LAPORAN PEPERIKSAAN STPM & MUET 2021

Mathematics (M) (950)
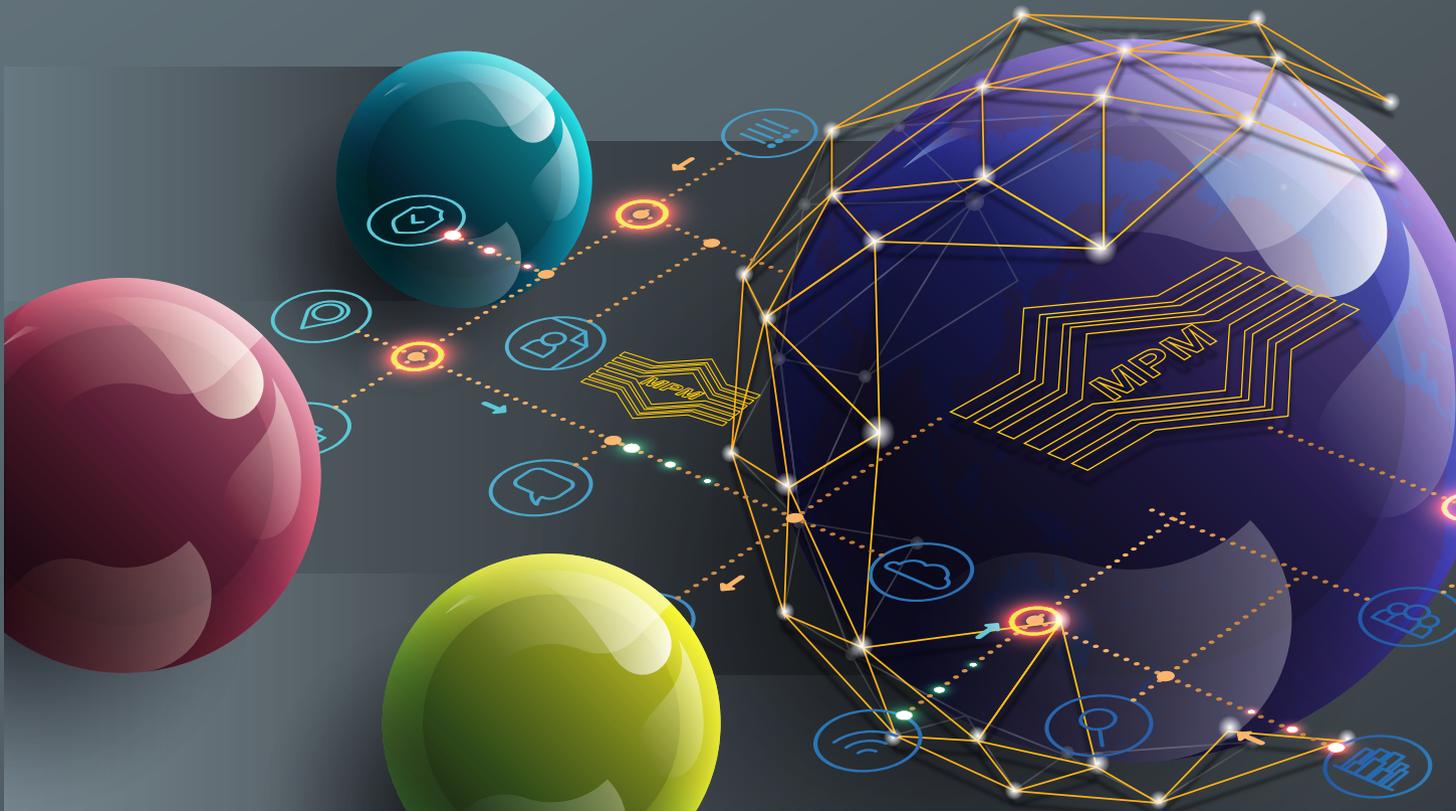
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MATHEMATICS (M) (950/1)

OVERALL PERFORMANCE

The number of candidates for this subject was 682. The percentage of candidates who obtained a full pass was 31.95%.

The achievement of candidates according to grades is as follows:

Grade	A	A–	B+	B	B–	C+	C	C–	D+	D	F
Percentage	5.57	3.37	2.49	3.37	4.69	5.13	7.33	5.13	2.49	3.67	56.74

CANDIDATES' RESPONSES

PAPER 950/1 (ESSAY)

General comments

Overall, the quality of answer is below average. Many candidates did not perform well. All candidates answered in English.

Comments on individual questions

Question 1

Most of the candidates were not able to express the rational function in the form $\dfrac{A + Bx}{1 + x^2} + \dfrac{C}{1 - x} + \dfrac{D}{(1 + x)^2}$. Many of them failed to notice that one of the denominators is repeated factor. Other errors include:

(i) making mistake in forming equations,

(ii) inadequate number of equation to solve the unknowns,

(iii) making mistake when comparing coefficients and solving simultaneous equations.

Answer: $\dfrac{2x^3}{(1 + x^2)(1 - x)^2} \equiv \dfrac{1}{1 + x^2} - \dfrac{2}{1 - x} + \dfrac{1}{(1 + x)^2}$

Question 2

Almost all of the candidates were not able to multiply $\dfrac{1}{\sqrt{1 + x^2} + 1}$ with its conjugate and most of candidates were not able to expand the expression correctly even though the formula was given in the question paper.

Answer: $\dfrac{1}{\sqrt{1 + x^2} + 1} \approx \dfrac{1}{2} - \dfrac{1}{8}x^2$

Question 3

Most of the candidates able to solve this question.

Answer: *x* = 1, *y* = −1, *z* = 3

Question 4

Most of the candidates were not able to differentiate $2x^2y + y \ln x$ correctly. However, they were able to differentiate $y^2 - 3x$ correctly. Majority of the candidates failed to substitute *x* = 1 in the implicit function to find the values of *y*.

Answer: $\dfrac{dy}{dx} - \dfrac{9}{2}$

Question 5

Most of the candidates were able to show that *x*-coordinate of *P* is $\dfrac{1}{3} \ln 4$. However, some candidates wrote $(e^{3x})^2 = e^{9x^2}$ instead of $(e^{3x})^2 = e^{6x}$. Almost all candidates were not able to write the formula of the volume correctly in part (*b*). Very few candidates could answer part (*c*) even though the answer is obvious.

Answer: (*b*) $(3 \ln 4 + 6)\pi$

Question 6

Most of the candidates failed to substitute *y* = 0 and *t* = 0 to solve for *c* in part (*a*). In part (*b*), a lot of the candidates managed to find the value of *t* but failed to write the answer to the nearest 0.1 hour as required in the question. Most of the candidates not able to sketch the graph correctly in part (*c*).

Answer: (*b*) *t* = 19.6 hours

Question 7

Candidates who tried this question did badly. Majority of the candidates could find the f^{-1} but failed to state the domain. They also couldn't find the inverse of the quadratic function. Finding the inverse of g is a little bit challenging as it requires the student to complete the square. But almost all candidates cannot sketch the graphs of $(f \circ g)$ and $(f \circ g)^{-1}$ completely.

Answers: (*a*) $f^{-1}(x) = 9 - e^x, -\infty < x < \infty$, $g^{-1}(x) = 3 + \sqrt{9 - x}, x < 9$;
(*b*) $(f \circ g)(x) = 2 \ln (x - 3), 3 < x < \infty$

Question 8

Many candidates were able to get the first derivative in part (*a*), however failed to obtain the second derivative, even though the answer of the second derivative is given. Candidates were not able to find $x = -2y$ when $\dfrac{dy}{dx} = 0$ and hence they failed to find the turning points. For those who were able to find $x = -2y$, they could find local maximum and minimum points. Majority of the candidates also failed to make used the results given in part (*a*) to show that there is no inflection point of the curve. All candidates failed to sketch the graph correctly.

Answer: (*a*) $\dfrac{dy}{dx} = \dfrac{x + 2y}{2x + y}$

MATHEMATICS (M) (950/2)

OVERALL PERFORMANCE

The number of candidates for this subject was 678. The percentage of candidates who obtained a full pass was 60.17%.

The achievement of candidates according to grades is as follows:

Grade	A	A–	B+	B	B–	C+	C	C–	D+	D	F
Percentage	7.82	7.23	8.11	8.11	11.06	6.78	11.06	5.31	6.64	4.28	23.60

CANDIDATES' RESPONSES

PAPER 950/2 (ESSAY)

General comments

The performance of the candidates showed a wide range of mathematical ability among STPM candidates. The answers presented by good candidates showed full understanding of mathematical concepts with nearly perfect. They showed systematic analysis of the problems and good planning in their answers. Poor performance candidates are the one that not careful enough to read the question accordingly. This is why they are not getting full mark on the answer.

In general, the performance of candidates was satisfied. The candidates were good in answering quantitative questions but weak in answering qualitative questions such as interpretation and comments. There is a significant difference in the quality of scripts produced by different centres. Some candidates had been well prepared and showed considerable confidence in their responses. All candidates preferred to answer the whole paper in English.

Comments on individual questions

Question 1

The performance of the candidates was moderate. For part (*a*), only very few candidates were able to compare and comment on the graduate employability. And for part (*b*), some candidates failed to estimate the percentile from cumulative frequency curve.

Answer: (*b*) College Q performs better

Question 2

Some of the candidates performed poorly and some candidates made no attempts on this question. Common mistakes include:

(i) P(C | Dined in) as P($C \cap$ Dined in)

(ii) P($C \cap$ Dined in) as P(C) × P(Dined in)

Answers: (*a*) $\dfrac{5}{12}$; (*b*) $\dfrac{7}{8}$

Question 3

The performance of the candidates was good. Majority of the candidates who response to question in parts (*a*) and (*b*) were able to use Poisson Distribution. Common mistake for part (*a*) was candidates write $X \sim Po(8)$ instead of $X \sim Po(8k)$. However, some candidates could not use the answer obtained in part (*b*) and binomial distribution to answer part (*c*).

Answers: (*b*) 0.9084;   (*c*) 0.6186

Question 4

This was a straightforward question. The overall performance of the candidates was good. Most of the candidates were able to calculate the Spearman's rank correlation coefficient. However, some of the candidates were wrongly rank the two categories as indicated in the questions.

Answer: *r* = 0.786

Question 5

The performance of the candidates was good. This is a straight-forward question. Many candidates used correct formula and obtained correct answer. Carelessly, some of them did not give their answers of index in 2 decimal places or include the unit for index. Some candidates failed to comment on the net exports clearly.

Answers: (*a*) 90.00;   (*b*) 58.45
(*c*) Net export Country *Y* is 20% more than Country *Z* relative to Country *X*

Question 6

The performance was moderate. Majority candidates could not identify the component that are present and absent in the time series plot. Many candidates gave the irregular component as their answer. Some of the candidates use additive model instead of multiplicative model to forecast the annual profit for the year 2021. Some candidates did not give the answer in the correct unit (RM *x* million). Some candidates unable to interpret the negative value obtained.

Answers: (*a*) Trend: General direction/movement of data is decreasing,
Cyclical: long term repeated fluctuation;
(*b*) The annual profit is expected to decrease by RM859 650

Question 7

Overall performance for this question was moderate. For part (*a*), most candidates could not calculate the probability by using union and conditional probability. For part (*b*), most candidates can use the concept if $P(M \cap A) = P(M) \times P(A)$ or $P(M \mid A) = P(M)$ then *M* and *A* are independent to determine whether the event *M* and *A* are independent. And for part (*c*), most candidates' performance poorly. The candidates were unable to relate combination with the probability of winning the prize. Some of the candidates wrongly interpret the event as permutation.

Answers: (*a*) (i) $\dfrac{7}{16}$,   (ii) $\dfrac{3}{4}$;   (*c*) (i) 0.1377,   (ii) 0.3797,   (iii) 0.3671

Question 8

The performance of candidates was good. This question was proven to be another main source of marks for most of the candidates, especially those who performed moderately and poorly in Section A. Common mistakes include:

(i)   Do not provide the regression line in the form of y^2 on x, but in the form of y on x in part (*c*).

(ii) Substitute total cost as RM14000 into the equation to obtain the fitted value and failed to convert the final answer to hundred units in part (*d*).

Answers: (*b*) $r = 0.995$;   (*c*) $y^2 = 0.2879x - 0.2515$;   (*d*) 193 units

MATHEMATICS (M) (950/3)

OVERALL PERFORMANCE

The number of candidates for this subject was 676. The percentage of candidates who obtained a full pass was 70.86%.

The achievement of candidates according to grades is as follows:

Grade	A	A–	B+	B	B–	C+	C	C–	D+	D	F
Percentage	8.58	9.02	10.80	6.51	9.47	15.24	11.24	3.40	2.96	3.40	19.38

CANDIDATES' RESPONSES

PAPER 950/3 (ESSAY)

General comments

The performance of the candidates showed a wide range of mathematical ability among STPM candidates. There is significant difference in the quality of scripts produced by different centres. There were quite a number of good scripts with well-planned and almost the same with the mark scheme. The performance of the candidates showed a wide range of mathematical ability among STPM candidates. There is significant difference in the quality of scripts produced by different centres. The answers presented by good candidates showed full understanding of mathematical concept with nearly perfect working. They showed systematic analysis of the problems and good planning in their answers.

Comments on individual questions

Question 1

Candidates poorly attempted this question. Some candidates recalculate effective interest rate, many of the candidates were wrongly calculated present value using annuity formula. Basically, candidates did not read the question carefully. Candidates appear to be incapable of calculating present value when the payments are not equal. A lot of them jump straight into using the present value of annuity formula; completely ignoring the fact that the payments are not the same throughout the financing period.

Answers: (*a*) RM6654.38; (*b*) RM11654.09

Question 2

The performance of the candidates was good. Most candidates did well in the first part; they are able to correctly recognize the characteristics of supply and demand and able to choose the correct price. In part two, some of the candidates makes careless mistakes while finding gradient; they use horizontal distance over vertical distance instead. Candidates mostly did well in part three.

Answers: (*a*) Price 1 for supply and price 2 for demand; (*b*) Demand equation: $p = 350 - 2q$, Supply equation: $p = 2q + 100$; (*c*) $p = $ RM225, $q = 62.5$ units

Question 3

Candidates perform moderately. Mistaken variables as number of students and number of chaperones. Some candidates lost marks due to graph without labelling and incomplete form of formulate without $x > 0$ and $y > 0$. Candidates also wrongly shade the wrong feasible region. Some candidates did not draw their objective function lines properly.

Answer: (*c*) RM9900

Question 4

Candidates did well in this question. Most of the candidates could draw a correct AON/AOA network diagram with activities, duration, EST and LST but did not manage to get full marks because did not show the key. Some of the candidates were unable to state the correct reason for part (*b*) related to total float, activity *C* as a critical activity.

Answers: (*a*) *B – C – E – G*;   (*b*) No, since activity *C* is one of the critical activity

Question 5

This is a straightforward and easy question. It was well presented by most of the candidates for part (*a*) as the formula for EOQ are provided. However, some candidates lost marks for part (*b*) because did not include purchasing cost.

Answers: (*a*) 182 units;   (*b*) RM83 044.98

Question 6

Candidates performed badly and some shown no attempts. Almost all candidates failed to answer this question. The small portion who managed did not show their steps and justified their answer properly. Candidates failed to explain the reason why *t* should be in between −2 and 2 (inclusive).

Answer: $-2 \leqslant t \leqslant 2$

Question 7

This question provided the main source of marks for most of the candidates especially to those who did moderately and poorly in section A. Not a lot of candidates chose to answer this question. But candidates that choose to do so did quite well. Some candidates did not properly show the correct integration to obtain C(x). Most of them did not consider the constant after integrating. Some straight away put 70 into their cost function without justification. Most candidates did well in part (*b*) until (*e*).

Answers: (*a*) $C(x) = 40x + 0.035x^2 + 70$;   (*b*) $R(x) = -\dfrac{1}{4}x^2 + 60x$;   (*c*) 35 088 units, RM280.88

Question 8

Majority candidates chose to answer this question in section B. The performance of the candidates was good. Candidates understand that the question require them to calculate the optimal order quantity, minimum total inventory cost, the number of orders, cycle time and reorder point, but a majority of them did not consider the effective lead time. Some candidates made careless mistakes when applying the formulae for the annual total inventory cost and some of them didn't add in the purchasing cost. When sketch the inventory graph, some candidates didn't label the graph completely.

Answers: (*a*) 1200 units; (*b*) 900 units; (*c*) 100 units; (*e*) RM270 900

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