COMPUTING	**9691/21**
Paper 2 Written Paper	May/June 2016
MARK SCHEME	
Maximum Mark: 75	

Published

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1 (a) Example Pascal: [4]

```
PROCEDURE PrintNameLine(Symbol : CHAR, Name : STRING)
BEGIN
    Write(Symbol, '  ');
    WRITE(Name);
    WriteLn('  ', Symbol);
END;
```

Mark as follows:
- correct procedure header & ending
- output symbol at either end of line
- output name
- output (2) spaces either side between name and symbol

(b) Example Pascal: [6]

```
PROCEDURE PrintSymbolLine(Symbol : CHAR, LabelWidth : INTEGER)
VAR i : INTEGER;
BEGIN
    FOR i := 1 TO LabelWidth DO
        Write(Symbol);
    WriteLn();
END;
```

Mark as follows:
- correct procedure headings and endings
- output line of symbols to correct length
- followed by newline

```
PROCEDURE PrintGapLine(Symbol : CHAR, LabelWidth : INTEGER)
VAR i : INTEGER;
BEGIN
    Write(Symbol);
    FOR i := 1 TO LabelWidth – 2 DO
        Write(' ');
    WriteLn(Symbol);
END;
```

Mark as follows:
- output a symbol at either end
- output (`LabelWidth – 2`) spaces
- followed by newline

(c) (i) Example Pascal: **[7]**

```
PROCEDURE PrintNameLine(Symbol : CHAR, Name : STRING,
                                     LabelWidth : INTEGER)
VAR NumberOfSpaces, i : INTEGER;
   BEGIN                    // remember to allow for symbol at edges
   NumberOfSpaces := (LabelWidth – Length(Name) - 2) DIV 2
   Write(Symbol);
   FOR i := 1 TO NumberOfSpaces DO Write(' ');
   WRITE(Name);
   IF (LabelWidth - Length(Name)) MOD 2 > 0
       THEN NumberOFSpaces := NumberOFSpaces + 1;
   FOR i := 1 TO NumberOfSpaces DO Write(' ');
   WriteLn(Symbol);
END;
```

Mark as follows:
– correct procedure header & ending
– output symbol at either end of line, and name in middle
– calculate the number of spaces required
– output half number of spaces before name
– output half number of spaces after name
– check for odd number of spaces
– add extra space at front/rear

(ii) – `IF LENGTH(Name) > LabelWidth – 2` **[2]**

1 mark for suggesting length of name too long
1 mark for giving exact amount of excessive length

(iii) – ask user to input a shorter name // validate length of name **[2]**
– loop around INPUT `Name` until `LENGTH(Name) <= LabelWidth – 2`

(d) – reusing modules **[2]**
– easier to amend/maintain

(e) – constant declaration **Max [3]**
– meaningful identifiers/variable names
– modules // procedure calls
– use of parameters
– indentation
– capitalised variable names/identifiers // upper case key words

2 (a) Example Pascal: **[2]**

```
VAR Interval : ARRAY [1..4] OF INTEGER;
Interval[1] := 4;
Interval[2] := 2;
Interval[3] := 1;
Interval[4] := 3;
```

Mark as follows:
– declare array
– initialising

(b) Mark the reason (data must match the reason) **Max [4]**

– travelling 1 interval
– travelling 2 intervals
– travelling 3 intervals
– travelling in opposite direction should give same result
– using stations in the middle

(c) Example Pascal: **[10]**

```
PROCEDURE TicketCalculator;
VAR Origin, Destination, Temp, Distance, i : INTEGER;
VAR TicketPrice : Currency;
   BEGIN
      ReadLn(Origin);
      ReadLn(Destination);
      Distance := 0;
      IF Origin > Destination
         THEN
            BEGIN
               Temp := Origin;
               Origin := Destination;
               Destination := Temp
            END;
      FOR i := Origin TO Destination - 1 DO
         Distance := Distance + Interval[i];
      TicketPrice := Distance * 0.25;
      WriteLn(TicketPrice);
   END;
```

Mark as follows:
– declare local variables
– procedure heading and ending
– input origin and destination
– initialise distance
– swap origin and destination
– use of a temporary variable for swapping
– loop correct number of times (accept REPEAT or WHILE loops)
– add correct interval* to distance
– calculate ticket price
– output ticket price

Note: *Need to see answer to part (a)

3 (a)

```
PROCEDURE TakeBooking                                              [11]
    DECLARE NumberOfCustomers, TableNumber : INTEGER         (1)
    DECLARE Found : BOOLEAN                                  (1)
    INPUT NumberOfCustomers
    // initialise search for a suitable table
    Found ← FALSE
    TableNumber = 0                                          (1)
    REPEAT         // find a table with enough seats
        TableNumber ← TableNumber + 1
        IF TableSeats[TableNumber] >= NumberOfCustomers    (1+1)
             AND Booked[TableNumber] = FALSE                (1)
          THEN
          Found ← TRUE
        ENDIF
    UNTIL Found = TRUE OR TableNumber = 12                 (1+1)
    IF Found = FALSE
        THEN    // no tables left with enough seats
           OUTPUT "Sorry no tables with enough seats"       (1)
        ELSE...// make the booking
           Booked[TableNumber] ← TRUE                       (1)
           GroupSize[TableNumber] ← NumberOFCustomers       (1)
        OUTPUT "Table number booked: ", TableNumber
    ENDIF
ENDPROCEDURE
```

(b)

```
PROCEDURE CancelBooking                                            [4]
    DECLARE TableNumber : INTEGER                            (1)
    INPUT TableNumber
    IF Booked[TableNumber] = FALSE                           (1)
        THEN
           OUTPUT "Error – this table is not booked"
        ELSE    // cancel booking
           Booked[TableNumber] ← FALSE                       (1)
           GroupSize[TableNumber] ← 0                        (1)
           OUTPUT "Booking cancelled"
    ENDIF
ENDPROCEDURE
```

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(c)
```
PROCEDURE AvailableTablesReport
    DECLARE TableNumber : INTEGER
    FOR TableNumber ← 1 TO 12
        IF Booked[TableNumber] = FALSE
            THEN
                OUTPUT "Table Number: ", TableNumber,
                    " available seats: ", TableSeats[TableNumber]
        ENDIF
    ENDFOR
ENDPROCEDURE
```
[4]

Mark as follows:
– loop to access every table
– check if table not booked
– output table number
– output seats available at this table

(d) (i) Example Pascal: **[5]**

```
TYPE BookingType = RECORD
    TableSeats          : INTEGER;
    Booked              : BOOLEAN;
    GroupSize           : INTEGER;
    CustomerName        : STRING[20];
    CustomerTelNumber   : STRING[15];
    AmountDepositPaid   : CURRENCY;
END;
```

Mark as follows:
– record header & ending
– TableSeats, GroupSize correctly declared
– Booked correctly declared
– CustomerName, CustomerTelNumber correctly declared
– AmountDepositPaid correctly declared

(ii) Example Pascal: **[3]**

```
VAR TableBookings : ARRAY[1..12] OF BookingType
```

Mark as follows:
– array name declaration
– array dimension
– data type

(e) Example Pascal: **Max [6]**

```
PROCEDURE SaveToFile;                                 (1)
BEGIN
   VAR BookingFile : FILE OF BookingType;             (1)
   VAR i : INTEGER;                                   (1)
   ASSIGNFILE (BookingFile, 'TableBookings.DAT');     (1)
   REWRITE (BookingFile);                             (1)
   FOR i := 1 TO 12 DO                                (1)
      WRITE(BookingFile, TableBookings[i]);           (1)
   CLOSEFILE(BookingFile);
END;
```

Mark as follows:
– Procedure heading and ending
– Declare local variable
– Assign file name
– Open file for writing
– Close file
– Loop 12 times
– Write record to file