



BOARD OF ENGINEERS MALAYSIA

PROFESSIONAL COMPETENCY EXAMINATION

EXAMINATION REGULATIONS



CONTENTS

A EXAMINATION REGULATIONS		PAGE
1	Timing	3
2	Personal Belongings	4
3	At the Start of the Examination	5
4	During the Examination	6
5	At the end of the Examination	7
B PROHIBITION ON THE USE OF ELECTRONIC DEVICES		
	The Do's and Don'ts	9
C SAMPLE QUESTIONS		
Common	Paper 1 – Objective Questions	10
Common	Paper 2 – Subjective Questions	15
Civil	Paper 1 – Objective Questions	16
Civil	Paper 2 – Subjective Questions	21
Electrical	Paper 1 – Objective Questions	22
Electrical	Paper 2 – Subjective Questions	27
Mechanical	Paper 1 – Objective Questions	29
Mechanical	Paper 2 – Subjective Questions	34
Chemical	Paper 1 – Objective Questions	35
Chemical	Paper 2 – Subjective Questions	40
Environmental	Paper 1 – Objective Questions	41
Environmental	Paper 2 – Subjective Questions	46
Mining	Paper 1 – Objective Questions	47
Mining	Paper 2 – Subjective Questions	52
Geotechnical	Paper 1 – Objective Questions	53
Geotechnical	Paper 2 – Subjective Questions	58



PROFESSIONAL COMPETENCY EXAMINATION

A. EXAMINATION REGULATIONS

Please read these instructions carefully.

A candidate who breaches any of the Examination Regulations will be liable to disciplinary action including not being allowed to sit for the examination.

1.0 Timing

- 1.1 The BEM Professional Competency Examination (PCE) will be conducted during the allocated dates and times as informed to the candidates.
- 1.2 The examination hall will be open for admission 10 minutes before the time scheduled for the commencement of the examination. You are to find your allocated seat but do NOT turn over the question paper until instructed at the time of commencement of the examination.
- 1.3 You will not be admitted to the examination hall if you arrive half hour after commencement of the examination.

2.0 Personal Belongings

- 2.1 All your personal belongings (such as bags, pouches, ear/headphones, laptops etc.) must be placed with the Examination Secretariat outside the examination hall. Please do not bring any valuable belongings except essential materials required for the examination. BEM will not be responsible for the loss or damage of any belongings in or outside the examination hall.
- 2.2 Any unauthorised materials such as electronic devices with communication and/or storage capabilities, hand phones, tablet PC, laptop, smart watch, cameras, portable audio/video/gaming devices, etc. are not to be brought into the examination hall.
- 2.3 Mobile phones cannot be brought into the examination hall. If your mobile phone is found to have been brought into the examination hall, the phone will be confiscated and retained for investigation of possible violation of regulations.
- 2.4 Photography is NOT allowed in the examination hall at ALL times.
- 2.5 All materials and/or devices that are found in violation of any examination regulations will be confiscated.

3.0 At the Start of the Examination

- 3.1 Candidates must provide all equipment and materials required to sit for the examination, except paper. Individual A4 lined answer pads will be provided by the BEM.
- 3.2 Do NOT turn over the question paper placed on your desk until instructed to do so at the time of commencement of the examination.
- 3.3 Please place your identification documents (either identity card or passport) at the top right corner of your examination desk for marking of attendance and verification of identity during the examination.
- 3.4 Please check that you have the correct question paper and read the instructions printed on your examination question paper carefully.
- 3.5 The examination is anonymous. Therefore, do not write your name on the answer book. **You should write only your Candidate Number, correctly and legibly, in the space provided on the cover of each answer book.** Providing incorrect/illegible Candidate Number could risk your answer book being considered void.

4.0 During the Examination

- 4.1 The invigilators will adhere to the length of and the times allotted for the examination.
- 4.2 You are not allowed to communicate by word of mouth or otherwise with other candidates (this includes the time when answer books are being collected).
- 4.3 Please raise your hand if you wish to communicate with an invigilator. The invigilator will not answer any queries on the interpretation of examination questions.
- 4.4 Unless granted permission by an invigilator, you are not allowed to leave your seat.
- 4.5 Once you have entered the examination hall, you will not be allowed to leave the hall until half hour after the examination has commenced.
- 4.6 If, for any reason, you are given permission to leave the hall temporarily, you must be accompanied by an invigilator throughout your absence from the examination hall.

4.7 All answers, rough working and preparatory sketches must be made on the paper officially supplied and shall be given up at the end of the examination. All answers, with the exception of graphs, sketches, diagrams, etc. should be written in black or blue pen, unless otherwise specified. The blank pages in the answer book are to be used only for candidates' rough work. Solutions or any other materials written on these blank pages will not be marked.

5.0 At the End of the Examination

5.1 You are NOT allowed to leave the examination hall during the last 15 minutes of the examination and during the collection of the question paper and answer books. All candidates must remain seated throughout this period for invigilators to properly account for all question papers and answer books to be collected. Please note that candidates are not allowed to take the question papers back.

5.2 Do NOT continue to write after the examination has ended. You are to remain seated quietly while the question paper and your answer books are being collected and counted.

5.3 No papers, used or unused, may be removed from the examination hall. You are not allowed to take your own question paper back with you.

- 5.4 You are to stay in the examination hall until the Chief Invigilator has given the permission to leave. Do NOT talk until you are outside of the examination hall.
- 5.5 You are responsible to ensure that your answer books are submitted at the end of the examination. If you are present for the examination and do not submit your answer script, you will be deemed to have sat for and failed the examination concerned. Any unauthorised removal of the question paper and/or your answer book or part of your answer book from the examination hall may subject you to disciplinary action including failure of the examination.
- 5.6 Once dismissed, you should leave the examination hall quickly and quietly. Remember to take your personal belongings with you.

B. PROHIBITION ON THE USE OF ELECTRONIC DEVICES

1. The use of wireless capable electronic devices is not allowed during the Professional Competency Examination.
2. Candidates are not allowed to bring into the examination hall any wireless-capable electronic devices. The prohibited devices include:
 - (i) **Mobile phones and smart watches**
 - (ii) **Laptops, notebooks or portable computers and similar devices**
 - (iii) **iPads, tablets and similar devices**
 - (iv) **e-readers (e.g. Kindle) and similar devices**
 - (v) **Cameras, optical scanners and similar devices**
3. If any candidate is found to have entered the examination hall with these devices, the device will be confiscated and retained for investigation of possible violation of regulations.
4. Electronic battery-operated calculators, programmable or not, which do not contain any means of wireless communication or recording can be brought into the examination hall.
5. Candidates may bring into the exam room any printed textbooks or reference books - material in paper form (binding) which they may wish to use during the exam. Handwritten and loose notes **ARE NOT ALLOWED.**

SAMPLE QUESTIONS

Common Paper 1

Objective Questions

Q1. A Main Contractor (A) owes a sub-contractor (B) RM2 Million for work done under a sub-contract and fails to pay B. Subsequent to protracted negotiations, B agrees to accept from A a payment of RM1 Million in satisfaction of the whole debt. What is the effect of this agreement?

- A. B can still claim the outstanding RM1 Million.
- B. B can challenge the agreement on the basis of economic duress.
- C. The whole debt is discharged .
- D. The agreement is void in law.
- E. B can only claim under Common Law.

SAMPLE QUESTIONS

Common Paper 1

Objective Questions

Q2. Which of the following statement is/are true?

- a) Only Mechanical Professional Engineers can submit active fire protection plans.
- b) Only Civil or Mechanical Professional Engineers can submit passive fire protection plans for industrial buildings.
- c) Professional Engineers of any discipline can submit active fire protection plans.
- d) Only Electrical Professional Engineers can submit electrical plans.

A. a) only

B. a) and b) only

C. a), b) and d) only

D. c) only

E. b), c) and d) only

SAMPLE QUESTIONS

Common Paper 1

Objective Questions

Q3. In the event of any change of consultant after works have commenced, who is responsible for informing the relevant local authority concerned of the change?

A. Original/First consultant

B. Replacement consultant

C. Employer

D. Board of Engineers Malaysia (BEM)

E. Any of the above

SAMPLE QUESTIONS

Common Paper 1

Objective Questions

Q4. If the original/first consultant refuses and/or neglects to issue a Letter of Release (LOR), to which body must a complaint be made?

A. Association of Consulting Engineers, Malaysia (ACEM)

B. Ministry of Works

C. Board of Engineers Malaysia (BEM)

D. The Institution of Engineers, Malaysia (IEM)

E. Any of the above

SAMPLE QUESTIONS

Common Paper 1

Objective Questions

Q5. Which of the following statement is FALSE?

- A. The BEM Scale of Fees is mandatory
- B. A Sole Proprietorship practicing as an ECP must be registered with BEM
- C. All ECPs must be registered with BEM.
- D. Professional Fees based on man months do not contravene the BEM Scale of Fees.
- E. For a private project, a consultant may exclude provision of supervision and hence need not charge the corresponding professional fees.

SAMPLE QUESTIONS

Common Paper 2

Subjective Questions

- Q1. The contractor applies for Extension of Time (EOT) before his contract completion period expires. The Contract Administrator does not respond and the original contract completion date is passed. One month later, the Contract Administrator issues a V.O. for additional works to the Contractor. The Contractor refuses to carry out the V.O. works. What can the Contract Administrator do in this situation?
- Q2. A Consultant has carried out substantial works on a project and the Employer encounters financial difficulties. He suspends the project. On resumption, he terminates the Consultant's employment citing use of in-house consultants to complete the works due to financial constraints. What is the legal effect of the termination and what financial compensation can the consultant seek?

SAMPLE QUESTIONS

Civil Engineering Paper 1

Objective Questions

Q1. From the appropriate Table in BS 8110 determine the bending moments of short span on a rectangular slab freely supported on all four sides (corners not held down) and subjected to a load of $g_k = 4 \text{ kN/m}^2$ and $q_k = 6 \text{ kN/m}^2$, when $l_x = 3.0 \text{ m}$ & $l_y = 3.75 \text{ m}$.

A. 7.70 kNm

B. 12.18 kNm

C. 5.02 kNm

D. 3.22 kNm

E. 9.75 kNm

SAMPLE QUESTIONS

Civil Engineering Paper 1

Objective Questions

Q2. Based on stress distribution in a semi-infinite elastic solid by the Boussinesq solution, what is the critical depth in which the increase in stresses is only about 10 percent of the applied stress on a square footing? This depth is usually the critical depth for settlement assessment of a footing.

A. 0.5 times of footing width (0.5B)

B. 2.0 times of footing width (2.0B)

C. 5.0 times of footing width (5.0B)

D. 10.0 times of footing width (10.0B)

E. 15.0 times of footing width (15.0B)

SAMPLE QUESTIONS

Civil Engineering Paper 1

Objective Questions

Q3. Which of the following statements are true for circular column?

- | | |
|---|--------------------------|
| A. Minimum no. of bars is 8, size of bar is not less than 10 mm | <input type="checkbox"/> |
| B. Minimum no. of bars is 8, size of bar is not less than 12 mm | <input type="checkbox"/> |
| C. Minimum no. of bars is 6, size of bar is not less than 10 mm | <input type="checkbox"/> |
| D. Minimum no. of bars is 6, size of bar is not less than 12 mm | <input type="checkbox"/> |
| E. None of the above | <input type="checkbox"/> |

SAMPLE QUESTIONS

Civil Engineering Paper 1

Objective Questions

Q4. What is the minimum residual pressure head for an external hydrant system required by Bomba?

A. 3.0m

B. 7.5m

C. 12.5m

D. 10.0m

E. 15.0m

SAMPLE QUESTIONS

Civil Engineering Paper 1

Objective Questions

Q5. What is the fire resistance requirement of a concrete structure for an underground basement car park?

A. One hour

B. Half an hour

C. Two hours

D. Three hours

E. Four hours

SAMPLE QUESTIONS

Civil Engineering Paper 2

Subjective Questions

- Q1. You are the infrastructure engineer for a 500-acre housing development scheme. What is your advice to the Developer, Planners and Architects in terms of requirements for drainage for the whole development?
- Q2. A 3-storey basement car park is to be built with an excavation of approximately 15.0m from the existing ground level. The water table is 1.0m below the existing ground level. You are required to provide a solution on the structural system for the retaining walls of the basement.

SAMPLE QUESTIONS

Electrical Engineering Paper 1

Objective Questions

Q1. Select the statement, which **DO NOT** describe the function of the Minister under 'The Electricity Supply ACT'.

A. Efficient use of energy.

B. Power to fix tariff for electricity.

C. Competency of persons in charge.

D. Licensing of electrical installation.

E. Control of electrical equipment and plant for safety.

SAMPLE QUESTIONS

Electrical Engineering Paper 1

Objective Questions

Q2. Select the CORRECT condition(s) where Standby Generator–Alternator Set is **mandatory** under the Uniform Building By-Law:

- A. Standby supply for hose reel pump where hose reel system is required under the Tenth Schedule
- B. Standby supply for sprinkler pump where sprinkler system is required under the Tenth Schedule
- C. In a building where the top occupied floor is over 18.5m above fire appliance access level
- D. Standby supply for hydrant pump where pressurised hydrant system is required under the Tenth Schedule
- E. All of the above

SAMPLE QUESTIONS

Electrical Engineering Paper 1

Objective Questions

Q3. What is the expected minimum short circuit rating for the TNB system at 11kV?

A. 40 kA for 3 sec

B. 20kA for 3 sec

C. 25 kA for 3 sec

D. 31.5 kA for 3 sec

E. 18 kA for 3 sec

SAMPLE QUESTIONS

Electrical Engineering Paper 1

Objective Questions

Q4. Select the item NOT classified as an Electro-magnetic Compatibility (EMC) phenomenon.

A. Electrostatic discharge

B. H.F. interference

C. L.F. interference

D. Voltage dip or surge

E. Transient

SAMPLE QUESTIONS

Electrical Engineering Paper 1

Objective Questions

Q5. Which of the following is true about optical fibre?

- A. A single-mode fibre carries less traffic than a multimode fibre
- B. A single mode fibre can carry data a longer distance than a multimode fibre
- C. A single mode fibre can carry data a shorter distance than a multimode fibre
- D. A single mode fibre requires only one cable for communication whereas a multimode fibre requires a minimum of 2 cables
- E. A single mode fibre carries data only in one direction

SAMPLE QUESTIONS

Electrical Engineering Paper 2

Subjective Questions

- Q1. Answer ALL parts:
- a. List ALL the functions of the Minister under 'The Electricity Supply Act' and describe briefly similarities with the Sarawak Electricity Ordinance.
 - b. List the departments or agencies the electrical engineer must submit for approval in a typical project.

SAMPLE QUESTIONS

Electrical Engineering Paper 2

Subjective Questions

Q2. You are requested to plan the electrical installation for a modern 8-storey commercial building given the following information:

- a. Building aircond with 1x35kW ACPU serving basement and ground floor, 6 sets 17kW APU for each of the other floors and 1x7kW and 1x25kW ACPU on the 8th Floor.
- b. 1x15kW lift motor at motor room at roof.
- c. 1x15kW water pump at basement floor.
- d. Lighting and other power loads per floor (including basement and ground) estimated at 5kW and 4kW respectively.
- e. The landlord will be responsible for the consumption with respect to air conditioners on all floors, lift, water pumps, lighting in staircase and lighting and power in basement.
- f. The basement floor will house TNB substation and consumer main switchboard whilst the rest of the floors will be sublet for offices.

Draw a single line diagram of the installation showing the sizes of main conductors, method of running, rating of switches and metering arrangement on the main intake board and individual metering by TNB for each floor

SAMPLE QUESTIONS

Mechanical Engineering Paper 1

Objective Questions

Q1. In HVAC systems, Coefficient of Performance (COP), is defined as:

- A. Input electrical power in kW / Output cooling capacity in kW
- B. Output cooling capacity in W / Input electrical power in W
- C. Input electrical power in kW / Output cooling capacity in RT
- D. Output cooling capacity in Btu/hr / Input electrical power in kW
- E. None of the above

SAMPLE QUESTIONS
Mechanical Engineering Paper 1

Objective Questions

Q2. “Reverse Return” is a term commonly used in;

A. Steam piping system

B. Chilled water piping system

C. Ductwork system

D. Sanitary piping system

E. Gas piping system

SAMPLE QUESTIONS

Mechanical Engineering Paper 1

Objective Questions

Q3. For an 8-storey, 32m tall medium cost apartment, what are the minimum systems to be provided?

- i. Automatic Fire Alarm system
- ii. Wet riser system
- iii. Sprinkler system
- iv. Portable Extinguishers
- v. Fire lift
- vi. Dry riser system
- vii. Down comer system

A. i, iv, v and vii

B. i, ii, iii, iv and v

C. i, iv, v and vi

D. i, ii, iv and v

E. i, iii, iv and v

SAMPLE QUESTIONS

Mechanical Engineering Paper 1

Objective Questions

Q4. Loading and Discharge units in plumbing system refers to

A. Total water weight in pipes

B. Total volumetric flows

C. Fluid viscosity in carrier pipe

D. Reynolds number

E. None of the above

SAMPLE QUESTIONS

Mechanical Engineering Paper 1

Objective Questions

Q5. Fire lifts are required for buildings where the topmost occupied floor is

A. Over 30.5m

B. Over 18.5m

C. Over 1,000m².

D. Over 18.5m and 1,000m²

E. Over 30.5m and 1,000m².

SAMPLE QUESTIONS

Mechanical Engineering Paper 2

Subjective Questions

- Q1. You are appointed to design the air conditioning and mechanical ventilation system for the retrofit of a 20 year old, 25 storey Office Building with a nett rentable area of 1500m² per floor. Your client requires for the new air conditioning system to have minimum running costs and with flexibility to cater for after normal office hour occupation by some of the tenants.

List the types of air conditioning systems you would consider and recommend. Elaborate the reasons for your recommendation and how you would ensure compliance to current local authorities requirements. Also, list down specific areas not within your responsibilities and capabilities where you need your client to seek expert advice.

- Q2. You are required to undertake the design and supervision of the fire protection services for a Mixed Commercial Development. The architectural drawings show the following layout;
- 3 Basement car park floors of gross area 15,000m² per floor and 3.5m height.
 - 4 Storey Shopping Floors Podium. Each floor of gross area 12,000m² and floor to floor height of 4.5m
 - A Hypermarket of 10,000m² on ground floor and a Department Store of 6000m² on 1st floor.

List the types of fire protection installations required by Bomba and the basis of such requirements. Describe the design concept you would propose for the following installations and their reasons;

- Automatic Sprinkler System
- Smoke Control System

SAMPLE QUESTIONS

Chemical Engineering Paper 1

Objective Questions

Q1. A polymer dose of 0.6 mg/L is required for the treatment of an industrial effluent. If the specific gravity of the 0.5% liquid polymer is 1.0 and the effluent flow is 100m³/hr, calculate the polymer feed rate of the dosing pump in mL per minute

A. 1 mL/min

B. 5 mL/min

C. 200 mL/min

D. 1200 mL/min

E. 2000 mL/min

SAMPLE QUESTIONS

Chemical Engineering Paper 1

Objective Questions

Q2. Referring to ASTM E 1226, explosion severity of dust explosion hazard can be classified to the following categories based on test using 1 m³ and 20 L vessels and 10 KJ ignition source. Which of the following statement are true? K_{st} is explosion severity of dust cloud.

- i. Dust explosion class, St 0 with K_{st} of 0 bar. m/s is characterised as non-explosible.
- ii. Dust explosion class, St 0 with K_{st} of 0 to 200 bar. m/s is characterised as weak to moderate explosible
- iii. Dust explosion class, St 0 with K_{st} of 210 to 250 bar. m/s is characterised as strong explosible
- iv. Dust explosion class, St 0 with K_{st} more than 500 bar. m/s is characterised as strong explosible

A. i, iii

B. i, ii, iii

C. ii, iii, iv

D. ii, iv

E. i, ii, iii, iv

SAMPLE QUESTIONS

Chemical Engineering Paper 1

Objective Questions

Q3. Which of the following statements are true for safety valves installed in boiler?

A. All the boilers must be installed with minimum two or more safety valves

B. Lifting pressure for safety valve has to set at 5% above the boiler working pressure

C. If more than one safety valve is installed, difference of pressure rating between the safety valves should be 10%

D. During carry out testing on safety valve, all the steam outlets must shut off

E. None of the above

SAMPLE QUESTIONS

Chemical Engineering Paper 1

Objective Questions

Q4. A plate heat exchanger is required to heat oil to a minimal required temperature after storage. The cold side of the oil heater is edible oil whereas the hot side is steam. It is a heat exchanger catered for a capacity of 1500 ton/day of oil. What is the appropriate type of material for the oil line and line size for the oil line in the equipment? Given the density of oil is 902kg/m^3 and velocity of oil in 2 m/s

A. All the boilers must be installed with minimum two or more safety valves

B. Lifting pressure for safety valve has to set at 5% above the boiler working pressure

C. If more than one safety valve is installed, difference of pressure rating between the safety valves should be 10%

D. During carry out testing on safety valve, all the steam outlets must shut off

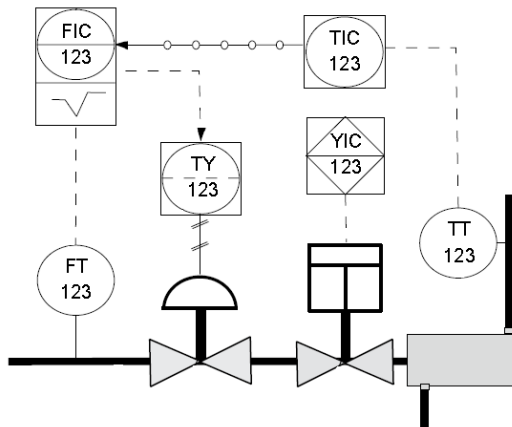
E. None of the above

SAMPLE QUESTIONS

Chemical Engineering Paper 1

Objective Questions

Q5.



Referring to the figure above, what kind of signal is transmitted out from the temperature transmitter?

A. Data link

B. Mechanical signal

C. Pneumatic signal

D. Electrical signal

E. Compressed air

SAMPLE QUESTIONS

Chemical Engineering Paper 2

Subjective Questions

- Q1. The final discharge point from any wastewater treatment plant is the point where the treated effluent is discharged after the last unit process of the industrial effluent treatment system (IETS). Please list down FIVE specifications of point of discharge as stipulated in the Fifth Schedule of the Industrial Effluent Regulations, 2009. If you notice that your client is violating the rules, with reference to the Board of Engineers Malaysia (BEM) Code of Professional Conduct, suggest your actions.

SAMPLE QUESTIONS

Environmental Engineering Paper 1

Objective Questions

Q1. Calculate the molarity of dissolved CO_2 in a vessel pressurized with 3.0 atm CO_2 . The Henry's Law of constant for CO_2 dissolved in water at same temperature is 30 atm. M^{-1}

A. 0.1 M

B. 0.01 M

C. 10 M

D. 0.33 M

E. 1.0 M

SAMPLE QUESTIONS

Environmental Engineering Paper 1

Objective Questions

Q2. When a 1.25 g limestone dissolved in acid, 0.44 g of CO_2 was generated. Calculate % of CaCO_3 in limestone, if only carbonate available in limestone is CaCO_3

A. 30%

B. 40%

C. 60%

D. 80%

E. 100%

SAMPLE QUESTIONS

Environmental Engineering Paper 1

Objective Questions

Q3. Select a FALSE statement from the following answer

- A. Atmospheric pressure is around 101 kPa
- B. Atmospheric pressure is sum of gauge and atmospheric pressure
- C. Atmospheric pressure is around 1 atm
- D. Under vacuum condition, gauge pressure will be a negative value
- E. Under vacuum condition, absolute pressure will be a negative value

SAMPLE QUESTIONS

Environmental Engineering Paper 1

Objective Questions

Q4. What is the absolute pressure of a liquid in a pipe if the gauge pressure is 50 kPa?

A. 85 kPa

B. 51 kPa

C. 151 kPa

D. 101 kPa

E. 151 MPa

SAMPLE QUESTIONS

Environmental Engineering Paper 1

Objective Questions

Q5. A body at a temperature T , K radiates heat with proportional rate of:

A. T^4

B. T^{-4}

C. T^2

D. T^{-2}

E. T

SAMPLE QUESTIONS

Environmental Engineering Paper 2

Subjective Questions

- Q1. You are employed by a turnkey contractor to advise them on qualitative requirement for designing and constructing a facility for storing hazardous waste for a car assembly plant. Develop an exhaustive list of all possible designs and operational criteria that can be used for this purpose so that the storage facility will be legally and practically acceptable.

SAMPLE QUESTIONS

Mining Engineering Paper 1

Objective Questions

Q1. You need the following to allow you to mine for minerals.

- I. Exploration Licence
- II. Prospecting Licence
- III. Mining Lease
- IV. Proprietary Mining Licence
- V. TOL for Quarrying

A. All of the above

B. III and IV

C. III, IV and V

D. II, III and IV

E. I, II, III and IV

SAMPLE QUESTIONS

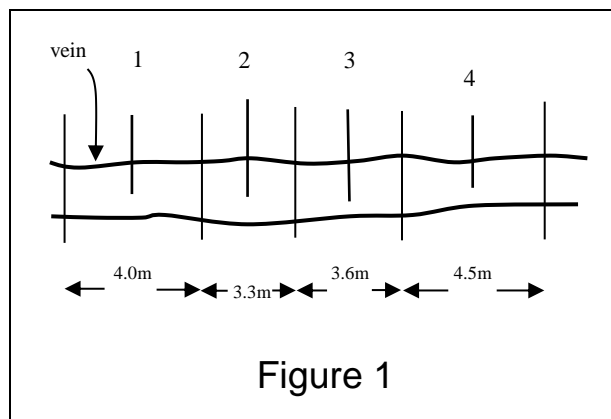
Mining Engineering Paper 1

Objective Questions

Q2. Table 1 and Figure 1 are the results from sampling made on a vein.

Table 1

Sample	Width of vein (m)	Zone of influence (m)	Zinc assay (%)
1	1.05	4.0	7.1
2	1.41	3.3	5.8
3	1.38	3.6	8.2
4	1.02	4.5	6.3
Total	4.86	15.4	



SAMPLE QUESTIONS

Mining Engineering Paper 1

Objective Questions

What is the weighted average assay for zinc based on Table 1 and Figure 1?

A. 85%

B. 6.87%

C. 6.90%

D. 6.3%

E. 6.2%

SAMPLE QUESTIONS
Mining Engineering Paper 1

Objective Questions

Q3. The shock tube or commonly known as nonel tube, can be initiated by the following.

- I. detonator
- II. safety fuse
- III. matches
- IV. detonating cord
- V. gun powder

A. All of the above

B. I and II

C. II and III

D. I and IV

E. I, IV and V

SAMPLE QUESTIONS

Mining Engineering Paper 1

Objective Questions

Q4. What is the purpose of screening

- I. To avoid uncrushed samples (oversize) from entering into other process.
- II. To avoid entrance of other fine materials into crushing parts for upgrading its efficiency and capacity
- III. To reduce size for the following stage.
- IV. To prepare sized product (product sizing)

A. I and II

B. I, II and III

C. I, II and IV

D. III and IV

E. All of the above

SAMPLE QUESTIONS

Mining Engineering Paper 2

Subjective Questions

- Q1. A feasibility study is utmost important before decide to start a mining operation and the most common method is using discounted cash flow (DCF) analysis.
- (a) Why is a feasibility study important.
 - (b) What are the inputs required to do DCF analysis.
 - (c) Describe what are NPV, IRR and Payback?
- Q2. (a) Explain the importance of having close circuit arrangement in comminution circuits.
- (b) Explain two types of grinding machine (working principle and breakage mechanism)
- Q3. What is the dominant mineral responsible for acid mine drainage (AMD) production? What group of minerals are most effective in neutralising acidity? How effective are aluminosilicate minerals in neutralising acidity?

Explain why some mine waste dumps that contain potential acid forming (PAF) minerals and neutralising minerals do not generate AMD immediately. Instead low pH AMD are only generated several years after the dumps have been abandoned.

SAMPLE QUESTIONS

Geotechnical Engineering Paper 1

Objective Questions

Q1. Field Vane Shear Test (FV) is a common in-situ test carried out at site to obtain the subsoil strength. Which of the following descriptions are correct?

- I. FV causes less disturbance to the subsoil and the shear strength is generally higher as compared to the shear strength obtained from laboratory test.
- II. FV is normally restricted to fairly uniform soft cohesive soil.
- III. The result of FV may be misleading high if it was carried out in non-uniform soil consists of thin layers of sand or sand lenses.
- IV. The undrained shear strength of soft clay as determined from FV is equal to the mobilized average undrained strength of soft clay measured at failure of an embankment.

A. I and II

B. I, II and III

C. II, III and IV

D. I, III and IV

E. All of the above

SAMPLE QUESTIONS

Geotechnical Engineering Paper 1

Objective Questions

Q2. Discharge capacity of Prefabricated Vertical Drain (PVD) is an important parameter in design. Usually the higher the discharge capacity, the better the PVD. To assess the discharge capacity of a drain, which of the following factors that influence discharge capacity are to be considered:

- I.Consolidation stress
- II.PVD core type
- III.Deformation of drain
- IV.Time

- | | |
|----------------------|--------------------------|
| A. I, II and III | <input type="checkbox"/> |
| B. II, III and IV | <input type="checkbox"/> |
| C. I, III and IV | <input type="checkbox"/> |
| D. All the above | <input type="checkbox"/> |
| E. None of the above | <input type="checkbox"/> |

SAMPLE QUESTIONS

Geotechnical Engineering Paper 1

Objective Questions

Q3. Ultimate settlement of footings on soft cohesive soils is best estimated using the data from:

A. Plate bearing test

B. Consolidation test

C. Cone penetration test

D. Standard penetration test

E. Pressure meter test

SAMPLE QUESTIONS

Geotechnical Engineering Paper 1

Objective Questions

Q4. At the beginning of an oedometer test, the void ratio and thickness of the specimen was 0.988 and 20.0 mm respectively. Find the final void ratio if the soil consolidated by 4.62 mm.

A. 0.529

B. 0.459

C. 0.228

D. 0.760

E. 0.231

SAMPLE QUESTIONS

Geotechnical Engineering Paper 1

Objective Questions

Q5. Which statement is **NOT TRUE** in building basement design and construction?

A. Recharging Water Well must be provided during construction for condition with high ground water and sandy ground

B. The lowest basement level's slab shall consider up lift pressure due to water seepage force

C. Seismic refraction survey can be adopted to estimate rock level especially dealing with limestone ground to avoid under estimate on rock cutting quantity.

D. Before any excavation works, dilapidation survey must be conducted on the surround structures and utilities.

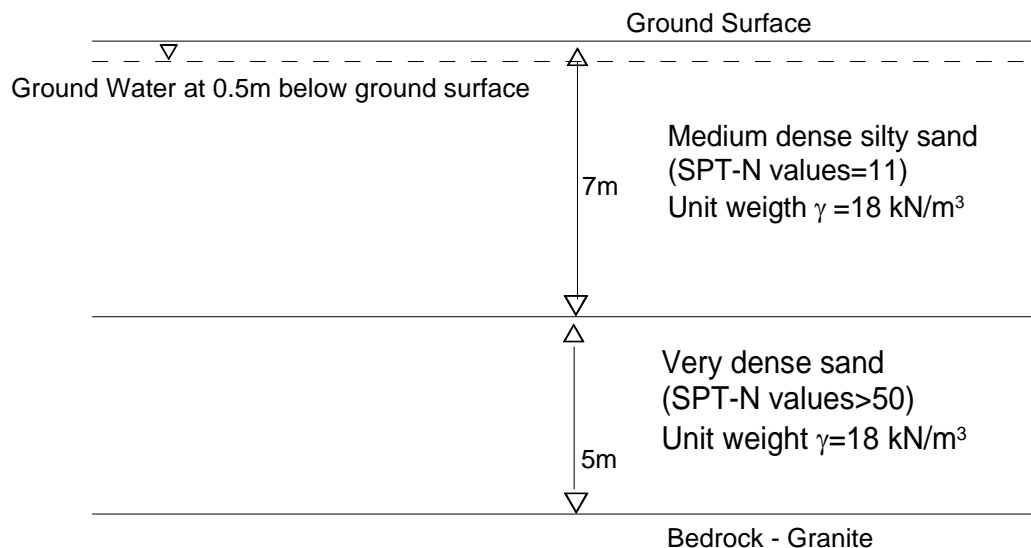
E. Open excavation is only allow for one level basement construction

SAMPLE QUESTIONS

Geotechnical Engineering Paper 2

Subjective Questions

Q1. Soil Investigation results show that the subsoil for a project site consists of 3 main soil layers as shown in the following Figure. The ground water level at site is high which is at about 0.5m below the existing ground surface.



It is expected that an excavation of 6m will be required for the construction of the basement. As the site is surrounded by other structures, open cut method is not feasible.

SAMPLE QUESTIONS

Geotechnical Engineering Paper 2

Subjective Questions

- a) If you are the design engineer, please review the following available retaining wall systems. You are to study the suitability of each wall system and to give reasons of why the wall is suitable or not suitable for this site.
- i) Soldier Piles with timber lagging (10 marks)
 - ii) Sheet Pile wall (10 marks)
 - iii) Contiguous Bored Pile wall (CBP) (10 marks)
 - iv) Secant Bored Pile wall (SBP) (10 marks)
- b) The bottom of the excavation could be instable. You are to assess the possibility of the following failure mechanisms and provide the basis of your assessment. If the failure mechanism is likely, you are to propose remedy/mitigation measure.
- i) Base heave (10 marks)
 - ii) Piping (10 marks)

Based on the above assessment, what is the minimum penetration depth required of the retaining wall to ensure the stability of the bottom of excavation? Please show your analysis, method adopted and assumptions, if any (40 marks)

SAMPLE QUESTIONS

Geotechnical Engineering Paper 2

Subjective Questions

Q2. a) In site investigation planning, explain briefly the criteria in determining the numbers of borehole and the depth of the borehole.

(40 marks)

b) Explain briefly, types of investigation method, field test and laboratory test for a road construction project at the coastal area in Klang. The lithology of the area is an alluvium formation with thick soft marine clay. Support the facts with reasons that are relevant to the site conditions and designs.

(60marks)

This page is intentionally left blank.



Publisher:

BOARD OF ENGINEERS MALAYSIA
Tingkat 11 & 17, Blok F Ibu Pejabat JKR
Jalan Sultan Salahuddin
50580 Kuala Lumpur, Malaysia.
Tel: +603-26912090; Fax: +603-26925017
Email: pce@bem.org.my
Website: www.bem.org.my

Copyright © 2018 Board of Engineers Malaysia
All rights reserved. No part of this book may be reproduced or transmitted in any form without permission in writing from the copyright holder.