## Strategic Professional - Options

## Advanced Performance Management (APM)

September/December 2020 Sample Questions


Time allowed: 3 hours 15 minutes

This question paper is divided into two sections:
Section A - This ONE question is compulsory and MUST be attempted
Section B - BOTH questions are compulsory and MUST be attempted
Present Value and Annuity Tables are on pages 8 and 9.

Do NOT open this question paper until instructed by the supervisor.

This question paper must not be removed from the examination hall.

## Think Ahead

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## Section A - This ONE question is compulsory and MUST be attempted

## 1 Organisation information

You are a performance management consultant brought in by the chief executive officer (CEO) of the Department for Internal Affairs (DIA) for the country of Deeland. The department handles, among other areas, the policing of Deeland. The CEO is a government employee reporting to the Minister for Internal Affairs. The Minister for Internal Affairs is an elected politician appointed by the leader of the Deeland government.

The government of Deeland has recently changed and the new Minister for Internal Affairs has instructed the CEO of the DIA to improve the performance of the Deeland Police (DP) by implementing the Minister's new mission statement for DP: 'to protect the community and prevent crime while providing a value for money service.' As part of this implementation, the CEO has identified the following four key areas for action:

1. Protecting and supporting those at risk of harm
2. Ensuring criminals are caught and brought before the courts
3. Achieving long-term sustainable solutions to the causes of crime
4. Addressing new forms of crime arising in the virtual world

The new Minister wants general improvement in the first three of these areas, as her political campaign was based around criticism of the previous government's perceived failure on these points. It is widely agreed that in the second area, the major concern is the catching of criminals since, historically, there is a high probability that once caught they are brought before the courts. The third area is being addressed through increased involvement with local communities in order to identify and address the causes of crime. The fourth area of crime in the virtual world (the use of computers to facilitate crime) was hardly addressed under the previous government and the Minister wants to see the creation of a task force which will develop skills in detection and prosecution of virtual crime.

## CSFs and KPIs

In a recent meeting with the CEO, the Minister indicated that she felt that the four key areas were too vague and in order to better focus actions, the Minister's adviser has suggested the following critical success factors (CSFs):

1. Greater protection and more support for those at risk of harm
2. Be better at catching criminals
3. Reducing the causes of crime by increased involvement with local communities
4. Create a task force to develop skills in detection and prosecution of virtual crime

Initially, the CEO did not see why the four key areas originally given could not be used as CSFs. He wants you to provide justifications in the light of the Minister's concerns for the changes which the adviser has made to each of these. Then, using the above CSFs, he wants you to provide justified recommendations of up to two key performance indicators (KPIs) per CSF in order to measure performance.

In order to help you with the KPIs, the CEO has provided you with a table of data (Appendix 1) which has been used in the past when considering DP's performance. However, you are allowed to suggest new data which would help in measuring performance. The CEO has made it clear that at this stage, no calculations are required.

## Value for money

Since DP is funded wholly through Deeland's general taxation, the CEO wants to be able to report on whether DP is providing a value for money (VFM) service as required by the new mission statement. He has heard of the 3Es (economy, efficiency and effectiveness) but needs an explanation of these three headings and how this links to the work on CSFs and KPIs already requested. Then, he requires an evaluation, using the data given in Appendix 1, of whether DP provides such a service. He understands that the evaluation may be limited, as Appendix 1 may not give a data set to perform a full VFM exercise.

## Non-financial performance indicators

The new Minister has come from a business background into politics and so far, in departmental discussions, she has focused heavily on the financial aspects of running the Department of Internal Affairs. The CEO wants to help her change focus towards using non-financial performance indicators (NFPIs) and so to understand why financial indicators are not particularly useful for public sector organisations such as DP. The CEO wants you to explain this in your report and illustrate your explanation with examples relevant to DP.

## League tables

The Minister is interested in benchmarking as this was often done during her days in business. As a result, she joined an international initiative for creating a league table of fire service data by sharing information with other nearby countries. The CEO believes that the Minister will want to introduce this idea for DP and so wants an assessment of the use of an international police force performance league table and its link to targets for DP. The CEO is especially concerned about the police officers' reaction to this new idea as they have a powerful union, which has widespread public support. Therefore, he also needs you to explain how the use of league tables and targets might affect police officers' behaviour.

## Required:

It is now 1 September $20 X 5$.
Write a report to the CEO of the Department for Internal Affairs to respond to his instructions for work on the following areas:
(i) the critical success factors and key performance indicators for Deeland Police;
(ii) an evaluation of the value for money service provided;
(iii) the use of non-financial performance indicators;
(iv) the use of league tables in measuring the performance of Deeland Police.

Professional marks will be awarded for the format, style and structure of the discussion of your answer. (4 marks)

Appendix 1
Deeland Police data for each year ending 30 June

| Population ('OOOs) | $20 \times 5$ | $20 \times 4$ | $20 \times 3$ |
| :--- | ---: | ---: | ---: |
| Number of police officers | 11,880 | 11,761 | 11,644 |
| Number of administrative staff | 37,930 | 38,005 | 38,400 |
| Number of crimes reported in the year | 12,320 | 12,197 | 12,075 |
| Number of violent crimes reported in the year | 541,735 | 530,900 | 520,282 |
| Number of crimes solved in the year | 108,347 | 106,180 | 104,056 |
| Number of complaints | 297,954 | 300,934 | 303,943 |
| Response to an incident within the allocated time limit | 7,624 | 7,512 | 7,483 |
| Cost of police force for the year (\$m) | $84 \%$ | $86 \%$ | $87 \%$ |
| Staff costs (all staff including police officers) (\$m) | 2,248 | 2,226 | 2,203 |
|  | 2,026 | 2,103 | 2,141 |

## Section B - BOTH questions are compulsory and MUST be attempted

## 2 Company information

Clonyard is a private company which sells shoes to adults and children. Clonyard has several retail shops. The mission of Clonyard is 'to satisfy customers by providing footwear of excellent quality for the modern world.' Clonyard has built its reputation on providing footwear to those who have specialist needs in footwear, such as minor medical issues, and Clonyard's staff excel at spending time with customers to determine customers' correct requirements. Clonyard has achieved modest growth over the past five years.

Twelve months ago, Clonyard was the subject of a successful but hostile take-over bid by Elrig, a listed company. Elrig's mission is 'to return value consistently to our shareholders by growing our market share and by offering unrivalled value for money for our customers.'

Elrig's primary motivation for the takeover was to enhance its market share by acquiring a niche operator. In addition, Elrig's directors also believe that there is likely to be consolidation in the industry in the near future and the purchase of Clonyard by Elrig is a reaction to that belief. Having acquired Clonyard, Elrig is keen to retain the Clonyard brand and is also keen to ensure that all aspects of Clonyard's business operations are integrated into those of Elrig.

## Current situation

Elrig has taken a decision at board level that a similar range of inventory is maintained throughout all Elrig and Clonyard shops. Managers of Clonyard's individual shops are unhappy with this as this is contrary to the individual specialisms which shop managers were encouraged to develop previously. As a result, several managers have left the business.

In order to help with the integration of Clonyard into Elrig's business, Elrig has ensured that each Clonyard shop will have at least one of Elrig's employees working there. Clonyard's staff have complained that the Elrig members of staff are more focused on ensuring a sale is made than spending the required time with customers. Clonyard staff have also expressed concern about the lack of technical product knowledge of Elrig's staff.

Elrig has retained most of Clonyard's directors. These directors have found it challenging to adjust to Elrig's focus on pursuing market share and recently said, 'It's as though they don't measure anything else. Every report we get is about market share and the message is always that we need more of it, as quickly as possible.'

The chief executive officer (CEO) of Elrig was recently told by a management consultant that Elrig should consider using the McKinsey 7S model (Appendix 1) to help with the integration of Clonyard into Elrig's operation. The management consultant indicated that she felt that Elrig should only focus on the four soft elements in this model for now.

## Introduction of an ERPS

Elrig and Clonyard are currently utilising different computer systems. It is therefore difficult for staff at all levels of Elrig's operations to obtain access to Clonyard's performance data. The board of Elrig has complained that any information it receives on Clonyard's operations or performance is too late to enable the board to make decisions. The director of operations for the group, for example, has indicated that she does not see any reports on inventory levels at each Clonyard shop until at least three months into the financial year. She has also indicated that Clonyard shops appear to wait too long for goods to be delivered to them from their suppliers.

The group sales director indicated that the data he receives on Clonyard's monthly financial performance is at least three weeks late. This offers no opportunity to introduce discounted products at an appropriate time, which is a very common sales approach for Elrig.

Elrig's employees in general have expressed concern that Clonyard's computerised information systems are outdated and that Clonyard's employees do not use the computer system as much as they should. For example, it was reported that it is common practice for a Clonyard employee to place an order for inventory over the telephone and not enter the order onto the computer system until after the order has been delivered.

The board of Elrig has decided that it needs real time access to Elrig's overall business operations, including Clonyard, and is considering the purchase of an enterprise resource planning system (ERPS). Further, a director of Elrig has indicated: 'the use of a shared up-to-date information system such as an ERPS will ensure that the Clonyard operation is completely integrated within the Elrig one. The Clonyard employees will also be delighted with the brand new system.'

## Required:

It is now 1 September 20X5.
(a) Using the soft elements of the McKinsey 7S model, evaluate whether Elrig is properly aligned with Clonyard.
(b) Evaluate the introduction of an ERPS into Elrig's overall business, including Clonyard.

## Appendix 1



The soft elements are: skills, staff, style and shared values.

## 3 Background

Roan University (Roan) is based in Teeland, which is a developed country. The government of Teeland has stated that it will cut part of the funding for the university and has made it clear that Roan must develop new replacement income streams. Roan will remain state owned.

Saugh University (Saugh) is based in Deeland, which has a developing economy and which is culturally different to Teeland. Saugh's funding is from the government of Deeland and this funding is secure for the foreseeable future. The government of Deeland has indicated that it wants the university to develop joint ventures and alliances with universities in developed countries.

Roan and Saugh have recently entered into a joint venture to set up a new university in Deeland. The new university is called RS University (RSU). Roan and Saugh each own $50 \%$ of the joint venture and a new purpose-built campus has been constructed. RSU will welcome students within three months.

## Details of the joint venture

Roan and Saugh have established a joint management board (MB) to manage the long-term and short-term operations of RSU. The MB's membership is $50 \%$ from each university, plus at least one government representative from Deeland. The MB meets at least three times per annum and the position of chairman on the MB rotates between Roan and Saugh on a meeting-by-meeting basis.
Roan has stated that its aim for the joint venture RSU is 'to internationally expand our provision and lead educational developments in the global arena by enhancing our revenue streams from innovative sources.' Saugh, however, has made it clear that it will view the success of RSU by the quality of the graduates who are produced and by the contribution these graduates make to society.

Saugh is keen that Roan sends as many home-based staff from Teeland to teach at RSU in Deeland as is possible but Roan would prefer to recruit local staff in Deeland to undertake its teaching obligations at RSU. Roan's teaching staff have voiced concerns about the extensive travel involved to teach at RSU and have also indicated that their work at Roan is likely to suffer if they teach at RSU. Specifically, they feel that they would not be able to effectively undertake their teaching duties, research activities or supervision of students at Roan. Negotiations are currently taking place between the teachers' trade union, which Roan's staff belong to, and management at Roan which could result in all Roan's teaching staff refusing to teach at RSU.

## Public view of the joint venture

There has been some criticism of the joint venture within the local community in Teeland. A parent of one of the students studying at Roan has written, on behalf of a newly-formed public pressure group, to the local newspaper saying, 'All the attention at Roan is on this inappropriate joint venture. My son was told that he could not receive any help or guidance as the staff who could help him were all overseas helping with the development of RSU. His exam results were three weeks late as there was no one there to mark the exams. This is not acceptable. Roan should exist to educate Teeland students primarily. Everything else is secondary.'

Membership of the public pressure group is growing.

## Stakeholder analysis

Roan has undertaken an analysis of its stakeholders using Mendelow's matrix. Part of this work is supplied below, along with the justifications for the categorisation of the three stakeholder groups.

## Level of interest



Government of Teeland - the government would be keen to know of any financial problems or difficulties with the joint venture but, generally, it would belong in segment A so minimal effort should be expended.

Roan teachers' trade union - the teachers' trade union's power could be high if it has the backing to recommend to the management of Roan that Roan employees will not travel to or teach at RSU. If Roan can recruit local staff for RSU, the power and interest of the trade union will both be low as there will be little or no need for its involvement. If Roan cannot recruit local staff, then the power and interest of the trade union will both be high and it will fall into category D of being a key player.

Public pressure group in Teeland - the group has a very high level of interest in the joint venture and its power may be determined by its size. If it grows significantly, then its power may become high also. For the present, its power is likely to be low so the group will fall into category B - kept informed.

## Required:

It is now 1 September $20 X 5$.
(a) Discuss the problems that will be encountered in managing and measuring performance in the RSU joint venture.
(b) For each of the three stakeholder groups, recommend and justify an appropriate performance measure which could be used by Roan.

## Present Value Table

Present value of 1 i.e. $(1+r)^{-n}$
Where $r=$ discount rate
$\mathrm{n}=$ number of periods until payment

Discount rate (r)
Periods

| (n) | $1 \%$ | $2 \%$ | $3 \%$ | $4 \%$ | $5 \%$ | $6 \%$ | $7 \%$ | $8 \%$ | $9 \%$ | $10 \%$ |  |
| ---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 0.990 | 0.980 | 0.971 | 0.962 | 0.952 | 0.943 | 0.935 | 0.926 | 0.917 | 0.909 | 1 |
| 2 | 0.980 | 0.961 | 0.943 | 0.925 | 0.907 | 0.890 | 0.873 | 0.857 | 0.842 | 0.826 | 2 |
| 3 | 0.971 | 0.942 | 0.915 | 0.889 | 0.864 | 0.840 | 0.816 | 0.794 | 0.772 | 0.751 | 3 |
| 4 | 0.961 | 0.924 | 0.888 | 0.855 | 0.823 | 0.792 | 0.763 | 0.735 | 0.708 | 0.683 | 4 |
| 5 | 0.951 | 0.906 | 0.863 | 0.822 | 0.784 | 0.747 | 0.713 | 0.681 | 0.650 | 0.621 | 5 |
|  |  |  |  |  |  |  |  |  |  |  |  |
| 6 | 0.942 | 0.888 | 0.837 | 0.790 | 0.746 | 0.705 | 0.666 | 0.630 | 0.596 | 0.564 | 6 |
| 7 | 0.933 | 0.871 | 0.813 | 0.760 | 0.711 | 0.665 | 0.623 | 0.583 | 0.547 | 0.513 | 7 |
| 8 | 0.923 | 0.853 | 0.789 | 0.731 | 0.677 | 0.627 | 0.582 | 0.540 | 0.502 | 0.467 | 8 |
| 9 | 0.914 | 0.837 | 0.766 | 0.703 | 0.645 | 0.592 | 0.544 | 0.500 | 0.460 | 0.424 | 9 |
| 10 | 0.905 | 0.820 | 0.744 | 0.676 | 0.614 | 0.558 | 0.508 | 0.463 | 0.422 | 0.386 | 10 |
|  |  |  |  |  |  |  |  |  |  |  |  |
| 11 | 0.896 | 0.804 | 0.722 | 0.650 | 0.585 | 0.527 | 0.475 | 0.429 | 0.388 | 0.350 | 11 |
| 12 | 0.887 | 0.788 | 0.701 | 0.625 | 0.557 | 0.497 | 0.444 | 0.397 | 0.356 | 0.319 | 12 |
| 13 | 0.879 | 0.773 | 0.681 | 0.601 | 0.530 | 0.469 | 0.415 | 0.368 | 0.326 | 0.290 | 13 |
| 14 | 0.870 | 0.758 | 0.661 | 0.577 | 0.505 | 0.442 | 0.388 | 0.340 | 0.299 | 0.263 | 14 |
| 15 | 0.861 | 0.743 | 0.642 | 0.555 | 0.481 | 0.417 | 0.362 | 0.315 | 0.275 | 0.239 | 15 |


| (n) | $11 \%$ | $12 \%$ | $13 \%$ | $14 \%$ | $15 \%$ | $16 \%$ | $17 \%$ | $18 \%$ | $19 \%$ | $20 \%$ |  |
| ---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 0.901 | 0.893 | 0.885 | 0.877 | 0.870 | 0.862 | 0.855 | 0.847 | 0.840 | 0.833 | 1 |
| 2 | 0.812 | 0.797 | 0.783 | 0.769 | 0.756 | 0.743 | 0.731 | 0.718 | 0.706 | 0.694 | 2 |
| 3 | 0.731 | 0.712 | 0.693 | 0.675 | 0.658 | 0.641 | 0.624 | 0.609 | 0.593 | 0.579 | 3 |
| 4 | 0.659 | 0.636 | 0.613 | 0.592 | 0.572 | 0.552 | 0.534 | 0.516 | 0.499 | 0.482 | 4 |
| 5 | 0.593 | 0.567 | 0.543 | 0.519 | 0.497 | 0.476 | 0.456 | 0.437 | 0.419 | 0.402 | 5 |
|  |  |  |  |  |  |  |  |  |  |  |  |
| 6 | 0.535 | 0.507 | 0.480 | 0.456 | 0.432 | 0.410 | 0.390 | 0.370 | 0.352 | 0.335 | 6 |
| 7 | 0.482 | 0.452 | 0.425 | 0.400 | 0.376 | 0.354 | 0.333 | 0.314 | 0.296 | 0.279 | 7 |
| 8 | 0.434 | 0.404 | 0.376 | 0.351 | 0.327 | 0.305 | 0.285 | 0.266 | 0.249 | 0.233 | 8 |
| 9 | 0.391 | 0.361 | 0.333 | 0.308 | 0.284 | 0.263 | 0.243 | 0.225 | 0.209 | 0.194 | 9 |
| 10 | 0.352 | 0.322 | 0.295 | 0.270 | 0.247 | 0.227 | 0.208 | 0.191 | 0.176 | 0.162 | 10 |
|  |  |  |  |  |  |  |  |  |  |  |  |
| 11 | 0.317 | 0.287 | 0.261 | 0.237 | 0.215 | 0.195 | 0.178 | 0.162 | 0.148 | 0.135 | 11 |
| 12 | 0.286 | 0.257 | 0.231 | 0.208 | 0.187 | 0.168 | 0.152 | 0.137 | 0.124 | 0.112 | 12 |
| 13 | 0.258 | 0.229 | 0.204 | 0.182 | 0.163 | 0.145 | 0.130 | 0.116 | 0.104 | 0.093 | 13 |
| 14 | 0.232 | 0.205 | 0.181 | 0.160 | 0.141 | 0.125 | 0.111 | 0.099 | 0.088 | 0.078 | 14 |
| 15 | 0.209 | 0.183 | 0.160 | 0.140 | 0.123 | 0.108 | 0.095 | 0.084 | 0.074 | 0.065 | 15 |

Annuity Table

Present value of an annuity of 1 i.e. $\frac{1-(1+r)^{-n}}{r}$

$$
\begin{array}{ll}
\text { Where } & r=\text { discount rate } \\
& n=\text { number of periods }
\end{array}
$$

Discount rate (r)
Periods

| ( n ) | 1\% | 2\% | 3\% | 4\% | 5\% | 6\% | 7\% | 8\% | 9\% | 10\% |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | 0.990 | 0.980 | 0.971 | 0.962 | 0.952 | 0.943 | 0.935 | 0.926 | 0.917 | 0.909 | 1 |
| 2 | 1.970 | 1.942 | 1.913 | 1.886 | 1.859 | 1.833 | 1.808 | 1.783 | 1.759 | 1.736 | 2 |
| 3 | $2 \cdot 941$ | $2 \cdot 884$ | $2 \cdot 829$ | $2 \cdot 775$ | $2 \cdot 723$ | $2 \cdot 673$ | $2 \cdot 624$ | 2.577 | $2 \cdot 531$ | $2 \cdot 487$ | 3 |
| 4 | 3.902 | 3.808 | 3.717 | 3.630 | 3.546 | $3 \cdot 465$ | $3 \cdot 387$ | $3 \cdot 312$ | 3.240 | $3 \cdot 170$ | 4 |
| 5 | 4.853 | $4 \cdot 713$ | 4.580 | 4.452 | 4.329 | $4 \cdot 212$ | 4.100 | 3.993 | 3.890 | 3.791 | 5 |
| 6 | $5 \cdot 795$ | 5.601 | $5 \cdot 417$ | $5 \cdot 242$ | 5.076 | 4.917 | $4 \cdot 767$ | $4 \cdot 623$ | $4 \cdot 486$ | $4 \cdot 355$ | 6 |
| 7 | $6 \cdot 728$ | 6.472 | 6.230 | 6.002 | 5.786 | $5 \cdot 582$ | 5.389 | $5 \cdot 206$ | 5.033 | $4 \cdot 868$ | 7 |
| 8 | 7.652 | 7.325 | 7.020 | 6.733 | 6.463 | 6.210 | 5.971 | $5 \cdot 747$ | 5.535 | $5 \cdot 335$ | 8 |
| 9 | 8.566 | $8 \cdot 162$ | 7.786 | 7.435 | 7.108 | $6 \cdot 802$ | 6.515 | $6 \cdot 247$ | 5.995 | $5 \cdot 759$ | 9 |
| 10 | $9 \cdot 471$ | 8.983 | 8.530 | $8 \cdot 111$ | $7 \cdot 722$ | $7 \cdot 360$ | $7 \cdot 024$ | $6 \cdot 710$ | 6.418 | $6 \cdot 145$ | 10 |
| 11 | $10 \cdot 368$ | 9.787 | 9.253 | 8.760 | 8.306 | 7.887 | 7.499 | $7 \cdot 139$ | $6 \cdot 805$ | $6 \cdot 495$ | 11 |
| 12 | $11 \cdot 255$ | 10.575 | 9.954 | $9 \cdot 385$ | 8.863 | 8.384 | 7.943 | 7.536 | $7 \cdot 161$ | 6.814 | 12 |
| 13 | $12 \cdot 134$ | $11 \cdot 348$ | $10 \cdot 635$ | 9.986 | $9 \cdot 394$ | 8.853 | 8.358 | 7.904 | 7.487 | $7 \cdot 103$ | 13 |
| 14 | 13.004 | $12 \cdot 106$ | 11.296 | 10.563 | 9.899 | 9.295 | $8 \cdot 745$ | $8 \cdot 244$ | $7 \cdot 786$ | $7 \cdot 367$ | 14 |
| 15 | 13.865 | $12 \cdot 849$ | 11.938 | $11 \cdot 118$ | $10 \cdot 380$ | $9 \cdot 712$ | $9 \cdot 108$ | 8.559 | 8.061 | $7 \cdot 606$ | 15 |
| ( n ) | 11\% | 12\% | 13\% | 14\% | 15\% | 16\% | 17\% | 18\% | 19\% | 20\% |  |
| 1 | 0.901 | 0.893 | 0.885 | 0.877 | 0.870 | 0.862 | 0.855 | 0.847 | 0.840 | 0.833 | 1 |
| 2 | 1.713 | 1.690 | 1.668 | 1.647 | 1.626 | $1 \cdot 605$ | 1.585 | 1.566 | 1.547 | 1.528 | 2 |
| 3 | $2 \cdot 444$ | $2 \cdot 402$ | $2 \cdot 361$ | $2 \cdot 322$ | $2 \cdot 283$ | $2 \cdot 246$ | $2 \cdot 210$ | $2 \cdot 174$ | $2 \cdot 140$ | $2 \cdot 106$ | 3 |
| 4 | $3 \cdot 102$ | 3.037 | 2.974 | 2.914 | $2 \cdot 855$ | $2 \cdot 798$ | $2 \cdot 743$ | $2 \cdot 690$ | 2.639 | 2.589 | 4 |
| 5 | $3 \cdot 696$ | 3.605 | $3 \cdot 517$ | 3.433 | $3 \cdot 352$ | 3.274 | $3 \cdot 199$ | $3 \cdot 127$ | 3.058 | 2.991 | 5 |
| 6 | 4.231 | $4 \cdot 111$ | 3.998 | 3.889 | $3 \cdot 784$ | 3.685 | 3.589 | 3.498 | 3.410 | $3 \cdot 326$ | 6 |
| 7 | $4 \cdot 712$ | 4.564 | $4 \cdot 423$ | $4 \cdot 288$ | $4 \cdot 160$ | 4.039 | 3.922 | 3.812 | 3.706 | 3.605 | 7 |
| 8 | $5 \cdot 146$ | 4.968 | 4.799 | 4.639 | 4.487 | 4.344 | $4 \cdot 207$ | 4.078 | 3.954 | 3.837 | 8 |
| 9 | $5 \cdot 537$ | $5 \cdot 328$ | $5 \cdot 132$ | 4.946 | 4.772 | 4.607 | $4 \cdot 451$ | 4.303 | $4 \cdot 163$ | 4.031 | 9 |
| 10 | 5.889 | $5 \cdot 650$ | $5 \cdot 426$ | $5 \cdot 216$ | 5.019 | $4 \cdot 833$ | 4.659 | 4.494 | 4.339 | 4.192 | 10 |
| 11 | $6 \cdot 207$ | 5.938 | $5 \cdot 687$ | $5 \cdot 453$ | $5 \cdot 234$ | 5.029 | 4.836 | 4.656 | $4 \cdot 486$ | $4 \cdot 327$ | 11 |
| 12 | 6.492 | $6 \cdot 194$ | 5.918 | $5 \cdot 660$ | $5 \cdot 421$ | $5 \cdot 197$ | 4.988 | 4.793 | 4.611 | $4 \cdot 439$ | 12 |
| 13 | 6.750 | $6 \cdot 424$ | $6 \cdot 122$ | 5.842 | 5.583 | $5 \cdot 342$ | $5 \cdot 118$ | 4.910 | $4 \cdot 715$ | 4.533 | 13 |
| 14 | 6.982 | $6 \cdot 628$ | $6 \cdot 302$ | 6.002 | $5 \cdot 724$ | $5 \cdot 468$ | $5 \cdot 229$ | 5.008 | 4.802 | $4 \cdot 611$ | 14 |
| 15 | $7 \cdot 191$ | $6 \cdot 811$ | $6 \cdot 462$ | $6 \cdot 142$ | 5.847 | 5.575 | $5 \cdot 324$ | 5.092 | 4.876 | $4 \cdot 675$ | 15 |

## End of Question Paper

