KEMENTERIAN PENDIDIKAN TINGGI
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI

BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI
KEMENTERIAN PENDIDIKAN TINGGI

JABATAN KEJURUTERAAN AWAM

PEPERIKSAAN AKHIR

SESI II : 2025/2026

DCB40422 : BUILDING TRANSPORTATION

TARIKH : 06 MEI 2026
MASA : 2.30 PETANG - 4.30 PETANG (2 JAM)

Kertas soalan ini mengandungi **LAPAN (8)** halaman bercetak.
Bahagian A: Subjektif (2 soalan)
Bahagian B: Subjektif (4 soalan)

Dokumen sokongan yang disertakan : Formula

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

INSTRUCTION:

This section consists of **FOUR (4)** subjective questions. Answer **ALL** questions.

ARAHAN:

*Bahagian ini mengandungi **EMPAT (4)** soalan subjektif. Jawab **SEMUA** soalan.*

QUESTION 1

SOALAN 1

CLO1 (a) A multi-storey office building accommodates a large number of employees, visitors, and service personnel, particularly during peak hours. Interpret **THREE (3)** factors that should be considered in the design of efficient circulation spaces to ensure smooth flow within the building.

*Sebuah bangunan pejabat bertingkat menempatkan ramai pekerja, pelawat dan kakitangan sokongan, terutamanya pada waktu puncak. Tafsirkan **TIGA (3)** faktor yang perlu dipertimbangkan dalam reka bentuk ruang pergerakan yang cekap dan aliran lancar dalam bangunan tersebut.*

[6 marks]

[*6 markah*]

CLO1 (b) The design of corridors in buildings is important to ensure smooth, safe, and comfortable pedestrian flow, especially when the number of occupants is large. Explain **THREE (3)** factors in the design of corridors in buildings that can affect the smooth flow of pedestrians.

*Reka bentuk koridor dalam bangunan penting untuk memastikan aliran pejalan kaki yang lancar, selamat, dan selesa, terutamanya apabila bilangan penghuni ramai. Jelaskan **TIGA (3)** faktor reka bentuk koridor dalam bangunan dapat mempengaruhi kelancaran aliran pejalan kaki.*

[9 marks]

[*9 markah*]

CLO1

(c) In a manufacturing factory and a multi-storey restaurant, the building management wants to ensure that the movement of materials and food is carried out efficiently and safely. Explain **TWO (2)** types the building transportation systems that are suitable for use in the factory and the restaurant.

*Sebuah kilang pembuatan dan sebuah restoran bertingkat, pihak pengurusan bangunan ingin memastikan pergerakan bahan dan makanan dapat dilakukan dengan cekap dan selamat. Terangkan **DUA (2)** jenis sistem pengangkutan bangunan yang sesuai digunakan pada kilang dan restoran tersebut.*

[10 marks]

[*10 markah*]

QUESTION 2

SOALAN 2

CLO1 (a) Describe the **THREE (3)** differences between electric lifts and hydraulic lifts in terms of driving system, operating speed and building suitability.

*Huraikan **TIGA (3)** perbezaan antara lif elektrik dan lif hidraulik dari segi sistem penggerak, kelajuan operasi dan kesesuaian bangunan.*

[6 marks]

[6 *markah*]

CLO1 (b) A multi-storey office building plans to install elevators to manage the movement of employees during peak hours. Explain the differences between the down collective lift operation and the directional collective lift operation.

Sebuah bangunan pejabat bertingkat ingin memasang lif untuk menguruskan pergerakan pekerja pada waktu puncak. Terangkan perbezaan antara corak operasi down collective lift dan directional collective lift.

[9 marks]

[*9 markah*]

CLO1 (c) Sketch a sectional view of an electric lift system and indicate the positions of the component: motor, car guide rail, counterweight, buffer and lift car.

Lakarkan keratan rentas sistem lif elektrik serta kedudukan komponen: motor, rel pandu kereta, penimbang, penampan dan kereta lif.

[10 marks]

[*10 markah*]

QUESTION 3

SOALAN 3

CLO1 (a) Describe **THREE (3)** functions of each of the following escalator components which are frame structure, track, and landing platforms.

*Huraikan **TIGA (3)** fungsi setiap komponen escalator berikut iaitu struktur rangka, trek dan pelantar pendaratan.*

[6 marks]

[6 *markah*]

CLO1 (b) Escalators are vertical transportation systems in public places which are designed to facilitate the movement of people by ensuring safety, efficiency, and comfort of users. Explain **THREE (3)** specifications of the escalator.

*Escalator adalah sistem pengangkutan menegak di tempat awam yang direka untuk memudahkan pergerakan orang ramai dengan memastikan keselamatan, kecekapan, dan keselesaan pengguna. Terangkan **TIGA (3)** spesifikasi escalator.*

[9 marks]

[*9 markah*]

CLO1 (c) The safety system in an escalator is designed to protect passengers and ensure safe operation. Determine **FIVE (5)** main components of the safety system found in an escalator.

*Sistem keselamatan pada eskalator direka untuk melindungi penumpang dan memastikan operasi yang selamat. Tentukan **LIMA (5)** komponen utama sistem keselamatan yang terdapat pada eskalator.*

[10 marks]

[*10 markah*]

QUESTION 4

SOALAN 4

CLO2

(a) A group of lifts, each with a capacity of 20 people, is designed for a 24-storey apartment with a room height of 2.8 m. Given $S_1 = 12$, W = 1.1m, $V_d = 0.4$m/s, $T_u = 65.53$s & $T_d = 37.6$s. Calculate L, T_o, T_p, RTT and the number of lifts needed if the interval is 90 seconds.

Sekumpulan lif dengan kapasiti 20 orang bagi setiap lif direka untuk pangsapuri 24 tingkat dengan ketinggian bilik 2.8 m. Diberi $S_1 = 12$, W = 1.1m, $V_d = 0.4$m/s, $T_u = 65.53$s & $T_d = 37.6$s. Kirakan L, T_o, T_p, RTT dan bilangan lif yang diperlukan jika sela masa adalah 90 saat.

[6 marks]

[*6 markah*]

CLO2

(b) In designing the installation of lift in a 30-storey office building, traffic analysis and lift performance must be taken into consideration to ensure continuous operational efficiency. Your design proposes four lift cars with unified starting and stopping time. Given that the lift car speed is 3.0 m/s, the door width is 1.2 m, and the lift door operating speed is 0.5 m/s, and with reference to the data in Table Q4 (b), analyse the quality of the lift service.

Dalam mereka bentuk pemasangan lif di sebuah bangunan pejabat setinggi 30 tingkat, analisis trafik dan prestasi lif perlu diberi perhatian bagi memastikan kecekapan operasi lif secara berterusan. Anda mencadangkan empat kereta lif dengan masa mula dan tamat yang seragam. Diberi kelajuan kereta ialah 3.0m/s, lebar pintu 1.2m dan kelajuan operasi pintu lif 0.5m/s, berpandukan data dalam jadual Q4 (b), analisis kualiti perkhidmatan lif tersebut.

Table Q4 (b)

Jadual Q4 (b)

ELEMENTS	**DESCIPTIONS**
Peak demand for a 5 -minute period *Permintaan puncak bagi tempoh 5 minit*	164 persons *164 orang*
Car travel *Perjalanan lif*	60 meter *60 meter*
Number of persons (80% of the maximum capacity) *Bilangan penumpang (80% daripada kapasiti maksimum)*	18 person *18 orang*

[9 marks]

[*9 markah*]

CLO2 (c) The management of the company intends to upgrade the elevator transportation system in a 27-storey commercial building as part of its continuous commitment to improving visitor services. In line with this commitment, they plan to upgrade the elevator transportation system to ensure greater efficiency, comfort, and reliability. Several proposals have been identified and are currently under consideration to deliver the best possible outcome for stakeholders. The building has staggered starting and ending times, with a total floor area above the ground floor of 15,000 m² and a room height of 2.7 m. The vertical transportation system consists of a group of four lifts, each with a capacity of 24 persons and a car speed of 2.7 m/s. The lift door width is 1.4 m, operating at a speed of 0.5 m/s. Based on these parameters, analyse the quality of service of the lifts with reference to CIBSE Guide D.

Pengurusan syarikat berhasrat untuk menaik taraf sistem pengangkutan lif di bangunan komersial 27 tingkat sebagai sebahagian daripada komitmen berterusan dalam meningkatkan perkhidmatan kepada para pengunjung. Selaras dengan komitmen ini, sistem lif akan dinaik taraf bagi memastikan kecekapan, keselesaan dan kebolehpercayaan yang lebih tinggi. Beberapa cadangan telah dikenal pasti dan sedang dipertimbangkan untuk memberikan hasil terbaik kepada para pemegang kepentingan. Bangunan ini mempunyai masa mula dan tamat yang berperingkat, dengan jumlah keluasan lantai di atas aras tanah sebanyak 15,000 m² dan ketinggian bilik 2.7 m. Sistem pengangkutan

menegak terdiri daripada empat buah lif, setiap satu berkapasiti 24 orang dengan kelajuan kereta lif 2.7 m/s. Lebar pintu lif ialah 1.4 m dengan kelajuan operasi pintu 0.5 m/s. Berdasarkan parameter ini, analisis kualiti perkhidmatan lif perlu dilakukan dengan merujuk kepada CIBSE Guide D.

[10 marks]

[*10 markah*]

SOALAN TAMAT

Formula

1. Peak demand for 5-minute period:

   $$= \frac{\text{Ground floor area}}{\text{Density / Person}} \quad X \% \text{ starting and finishing}$$

2. Car travel (L) = Number of floors x floor height

3. Probable number of stops (S_1):

   $$S_1 = S - S\,(S\text{-}1 / S)^n$$

   S = maximum number of stops

   n = number of people or car capacity (usually approximately 80% of capacity)

4. Round Trip Time (RTT) = Tu + Td + To + Tp

5. Capacity of group = (5mins x 60s x Number of lifts x n) / RTT

6. Interval for the group = RTT / Number of lifts