), (P,S).

Now we also know that no one can vote for a candidate in their own department, so we can eliminate (P,S) and (Q,S) as we know that S voted for P and Q voted for S).

So we can infer that P and Q are from MS.

	FA	MS	OQ	BH
Case 1	0	P, Q	R	S
Case 2	0	P, Q	S	R

Now, among the given options, Only Option A is true. Therefore, Option A is the correct answer.

B. **Which of the following can be the number of votes that Prof. Qureshi received from a single department?**

A 7

B 6

C 8

D 9

Solution

Now, we know there is only 1 candidate from OQ, which means that the number of non-candidate voters in OQ will be 4.

We also know that the non-candidates in a particular department voted as a block, and we also know that the least number of non-candidate voters in a particular department can be 1 (BH, 3-2 faculty).

Now, we also know that R got 5 votes from non-candidates.

Now we can write 5 as

i)5

ii)4+1

iii)3+2

Considering case (i) 4+1. This is only possible when there is 1 candidate from OQ, and there are 2 candidates from BH. This implies that the number of candidates in FA and MQ is 1. Now, if we consider FA and MQ and put only 1 candidate there, it implies that there are 15 non-candidate

voters between them. Now we know this is not possible since the maximum number of non-candidate voters a candidate can get is 13. (Please note that noncandidates of a particular department vote as a block).

On similar grounds, we can eliminate Case (iii) as it also implies there is only 1 candidate in FA and MQ.

Now, considering Case (i), we know that 5+0 will happen only one when there are 5 non-candidates in a single department. This is only possible in MS (Out of 7, there will be 2 candidates and 5 non-candidates).

So we can conclude that MS has 2 candidates and that they voted Prof. R…….(i)

We also know that Prof P got 2 votes from Non-candidates. This is only possible when BH has 1 candidate.

So, we can conclude that the number of professors in FA, MS, OQ, BH is 0,2,1,1

	FA	MS	OQ	BH
Total number of voters	9	7	5	3
Number of candidates	0	2	1	1
Number of non-candidates	9	5	4	2

Thus, we get the following table:

	P	Q	R	S
Total Votes	3	14	6	1
Candidate Vote	1(S)	1(R)	1(P)	1(Q)
Votes from non candidates	2	13	5	0
	BH	FA+OQ	MS	

Now, if we consider Department MS, we know that there are 2 candidates from MS and R can’t be one of them as the people in that department voted for him….. (3 rd condition).

So the possible combinations of candidates in MS are (P,Q), (Q,S), (P,S).

Now we also know that no one can vote for a candidate in their own

department, so we can eliminate (P,S) and (Q,S) as we know that S voted for P and Q voted for S).

So we can infer that P and Q are from MS.

	FA	MS	OQ	BH
Case 1	0	P, Q	R	S
Case 2	0	P, Q	S	R

Now, we can see that the number of votes that Prof Qureshi received from a single department can be 9 or 5 (if R is from OQ) or 4 (if R is not from OQ).

So, among the options, only Option D can be true. Therefore, Option D is the correct answer.

C. **If Prof. Samuel belongs to B&H, which of the following statements is/are true?**
Statement A: Prof. Pakrasi belongs to M&S.
Statement B: Prof. Ramaswamy belongs to O&Q

A Neither statement A nor statement B

B Only statement B

C Only statement A

D **Both statements A and B**

Solution

Now, we know there is only 1 candidate from OQ, which means that the number of non-candidate voters in OQ will be 4.

We also know that the non-candidates in a particular department voted as a block, and we also know that the least number of non-candidate voters in a particular department can be 1 (BH, 3-2 faculty).

Now, we also know that R got 5 votes from non-candidates.

Now we can write 5 as

i)5

ii)4+1

iii)3+2

Considering case (i) 4+1. This is only possible when there is 1 candidate from OQ, and there are 2 candidates from BH. This implies that the number of candidates in FA and MQ is 1. Now, if we consider FA and MQ and put only 1 candidate there, it implies that there are 15 non-candidate voters between them. Now we know this is not possible since the maximum number of non-candidate voters a candidate can get is 13. (Please note that noncandidates of a particular department vote as a block).

On similar grounds, we can eliminate Case (iii) as it also implies there is only 1 candidate in FA and MQ.

Now, considering Case (i), we know that 5+0 will happen only one when there are 5 non-candidates in a single department. This is only possible in MS (Out of 7, there will be 2 candidates and 5 non-candidates).

So we can conclude that MS has 2 candidates and that they voted Prof. R…….(i)

We also know that Prof P got 2 votes from Non-candidates. This is only possible when BH has 1 candidate.

So, we can conclude that the number of professors in FA, MS, OQ, BH is 0,2,1,1

	FA	MS	OQ	BH
Total number of voters	9	7	5	3
Number of candidates	0	2	1	1
Number of non-candidates	9	5	4	2

Thus, we get the following table:

	P	Q	R	S
Total Votes	3	14	6	1
Candidate Vote	1(S)	1(R)	1(P)	1(Q)
Votes from non candidates	2	13	5	0
	BH	FA+OQ	MS	

Now, if we consider Department MS, we know that there are 2 candidates from MS and R can't be one of them as the people in that department voted for him….. (3 rd condition).

So the possible combinations of candidates in MS are (P,Q), (Q,S), (P,S).

Now we also know that no one can vote for a candidate in their own department, so we can eliminate (P,S) and (Q,S) as we know that S voted for P and Q voted for S).

So we can infer that P and Q are from MS.

	FA	MS	OQ	BH
Case 1	0	P, Q	R	S
Case 2	0	P, Q	S	R

We have been told Prof Samuel belongs to B&H. So we have to consider only Case 1. In Case 1 we can see that Prof Prakash belongs to MS and Prof Ramaswamy belongs to OQ.

Therefore, both the statements are true.

So, the correct answer is Option D

D. What best can be concluded about the candidate from O&Q?

A It was Prof. Samuel.

B **It was either Prof. Ramaswamy or Prof. Samuel.**

C It was Prof. Ramaswamy.

D It was either Prof. Pakrasi or Prof. Qureshi.

Solution

Now, we know there is only 1 candidate from OQ, which means that the number of non-candidate voters in OQ will be 4.

We also know that the non-candidates in a particular department voted as a block, and we also know that the least number of non-candidate voters in a particular department can be 1 (BH, 3-2 faculty).

Now, we also know that R got 5 votes from non-candidates.

Now we can write 5 as

i)5

ii)4+1

iii)3+2

Considering case (i) 4+1. This is only possible when there is 1 candidate from OQ, and there are 2 candidates from BH. This implies that the number of candidates in FA and MQ is 1. Now, if we consider FA and MQ and put only 1 candidate there, it implies that there are 15 non-candidate voters between them. Now we know this is not possible since the maximum number of non-candidate voters a candidate can get is 13. (Please note that noncandidates of a particular department vote as a block).

On similar grounds, we can eliminate Case (iii) as it also implies there is only 1 candidate in FA and MQ.

Now, considering Case (i), we know that 5+0 will happen only one when there are 5 non-candidates in a single department. This is only possible in MS (Out of 7, there will be 2 candidates and 5 non-candidates).

So we can conclude that MS has 2 candidates and that they voted Prof. R…….(i)
We also know that Prof P got 2 votes from Non-candidates. This is only possible when BH has 1 candidate.
So, we can conclude that the number of professors in FA, MS, OQ, BH is 0,2,1,1

	FA	MS	OQ	BH
Total number of voters	9	7	5	3
Number of candidates	0	2	1	1
Number of non-candidates	9	5	4	2

Thus, we get the following table:

	P	Q	R	S
Total Votes	3	14	6	1
Candidate Vote	1(S)	1(R)	1(P)	1(Q)
Votes from non candidates	2	13	5	0
	BH	FA+OQ	MS	

Now, if we consider Department MS, we know that there are 2 candidates from MS and R can't be one of them as the people in that department voted for him….. (3 rd condition).
So the possible combinations of candidates in MS are (P,Q), (Q,S), (P,S).
Now we also know that no one can vote for a candidate in their own department, so we can eliminate (P,S) and (Q,S) as we know that S voted for P and Q voted for S).
So we can infer that P and Q are from MS.

	FA	MS	OQ	BH
Case 1	0	P, Q	R	S
Case 2	0	P, Q	S	R

From the 2 cases, we can see that the candidate from OQ can either be Prof Ramaswamy or Prof Samuel. Therefore, the correct answer is Option B.

E. **Which of the following statements is/are true?**
Statement A: Non-candidates from M&S voted for Prof. Qureshi.
Statement B: Non-candidates from F&A voted for Prof. Qureshi.

A Both statements A and B

B **Only statement B**

C Only statement A

D Neither statement A nor statement B

Solution

Now, we know there is only 1 candidate from OQ, which means that the number of non-candidate voters in OQ will be 4.
We also know that the non-candidates in a particular department voted as a block, and we also know that the least number of non-candidate voters in a particular department can be 1 (BH, 3-2 faculty).
Now, we also know that R got 5 votes from non-candidates.
Now we can write 5 as

i)5

ii)4+1

iii)3+2

Considering case (i) 4+1. This is only possible when there is 1 candidate from OQ, and there are 2 candidates from BH. This implies that the number of candidates in FA and MQ is 1. Now, if we consider FA and MQ and put only 1 candidate there, it implies that there are 15 non-candidate voters between them. Now we know this is not possible since the maximum number of non-candidate voters a candidate can get is 13. (Please note that noncandidates of a particular department vote as a block).

On similar grounds, we can eliminate Case (iii) as it also implies there is only 1 candidate in FA and MQ.

Now, considering Case (i), we know that 5+0 will happen only one when there are 5 non-candidates in a single department. This is only possible in MS (Out of 7, there will be 2 candidates and 5 non-candidates).

So we can conclude that MS has 2 candidates and that they voted Prof. R…….(i)
We also know that Prof P got 2 votes from Non-candidates. This is only possible when BH has 1 candidate.

So, we can conclude that the number of professors in FA, MS, OQ, BH is 0,2,1,1

	FA	MS	OQ	BH
Total number of voters	9	7	5	3
Number of candidates	0	2	1	1
Number of non-candidates	9	5	4	2

Thus, we get the following table:

	P	Q	R	S
Total Votes	3	14	6	1
Candidate Vote	1(S)	1(R)	1(P)	1(Q)
Votes from non candidates	2	13	5	0
	BH	FA+OQ	MS	

Now, if we consider Department MS, we know that there are 2 candidates from MS and R can’t be one of them as the people in that department voted for him….. (3 rd condition).

So the possible combinations of candidates in MS are (P,Q), (Q,S), (P,S).

Now we also know that no one can vote for a candidate in their own department, so we can eliminate (P,S) and (Q,S) as we know that S voted for P and Q voted for S).

So we can infer that P and Q are from MS.

	FA	MS	OQ	BH
Case 1	0	P, Q	R	S
Case 2	0	P, Q	S	R

Since Prof Qureshi belongs to MS, non-candidates from MS can't vote for him. We can see that the noncandidates from FA voted for him. So, only statement B is true. Therefore, the correct answer is Option B.

13. **Let n be the least positive integer such that 168 is a factor of 1134^n . If m is the least positive integer such that 1134^n is a factor of 168^n , then m + n equals**

A 9

B 15

C 12

D 24

Solution

Prime Factorising 1134, we get 1134 =$2 \times 3^4 \times 7$ and 168 =$2^3 \times 3 \times 7$

1134^n is a factor of 168 => the factor of 2 should be atleast 3, for 168 to be a factor => n = 3. Now, $1134^n = 1134^3 = 2^3 \times 3^{12} \times 7^3$ is a factor of $168^m = (2^3 \times 3 \times 7)^m$ => m = 12 as power of 3 should be atleast 12.

=> So, m + n = 15.

14. **If x and y are positive real numbers such that $log_x(x^2+12)=4\ and\ 3\ log_y x=1$, then x+y equals:**

A 20

B 68

C **10**

D 11

Solution

Given, $log_x(x^2+12)=4$

=> $x^2+4=x^4$

=> $x^4-x^2-12=0$

=> $x^4-4x^2+3x^2-12=0$

=> $x^2\left(x^2-4\right)+3\left(x^2-4\right)=0$

=> $\left(x^2-4\right)\left(x^2+3\right)=0$ => since, x is a positive real number (given) => x = 2.

Now, Given $3\log_y x=1$

=> $\log_y x=\frac{1}{3}$

=> $x=y^{\frac{1}{3}}$

=> $y=x^3$ => y = 8.

=> x + y = 2 + 8 = 10.

15. If $\sqrt{5x+9}+\sqrt{5x-9}=3(2+\sqrt{2})$, then $\sqrt{10x+9}$ is equal to

A $3\sqrt{31}$

B $4\sqrt{5}$

C $3\sqrt{7}$

D $2\sqrt{7}$

Solution

Given, $\sqrt{5x+9}+\sqrt{5x-9}=3(2+\sqrt{2})$

=> $\sqrt{5x+9}+\sqrt{5x-9}=6+3\sqrt{2}$

=> $\sqrt{5x+9}+\sqrt{5x-9}=\sqrt{36}+\sqrt{18}$

Comparing the L.H.S. and R.H.S.

=> $5x+9=36$ => $5x=27$ => $x=\frac{27}{5}$

=> $\sqrt{10x+9}$ = $\sqrt{\left(10\times\frac{27}{5}\right)+9}$ = $\sqrt{63}=3\sqrt{7}$

16. If x and y are real numbers such that $x^2 + (x - 2y - 1)^2 = -4y(x + y)$, then the value $x - 2y$ is

A 0

B 1

C -1

D 2

Solution

Given, $x^2 + (x - 2y - 1)^2 = -4y(x + y)$

=> $x^2 + 4xy + 4y^2 + (x - 2y - 1)^2 = 0$

=> $(x + 2y)^2 + (x - 2y - 1)^2 = 0$

For the L.H.S. of the equation to be 0, each of the square terms should be 0 (as squares cannot be negative)

=> x - 2y - 1 = 0 => x - 2y = 1

17. **The number of integer solutions of equation $2|x|(x^2+1)=5x^2$ is**

A 1

B 2

C 3

D 4

Solution

Let us consider 3 cases:

1) x = 0, This is a solution, as both L.H.S and R.H.S will be equal (0) when x = 0. (1 solution)

2) x > 0

=> $2x\left(x^2+1\right)=5x^2$

=> $2\left(x^2+1\right)=5x$

=> $2x^2-5x+2=0$ => $2x^2-4x-x-2=0$

=> $2x\left(x-2\right)-1\left(x-2\right)=0$

=> $\left(x-2\right)\left(2x-1\right)=0$ => x = 2 or 1/2 => (1 integer solution)

3) x < 0

=> $-2x\left(x^2+1\right)=5x^2$

=> $2x^2+5x+2=0$

=> $2x^2+4x+x+2=0$

=> $2x\left(x+2\right)+1\left(x+2\right)=0$

=> $\left(x+2\right)\left(2x+1\right)=0$ => x = -2 or -1/2 => (1 integer solution)

18. **The equation $x^3 + (2r + 1)x^2 + (4r - 1)x + 2 = 0$ has -2 as one of the roots. If the other two roots are real, then the minimum possible non-negative integer value of r is**

A 1

B 2

C 3

D 4

Solution

Given that -2 is a root of the given cubic equation.

=> Dividing the given equation by (x + 2), Using the Horners method of synthetic division:

coefficient of is 1, and coefficient of x is (2r+1)-2 = 2r-1 and the constant term = (4r-1)-2(2r-1) = 1.

=> The quadratic obtained by dividing the cubic = $x^2 + (2r - 1)x + 1 = 0$, Since, this equation has 2 real roots => Discriminant should be greater than 0

=> $(2r - 1)^2 > 4$=> 2r-1 > 2 or 2r-1 < -2 => r > $\frac{3}{2}$ or r < $\frac{-1}{2}$.

=> Minimum possible non-negative integer value of r is 2.

19. **Let α and β be the two distinct roots of the equation $2x^2 - 6x + k = 0$, such that ($\alpha + \beta$) and $\alpha\beta$ are the distinct roots of the equation $x^2 + px + p = 0$. Then, the value of 8(k - p) is**

A 4

B 5

C 8

D 6

Solution

Given a and b are the distinct roots of the equation $2x^2 - 6x + k = 0$

=> a + b = -(-6/2) = 3 (Sum of the roots)

=> ab = k/2 (Product of the roots)

Now, (a+b) and ab are the roots of the quadratic equation $x^2 + px + p = 0$

=> a + b + ab = -p => 3 + k/2 = -p ---(1)

=> (a + b)(ab) = p => 3(k/2) = p ---(2)

$3 + \frac{k}{2} = -\frac{3k}{2}$ => 2k = -3 => k = $-\frac{3}{2}$

p = $\frac{3k}{2} = \frac{3}{2}\left(-\frac{3}{2}\right) = -\frac{9}{4}$

=> 8(k-p) = $8\left(-\frac{3}{2} + \frac{9}{4}\right) = -12 + 18 = 6$

20. **A mixture P is formed by removing a certain amount of coffee from a coffee jar and replacing the same amount with cocoa powder. The same amount is again removed from mixture P and replaced with same amount of cocoa powder to form a new mixture Q. If the ratio of coffee and cocoa in the mixture Q is 16 : 9, then the ratio of cocoa in mixture P to that in mixture Q is:**

A 1 : 3

B 1 : 2

C **5 : 9**

D 4 : 9

Solution

Given that in the final mixture, the ratio of coffee and cocoa is 16:9

Let us assume coffee is 16 units and cocoa is 9 units.

=> Initially, there are 25 units of coffee and 0 units of cocoa

Let's say x units of the mixture is removed and replaced with cocoa

=> Now, we have (25-x) coffee and x units of cocoa. => Mixture P

Now, if x units of the mixture is removed:

Amount of coffee present = $(25-x)-\frac{25-x}{25}\times x$

=> $(25-x)(1-\frac{x}{25})=16$

=> $(25-x)^2=400$

=> 25 - x = 20 => x = 5.

In mixture P, cocoa = x = 5

In mixture Q, cocoa = 9 units.

=> Required ratio = 5:9

21. **The minor angle between the hours hand and minutes hand of a clock was observed at 8:48 am. The minimum duration, in minutes, after 8.48 am when this angle increases by 50% is:**

A $\frac{36}{11}$

B 2

C 3

D $\frac{24}{11}$

Solution

The given time is 8:48 AM.

Angle made by hours hand w.r.t 12 is 8 $\times$ 30 (30 degrees in 1 hour) + 0.5 $\times$ 48 (0.5 degree in 1 minute) = 240 + 24 = 264 degrees.

Angle made by minutes hands w.r.t 12 is 48 $\times$ 6 = 288 degrees.

=> The angle between them is 288 - 264 = 24 degrees.

This should further increase by 12 degrees (50% of 24)

After m minutes, the further increase in angle = (6 - 0.5) $\times$ m = $\frac{11}{2}m = 12 => m = \frac{24}{11}$

22. **Gita sells two objects A and B at the same price such that she makes a profit of 20% on object A and a loss of 10% on object B. If she increases the selling price such that objects A and B are still sold at an equal price and a profit of 10% is made on object B, then the profit made on object A will be nearest to**

A 42%

B 45%

C **47%**

D 49%

Solution

Let us assume the initial selling prices of A and B is p.

Given, she made profit of 20% on A => 1.2 $\times$ c = p => c = $\frac{5p}{6}$ => cost of A is $\frac{5}{6}p$

Given, she made a loss of 10% on B => 0.9 $\times$ c = p => c = $\frac{10p}{9}$ => cost of B is $\frac{10}{9}p$

Now, she sold them at a price such that a 10% profit is made on B

=> Selling price = s = $\frac{11}{10} \times \frac{10}{9}p$ => $\frac{11}{9}p$

=> Profit % on A = $\frac{\frac{11}{9} - \frac{5}{6}}{\frac{5}{6}} \times 100 = 46.66\% = nearly\ 47\ \%$

23. **Brishti went on an 8-hour trip in a car. Before the trip, the car had travelled a total of x km till then, where x is a whole number and is palindromic, i.e., x remains unchanged when its digits are reversed. At the end of the trip, the car had travelled a total of 26862 km till then, this number again being palindromic. If Brishti never drove at more than 110 km/h, then the greatest possible average speed at which she drove during the trip, in km/h, was**

A 110

B 90

C **100**

D 80

Solution

Given the total number of kilometres travelled, including the trip = is 26862 Km, and the duration of the trip is 8 hrs.

If avg. speed of the car during the trip is 's' => the km travelled till just before the trip is 26862 - 8s, which should also be a palindrome.

=> From the options if s = 110 => The reading will be 26862 - 110× 8 = 25982 (Not a palindrome)

=> If s = 100 => The reading will be 26862 - 100× 8 = 26062 => It is a palindrome.

=> s = 100 is the correct option.

24. **In an examination, the average marks of 4 girls and 6 boys is 24. Each of the girls has the same marks while each of the boys has the same marks. If the marks of any girl is at most double the marks of any boy, but not less than the marks of any boy, then the number of possible distinct integer values of the total marks of 2 girls and 6 boys is**

A 21

B 20

C 22

D 19

Solution

Given that the average marks of 4 girls and 6 boys is 24.

Let us assume 'b' is the marks scored by a boy and 'g' is the marks scored by a girl.

=> 4g + 6b = 10 × 24 = 240 ---(1)

Given that, $b \leq g \leq 2b$

We need to find the distinct possible values of 2g + 6b = 2g + 240 - 4g = 240 - 2g.

From (1),

when b = g => 10g = 240 => g = 24

when b = $\frac{g}{2}$ => 7g = 240 => g = $\frac{240}{7}$

=> 240 - 2g varies from 240 - 2$\times$ 24 to 240 - 2 $\times$ $\frac{240}{7}$

=> 171.42 to 192 => Integer values of 172 to 192 => 21 values

25. **The salaries of three friends Sita, Gita and Mita are initially in the ratio 5 : 6 : 7, respectively. In the first year, they get salary hikes of 20%, 25% and 20%, respectively. In the second year, Sita and Mita get salary hikes of 40% and 25%, respectively, and the salary of Gita becomes equal to the mean salary of the three friends. The salary hike of Gita in the second year is:**

A 25%

B 28%

C **26%**

D 30%

Solution

Given, the salaries of Sita, Gita and Mita are initially in the ratio 5 : 6 : 7, respectively, Let us assume their salaries are 5p, 6p and 7p.

They get salary hikes of 20%, 25% and 20%, respectively.

=> Their salaries are $\frac{6}{5} \times 5p$, $\frac{5}{4} \times 6p$ *and* $\frac{6}{5} \times 7p$ => 6p, 7.5p, 8.4p

Now, Sita and Mita get salary hikes of 40% and 25%, respectively

=> Sita's salary = $1.4 \times 6p = 8.4p$ and Mita's salary =$1.25 \times 8.4p$ = 10.5p

Let Gita's salary be 'g' after hike

=> 3g = 8.4p + g + 10.5p => 2g = 18.9p => g = 9.45p

=> Hike % = $\frac{9.45-7.5}{7.5} \times 100 = 26\%$

26. **Arvind travels from town A to town B, and Surbhi from town B to town A, both starting at the same time along the same route. After meeting each other, Arvind takes 6 hours to reach town B while Surbhi takes 24 hours to reach town A. If Arvind travelled at a speed of 54 km/h, then the distance, in km, between town A and town B is:**

A 924

B 1012

C 900

D **972**

Solution

Let us assume the speeds of Arvind and Surbhi are 'a' and 's', respectively.

Let us say they meet after 't' hours

=> Arvind travelled s$\times$t distance in 6 hrs and Surbhi travelled a$\times$ t in 24 hrs

=> s$\times$t = a$\times$6 and a$\times$t = s$\times$24 => $t^2 = 6 \times 24$ => t = 12

Given a = 54 => s$\times$12 = 54$\times$6 => s = 27.

=> Total distance between A and B is (s+a)$\times$t = (54+27)$\times$12 = 81$\times$12 = 972 Kms.

27. **Anil invests Rs. 22000 for 6 years in a certain scheme with 4% interest per annum, compounded half-yearly. Sunil invests in the same scheme for 5 years, and then reinvests the entire amount received at the end of 5 years for one year at 10% simple interest. If the amounts received by both at the end of 6 years are same, then the initial investment made by Sunil, in rupees, is**

A 20808

B 28000

C 27272

D 29728

Solution

Anil invested 22000 for 6 years at 4% interest compounded half-yearly

=> Amount = $22000\,(1.02)^{6}$

Let Sunil invest 'S' rupees for 5 years at 4% C.I. half-yearly and 10% S.I. for 1 additional year

=> Amount = $S\,(1.02)^{10}\,(1.1)$

Given that the both amounts are equal

=> $22000\,(1.02)^{12} = S\,(1.02)^{10}\,(1.1)$

=> $S = \dfrac{22000\,(1.02)^{2}}{1.1} = 20808$

28. **The amount of job that Amal, Sunil and Kamal can individually do in a day, are in harmonic progression. Kamal takes twice as much time as Amal to do the same amount of job. If Amal and Sunil work for 4 days and 9 days, respectively, Kamal needs to work for 16 days to finish the remaining job. Then the number of days Sunil will take to finish the job working alone, is**

A 30

B **27**

C 24

D 20

Solution

Let us assume the efficiencies of Amal, Sunil, and Kamal are a, s, and k, respectively.

Given that they are in H.P.

=> $\frac{2}{s} = \frac{1}{a} + \frac{1}{k}$ ---(1)

Also, given that Kamal takes twice as much time as Amal to do the same amount of job

=> a = 2k

Given that when Amal and Sunil work for 4 days and 9 days, respectively, Kamal needs to work for 16 days to finish the remaining job.

=> If W is the total work => 4a + 9s + 16k = W.

from (1) $\frac{2}{s} = \frac{1}{a} + \frac{2}{a}$ => $a = \frac{3}{2}s$ and $k = \frac{3}{4}s$

=> $4\left(\frac{3s}{2}\right) + 9s + 16\left(\frac{3s}{4}\right) = W$

=> $6s + 9s + 12s = W$

=> $27s = W \implies s = \frac{W}{27}$

=> Sunil will take 27 days to finish the work when working alone.

29. **Let C be the circle $x^2 + y^2 + 4x - 6y - 3 = 0$ and L be the locus of the point of intersection of a pair of tangents to C with the angle between the two tangents equal to 60^0 . Then, the point at which L touches the line x= 6 is**

A (6.6)

B **(6.3)**

C (6,8)

D (6,4)

Solution

Given equation of circle = $x^2 + y^2 + 4x - 6y - 3 = 0$

Center of the circle is (-2,3) and radius of the circle = $\sqrt{g^2 + f^2 - c} = \sqrt{4 + 9 + 3} = 4$

Let us assume the point of the intersection of the tangents is (h,k)

The angle made by the line joining (h,k) to the centre makes an angle of 30 degrees with the tangent, and sin(30) will be the ratio of the radius and the distance between the center and (h,k)

$$\Rightarrow \sin(30) = \frac{4}{\sqrt{(h+2)^2 + (k-3)^2}}$$

Squaring on both sides:

$$\frac{1}{4} = \frac{16}{(h+2)^2 + (k-3)^2}$$

$$\Rightarrow (h+2)^2 + (k-3)^2 = 64$$

When x = 6 => h = 6 => $64 + (k-3)^2 = 64$ => k = 3.

=> required point is (6,3)

30. **A quadrilateral ABCD is inscribed in a circle such that AB : CD = 2 : 1 and BC : AD = 5 : 4. If AC and BD intersect at the point E, then AE : CE equals**

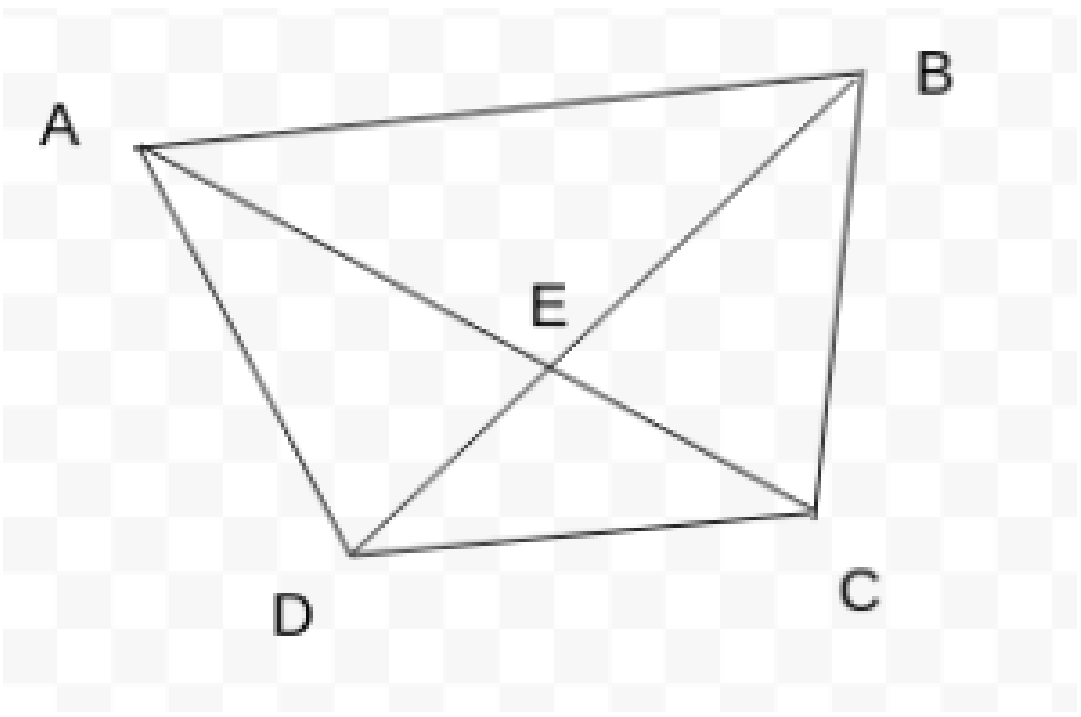
A 2 : 1

B 1 : 2

C **8 : 5**

D 5 : 8

Solution



Given ABCD is a cyclic quadrilateral.

Angle ADB = Angle ACB (Angle subtended by chord on the same side of arc)

Angle DAC = Angle DBC (Angle subtended by chord on the same side of

arc)

=> Triangles AED and BEC are similar triangles

Similarly triangles AEB and DEC are also similar using AA similarity property.

Now, given that AB : CD = 2 : 1 and BC : AD = 5 : 4

$\frac{AE}{BE} = \frac{AD}{BC} = \frac{4}{5}$ (Similar Triangles AED and BEC)

$\frac{BE}{CE} = \frac{AB}{CD} = \frac{2}{1}$ (Similar Triangles AEB and DEC)

Multiplying both, we get $\frac{AE}{CE} = \frac{8}{5}$.

31. **In a right-angled triangle ΔABC, the altitude AB is 5 cm, and the base BC is 12 cm. P and Q are two points on BC such that the areas of ΔABP, ΔABQ and ΔABC are in arithmetic progression. If the area of ΔABC is 1.5 times the area of ΔABP, the length of PQ, in cm, is**

A 1

B 2

C 3

D 4

Solution

Given that ABC is a right-angled triangle with AB = 5 and BC = 12 =>

Area of the triangle = $0.5 \times 5 \times 12 = 30$.

Let us assume BP = p, BQ = q

=> Area of ABP = $0.5 \times 5 \times p = 2.5p$

=> Area of ABQ = $0.5 \times 5 \times q = 2.5q$

Given the area of ABC is 1.5 times that of ABP => $30 = 1.5 \times 2.5p$ => $20 = 2.5p$ => $p = 8$.

Given Areas of ABP, ABQ and ABC are in A.P. => $2 \times 2.5q = 2.5 \times 8 + 30$ => $5q = 50$ => $q = 10$.

PQ = BQ - BP = q - p = 10 - 8 = 2.

32. **For some positive and distinct real numbers x,y and z, if $\frac{1}{\sqrt{y}+\sqrt{z}}$ is the arithmetic mean of $\frac{1}{\sqrt{x}+\sqrt{z}}$ and $\frac{1}{\sqrt{x}+\sqrt{y}}$, then the relationship which will always hold true, is**

A $\sqrt{x}, \sqrt{z}\ and\ \sqrt{y}$ are in arithmetic progression

B **y, x and z are in arithmetic progression**

C x, y and z are in arithmetic progression

D $\sqrt{x}, \sqrt{y}\ and\ \sqrt{z}$ are in arithmetic progression

Solution

Given that $\frac{1}{\sqrt{y}+\sqrt{z}}$ is the arithmetic mean of $\frac{1}{\sqrt{x}+\sqrt{z}}$ and $\frac{1}{\sqrt{x}+\sqrt{y}}$

$$\Rightarrow \frac{2}{\sqrt{y}+\sqrt{z}} = \frac{1}{\sqrt{x}+\sqrt{z}} + \frac{1}{\sqrt{x}+\sqrt{y}}$$

$$\Rightarrow 2\left(\sqrt{x}+\sqrt{z}\right)\left(\sqrt{x}+\sqrt{y}\right) = \left(\sqrt{y}+\sqrt{z}\right)\left(\sqrt{x}+\sqrt{y}+\sqrt{x}+\sqrt{z}\right)$$

$$\Rightarrow 2\left(x+\sqrt{xy}+\sqrt{xz}+\sqrt{yz}\right) = 2\sqrt{xy}+y+\sqrt{yz}+2\sqrt{xz}+\sqrt{yz}+z$$

$$\Rightarrow 2x = y+z$$

=> y, x, z are in A.P. as x is the arithmetic mean of y and z.

33. **The number of all natural numbers up to 1000 with non-repeating digits is**

A 504

B 648

C **738**

D 585

Solution

1-digit numbers => We have 1 to 9 => 9

2-digit numbers => x y, we have 9 ways to choose x from 1 to 9 => 9 ways and 9 ways to choose y (0 to 9 except x) => $9 \times 9 = 81$

3-digit numbers => x y z, we have 9 ways to choose x, 9 ways to choose y and 8 ways to choose z => $9 \times 9 \times 8 =$

1. Total numbers till 1000 without digits repeated in them is 9 + 81 + 648 = 738.

34. **A lab experiment measures the number of organisms at 8 am every day. Starting with 2 organisms on the first day, the number of organisms on any day is equal to 3 more than twice the number on the previous day. If the number of organisms on the nth day exceeds one million, then the lowest possible value of n is**

A 19

B 21

C 20

D 22

Solution

Given on day-1, there are 2 organisms.

On day-2, there are $2\times\ 2 + 3 = 7$ and on day-3, there are $2\times 7 + 3 = 17$..

Let us try to form a pattern:

$2 = 2 + 0$ (n = 1)

$7 = 4 + 3$ (n = 2)

$17 = 8 + 9$ $[8 + 3\times 3]$ (n = 3)

$37 = 16 + 21[16 + 3\times 7]$ (n = 4)

$T(n) = 2^n + 3(2^(n - 1) - 1)$

We know that $2^{20} = 2^{10} \times 2^{10} = 1024 \times 1024$ which is more than 1 million.

Let us check for n = 19

$2^{19} + 3(2^{18} - 1) = 2^{19} + 3 \cdot 2^{18} - 3 = 2 \cdot 2^{19} + 2^{18} - 3 = 2^{20} + 2^{18} - 3$

which is more than 1 million.

Let us check for n = 18

$2^{18} + 3(2^{17} - 1) = 2^{18} + 3 \cdot 2^{17} - 3 = 2 \cdot 2^{18} + 2^{17} - 3 = 2^{19} + 2^{17} - 3$

which is not more than a million.

=> n = 19.

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