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EXPERT COMPUTER COURSE

SPREADSHEET

Topics Covered:

#	Topic
1	Elements of Electronic Spreadsheet — Interface, Cells, Addressing, Save, Print
2	Manipulation of Cells — Entering Data, Series, Editing, Insert/Delete Rows/Columns
3	Formulas — Operators, Cell References, AutoSum, Formula Errors
4	Functions — Mathematical, Statistical, Logical, Text, Date/Time Functions
5	Relative and Absolute Cell References
6	Charts — Types, Creating and Formatting Charts
7	Working with Graphics — Clip Art, SmartArt
8	Pivot Tables and Pivot Charts
9	Quick Revision + Important MCQ Questions

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SECTION 1: ELEMENTS OF ELECTRONIC SPREADSHEET

1.1 What is a Spreadsheet?

> *A Spreadsheet is an electronic document that organises data in rows and columns (a grid of cells). It allows users to enter numbers, text, and formulas, perform calculations automatically, and create charts. Microsoft Excel is the most widely used spreadsheet application.*

Spreadsheet	Company	Extension	Key Features
Microsoft Excel	Microsoft (Office Suite)	.xlsx / .xls	Most powerful; pivot tables; macros (VBA); 1,048,576 rows × 16,384 columns
LibreOffice Calc	The Document Foundation (Free)	.ods (opens .xlsx)	Free open-source alternative; compatible with Excel
Google Sheets	Google (Cloud-based)	.gsheet	Online real-time collaboration; free; auto-save
Apple Numbers	Apple	.numbers	Mac/iOS only; visually beautiful; limited features vs Excel

1.2 MS Excel Interface

Interface Element	Description
Title Bar	Top — shows workbook name and 'Microsoft Excel'
Quick Access Toolbar	Top-left — Save, Undo, Redo, Print (customisable)
Ribbon	Tabbed toolbar — File, Home, Insert, Page Layout, Formulas, Data, Review, View
Name Box	Left of formula bar — shows active cell address (e.g., A1). Type address to navigate.
Formula Bar	Shows content of active cell — formulas or data. Edit here or directly in cell.
Column Headers	Letters A, B, C... across top — identify columns (up to XFD = column 16,384)
Row Headers	Numbers 1, 2, 3... down left side — identify rows (up to 1,048,576)
Cell	Intersection of a row and column — where data is entered
Active Cell	Currently selected cell — highlighted with blue/green border
Sheet Tab Bar	Bottom — shows sheet names (Sheet1, Sheet2). Click to switch sheets.
Status Bar	Bottom — shows Sum, Average, Count of selected cells; zoom slider
Scroll Bars	Right and bottom — scroll to any part of the large worksheet
Fill Handle	Small green square at bottom-right of active cell — drag to auto-fill series

1.3 Cell Addressing

> *A cell address (cell reference) uniquely identifies each cell in a worksheet using the column letter followed by the row number. Columns are labelled A-Z, then AA-AZ, BA-BZ... up to XFD (16,384 columns).*

Reference Type	Example	Description
Single Cell	A1	Column A, Row 1 — the most common cell reference
Cell Range	A1:D5	All cells from A1 to D5 — a rectangular block
Entire Column	A:A	All cells in column A
Entire Row	1:1	All cells in row 1
Multiple Ranges	A1:B3, D1:E3	Two separate ranges (comma separates non-adjacent ranges)
Named Range	TotalSales	User-defined name for a cell or range — more readable
3D Reference	Sheet1!A1	Refers to cell A1 on Sheet1 (different sheet)
Cross-workbook	[Book1.xlsx]Sheet1!A1	Refers to cell in another workbook file

1.4 Navigating in Excel

Navigation	Keyboard Shortcut
Move one cell right	Tab key OR Right Arrow
Move one cell left	Shift+Tab OR Left Arrow
Move one cell down	Enter OR Down Arrow
Go to specific cell	Ctrl+G or F5 → type address → OK OR click Name Box, type address, Enter
First cell of row	Home key
First cell (A1)	Ctrl+Home
Last used cell	Ctrl+End
Last cell of data in direction	Ctrl + Arrow key (jumps to end of data)
Select entire column	Click column header (A, B, C...)
Select entire row	Click row header (1, 2, 3...)
Select entire sheet	Ctrl+A OR click corner button (above row 1, left of column A)

1.5 Saving Workbooks

Format	Extension	Use Case
Excel Workbook	*.xlsx	Standard format — Excel 2007 and later. XML-based.
Excel 97-2003	*.xls	Old format — compatibility with older Excel versions
Excel Macro-Enabled	*.xlsm	Workbook containing macros (VBA code)

Format	Extension	Use Case
CSV (Comma Separated)	*.csv	Plain text — each cell separated by comma. Universal data format. Loses formatting.
PDF	*.pdf	Share for viewing only — preserves exact layout
Excel Template	*.xltx	Reusable template with formatting and formulas preset
OpenDocument Spreadsheet	*.ods	LibreOffice/OpenOffice format

- Save: Ctrl+S — saves to same location. First-time save opens Save As dialog.
- Save As: F12 — choose name, location, and format
- AutoSave: In Microsoft 365, files on OneDrive auto-save every few seconds

1.6 Page Setup and Printing

Print Setting	How to Access	Options
Print	File → Print OR Ctrl+P	Choose printer, pages, copies, orientation, paper size
Print Area	Page Layout → Print Area → Set Print Area	Select range → set — only that area prints
Page Orientation	Page Layout → Orientation	Portrait (tall) or Landscape (wide) — landscape for wide tables
Paper Size	Page Layout → Size	A4, Letter, Legal etc.
Margins	Page Layout → Margins	Normal, Narrow, Wide, Custom
Fit to Page	Page Layout → Scale to Fit → Width/Height dropdowns	Fit sheet to 1 page wide × 1 page tall etc.
Print Gridlines	Page Layout → Sheet Options → Print checkbox under Gridlines	Prints cell borders even if no border formatting set
Print Row/Column Headers	Page Layout → Sheet Options → Print checkbox under Headings	Prints A,B,C column letters and 1,2,3 row numbers
Repeat Rows at Top	Page Layout → Print Titles → Rows to repeat at top	Prints header row on every page — essential for long tables
Print Preview	File → Print — preview shown on right side	Check before printing — saves paper

SECTION 2: MANIPULATION OF CELLS

2.1 Entering Data

Data Type	Description	How Excel Aligns It	Example
Text (Labels)	Words, names, descriptions — cannot be used in calculations	Left-aligned by default	Student Name, City, Department
Numbers	Integers, decimals, negative numbers — used in calculations	Right-aligned by default	100, 3.14, -50, 1000000
Dates	Calendar dates — stored as serial numbers (1 = 1 Jan 1900)	Right-aligned	01/05/2024, 15-Mar-2024
Times	Time of day — stored as decimal fraction of a day	Right-aligned	10:30 AM, 14:45:00
Formulas	Calculations starting with = sign	Shows result; right-aligned for numbers	=A1+B1, =SUM(A1:A10)
Boolean	TRUE or FALSE values	Centre-aligned	TRUE, FALSE (or from IF functions)

2.2 Entering and Editing Data

- Click a cell → type data → press Enter (move down) or Tab (move right) or arrow key
- Edit cell: Double-click cell OR press F2 → cursor appears inside cell for editing
- Cancel edit: Press Escape — discards changes and restores original content
- Delete cell contents: Select cell(s) → Delete key (removes content, keeps formatting)
- Clear All: Home → Editing → Clear → Clear All (removes content AND formatting)
- Undo: Ctrl+Z. Redo: Ctrl+Y (works for many levels)

2.3 Creating Data Series (AutoFill)

> *AutoFill automatically fills a series of values based on a pattern. Drag the Fill Handle (small green square at bottom-right of selected cell) to extend the series.*

Series Type	Starting Values	AutoFill Produces	How to Start
Number Series	1, 2 (enter in 2 cells, select both)	3, 4, 5, 6, 7...	Select both → drag fill handle
Days of Week	Monday	Tuesday, Wednesday, Thursday...	Type Monday → drag fill handle
Month Names	January (or Jan)	February, March, April...	Type January → drag fill handle
Date Series	01/01/2024	02/01/2024, 03/01/2024...	Type date → drag fill handle
Custom Increment	2, 4 (enter both, select)	6, 8, 10, 12...	Select both → drag
Same value	100 (single cell)	100, 100, 100... (copy, not series)	Drag fill handle (hold Ctrl for series)
Text with number	Quarter 1	Quarter 2, Quarter 3, Quarter 4	Type Quarter 1 → drag fill handle

- Fill Series Dialog: Home → Editing → Fill → Series → set Type, Step, Stop values for precise series
- Flash Fill (Excel 2013+): Ctrl+E — Excel learns pattern from your examples and fills automatically

2.4 Inserting and Deleting Rows and Columns

Action	Method 1	Method 2	Notes
Insert Row Above	Right-click row number → Insert	Home → Cells → Insert → Insert Sheet Rows	Inserts blank row; existing rows shift down
Insert Column Left	Right-click column letter → Insert	Home → Cells → Insert → Insert Sheet Columns	Inserts blank column; existing columns shift right
Insert Multiple Rows	Select multiple row numbers → right-click → Insert	Same as above	Inserts same number of rows as selected
Delete Row	Right-click row number → Delete	Home → Cells → Delete → Delete Sheet Rows	Permanently removes; remaining rows shift up
Delete Column	Right-click column letter → Delete	Home → Cells → Delete → Delete Sheet Columns	Permanently removes; remaining columns shift left
Hide Row/Column	Right-click → Hide	Home → Format → Hide & Unhide	Data hidden but not deleted; formulas still work
Unhide	Select surrounding rows/cols → right-click → Unhide	Home → Format → Hide & Unhide → Unhide Rows/Columns	—

2.5 Changing Column Width and Row Height

Action	Mouse Method	Menu Method
Change Column Width	Drag right border of column header left/right	Right-click column header → Column Width → type value
Change Row Height	Drag bottom border of row header up/down	Right-click row header → Row Height → type value
AutoFit Column Width	Double-click right border of column header — fits widest content	Home → Format → AutoFit Column Width
AutoFit Row Height	Double-click bottom border of row header	Home → Format → AutoFit Row Height
Set Multiple Columns Same Width	Select multiple columns → drag one → all change together	Select columns → Format → Column Width → type value → OK
Default Column Width	—	Home → Format → Default Width — sets global default

> **Quick Tip:** When a cell shows '####', it means the column is too narrow to display the value. Simply widen the column by double-clicking the column border for AutoFit.

SECTION 3: FORMULAS IN EXCEL

3.1 What is a Formula?

> *A formula is an expression that calculates a value. All formulas in Excel must start with an equals sign (=). Formulas can contain numbers, cell references, operators, and functions.*

```
=A1+B1
=C5*D5
=SUM(A1:A10)/COUNT(A1:A10)
=IF(B2>50,"Pass","Fail")
```

3.2 Mathematical Operators

Operator	Symbol	Example	Result
Addition	+	=5+3 OR =A1+B1	8 (sum of values)
Subtraction	-	=10-4 OR =A1-B1	6 (difference)
Multiplication	*	=6*7 OR =A1*B1	42 (product)
Division	/	=20/4 OR =A1/B1	5 (quotient)
Exponentiation (Power)	^	=2^10 OR =A1^B1	1024 (2 to the power 10)
Percentage	%	=20% OR =A1*10%	0.2 (or 20% of a value)

3.3 Operator Precedence (Order of Calculation)

> *Excel follows BODMAS/PEMDAS rules: Brackets first, then Exponents, then Multiplication/Division (left to right), then Addition/Subtraction (left to right).*

```
=2+3*4      → Result: 14  (not 20; multiplication done first)
=(2+3)*4    → Result: 20  (brackets override — addition done first)
=10-6/2     → Result:  7  (division before subtraction)
=2^3+1      → Result:  9  (exponent first: 8+1=9)
```

3.4 Using AutoSum

> *AutoSum is a shortcut to quickly insert common functions (SUM, AVERAGE, COUNT, MAX, MIN) without typing the function name.*

AutoSum Option	Keyboard Shortcut	What It Does
Sum	Alt + =	Inserts =SUM() for the range above (or to the left) of active cell
Sum all	Select empty cell below/right of data, then Alt+=	Detects data range automatically and creates SUM formula
Other functions	Home → Editing → AutoSum dropdown arrow	Shows: Sum, Average, Count Numbers, Max, Min, More Functions

AutoSum Option	Keyboard Shortcut	What It Does
AutoSum multiple columns	Select row below all data columns → Alt+=	Creates SUM formula for each column simultaneously

3.5 Common Formula Errors and Their Meaning

Error	Name	Cause	How to Fix
#DIV/0!	Divide by Zero	Formula divides by zero or empty cell	Check denominator — use IF to avoid: =IF(B1=0,0,A1/B1)
#VALUE!	Wrong Data Type	Formula expects number but finds text	Check cell types — ensure numeric cells contain numbers not text
#REF!	Invalid Reference	Referenced cell was deleted	Correct the formula reference; undo the deletion
#NAME?	Unrecognised Name	Function name mistyped or named range doesn't exist	Check spelling: =SUM not =SOM; verify named ranges
#N/A	Not Available	Lookup value not found (VLOOKUP, MATCH)	Check lookup value exists in data; use IFERROR to handle
#NUM!	Invalid Number	Impossible mathematical operation (sqrt of negative)	Check formula logic; ensure valid numeric input
#NULL!	Null Intersection	Incorrect range operator — spaces instead of comma	Replace space with comma or colon: =SUM(A1:A5) not =SUM(A1 A5)
######	Column Too Narrow	Column too narrow to display the value	Widen the column by dragging or double-clicking column border

> **Exam Tip:** #DIV/0! = divide by zero. #VALUE! = wrong data type. #REF! = deleted reference. #NAME? = mistyped function name. #### = column too narrow (not really an error).

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SECTION 4: EXCEL FUNCTIONS

4.1 What is a Function?

> *A function is a predefined formula that performs a specific calculation. Excel has 400+ built-in functions. Functions take arguments (inputs) in parentheses and return a result.*

```
=FUNCTION_NAME(argument1, argument2, ...)
=SUM(A1:A10)          -- adds all values in A1 to A10
=AVERAGE(B1:B5)       -- calculates average of B1 to B5
=IF(C2>80,"A","B")  -- logical test: if C2>80 return A, else B
```

4.2 Mathematical and Statistical Functions

Function	Syntax	Description	Example
SUM	=SUM(range)	Adds all values in a range	=SUM(A1:A10) → total of A1 to A10
SUMIF	=SUMIF(range,criteria,sum_range)	Adds values where condition is met	=SUMIF(B:B,"Delhi",C:C) → sum of C where B=Delhi
SUMIFS	=SUMIFS(sum_range,criteria_range1,criteria1,...)	Sum with multiple conditions	=SUMIFS(Sales,City,"Delhi",Month,"Jan")
AVERAGE	=AVERAGE(range)	Calculates arithmetic mean	=AVERAGE(C1:C10) → mean of C1 to C10
AVERAGEIF	=AVERAGEIF(range,criteria)	Average where condition is met	=AVERAGEIF(B:B,"Male",C:C)
COUNT	=COUNT(range)	Counts cells with numbers	=COUNT(A1:A20) → how many have numbers
COUNTA	=COUNTA(range)	Counts non-empty cells (any data)	=COUNTA(A1:A20) → count of non-blank cells
COUNTIF	=COUNTIF(range,criteria)	Counts cells matching criteria	=COUNTIF(B:B,"Pass") → count of 'Pass'
COUNTBLANK	=COUNTBLANK(range)	Counts empty cells	=COUNTBLANK(A1:A20)

Function	Syntax	Description	Example
MAX	=MAX(range)	Returns highest value	=MAX(C1:C10) → highest marks
MIN	=MIN(range)	Returns lowest value	=MIN(C1:C10) → lowest marks
LARGE	=LARGE(range,k)	Returns k-th largest value	=LARGE(C1:C10,2) → 2nd highest
SMALL	=SMALL(range,k)	Returns k-th smallest value	=SMALL(C1:C10,3) → 3rd lowest
ROUND	=ROUND(number,digits)	Rounds to specified decimal places	=ROUND(3.14159,2) → 3.14
ROUNDUP	=ROUNDUP(number,digits)	Always rounds up	=ROUNDUP(3.1,0) → 4
ROUNDDOWN	=ROUNDDOWN(number,digits)	Always rounds down	=ROUNDDOWN(3.9,0) → 3
ABS	=ABS(number)	Returns absolute (positive) value	=ABS(-50) → 50
SQRT	=SQRT(number)	Square root	=SQRT(144) → 12
POWER	=POWER(number,power)	Raises number to power	=POWER(2,8) → 256
MOD	=MOD(dividend,divisor)	Remainder after division	=MOD(10,3) → 1
INT	=INT(number)	Rounds down to nearest integer	=INT(3.9) → 3

4.3 Logical Functions

Function	Syntax	Description	Example
IF	=IF(condition,value_if_true,value_if_false)	Tests condition;	=IF(B2>=35,"Pass","Fail")

Function	Syntax	Description	Example
		returns one value if true, another if false	
AND	=AND(condition1,condition2,...)	TRUE only if ALL conditions are true	=AND(A1>0,A1<100) → True if A1 is between 0 and 100
OR	=OR(condition1,condition2,...)	TRUE if ANY condition is true	=OR(A1="Delhi",A1="Mumbai")
NOT	=NOT(condition)	Reverses TRUE/FALSE	=NOT(A1>0) → True if A1 is NOT greater than 0
Nested IF	=IF(c1,v1,IF(c2,v2,v3))	Multiple conditions tested in sequence	=IF(B2>=90,"A",IF(B2>=75,"B","C"))
IFS	=IFS(cond1,val1,cond2,val2,...)	Multiple conditions — cleaner than Nested IF	=IFS(B2>=90,"A",B2>=75,"B",B2>=60,"C",TRUE,"D")
IFERROR	=IFERROR(formula,value_if_error)	Returns custom value if formula produces error	=IFERROR(A1/B1,"Error") — shows 'Error' instead of #DIV/0!
SWITCH	=SWITCH(expr,val1,result1,val2,result2)	Matches value to results — like a lookup	=SWITCH(A1,1,"Jan",2,"Feb",3,"Mar","Other")

4.4 Lookup and Reference Functions

Function	Syntax	Description	Example
VLOOKUP	=VLOOKUP(lookup_value,table_array,col_index,match_type)	Looks up value in FIRST column of table; returns value from specified column	=VLOOKUP("E001",A:D,3,FALSE) → finds E001 in col A, returns col 3 value

Function	Syntax	Description	Example
HLOOKUP	=HLOOKUP(lookup_value,table_array,row_index,match_type)	Like VLOOKUP but looks in FIRST ROW — horizontal	=HLOOKUP("Sales",A1:Z3,2,FALSE)
XLOOKUP	=XLOOKUP(lookup_value,lookup_array,return_array)	Modern replacement for VLOOKUP — can look any direction	=XLOOKUP("E001",A:A,C:C) — much simpler!
INDEX	=INDEX(array,row_num,col_num)	Returns value at specified row and column position	=INDEX(A1:D10,3,2) → value in 3rd row, 2nd column
MATCH	=MATCH(lookup_value,lookup_array,match_type)	Returns POSITION of value in range (not the value itself)	=MATCH("Delhi",B:B,0) → row number where Delhi appears
CHOOSE	=CHOOSE(index,value1,value2,...)	Returns value based on index number	=CHOOSE(2,"Jan","Feb","Mar") → 'Feb'

> **VLOOKUP Tip:** In VLOOKUP, match_type: FALSE = exact match (use always). TRUE = approximate match. VLOOKUP only looks LEFT TO RIGHT in the table — cannot look left. Use XLOOKUP for more flexibility.

4.5 Text Functions

Function	Syntax	Description	Example
UPPER	=UPPER(text)	Converts to UPPERCASE	=UPPER("hello") → HELLO
LOWER	=LOWER(text)	Converts to lowercase	=LOWER("HELLO") → hello
PROPER	=PROPER(text)	Converts to Title Case	=PROPER("ajay sharma") → Ajay Sharma

Function	Syntax	Description	Example
LEN	=LEN(text)	Returns number of characters	=LEN("Excel") → 5
LEFT	=LEFT(text,num_chars)	Returns leftmost characters	=LEFT("AB123",2) → AB
RIGHT	=RIGHT(text,num_chars)	Returns rightmost characters	=RIGHT("AB123",3) → 123
MID	=MID(text,start,num_chars)	Returns characters from middle	=MID("ABCDEF",3,2) → CD
TRIM	=TRIM(text)	Removes extra spaces	=TRIM(" Hello ") → Hello
CONCATENATE / &	=CONCATENATE(t1,t2) OR =A1&" "&B1	Joins text strings together	=A1&" "&B1 → "Ajay Sharma"
FIND	=FIND(find_text,within_text)	Returns position of text — case-sensitive	=FIND("@","ajay@email.com") → 5
REPLACE	=REPLACE(text,start,num_chars,new_text)	Replaces part of text	=REPLACE("Hello",1,2,"JE") → JEllo
TEXT	=TEXT(value,format)	Formats number as text with custom format	=TEXT(1234.5,"#,##0.00") → 1,234.50

4.6 Date and Time Functions

Function	Description	Example
TODAY()	Returns today's date (auto-updates daily)	=TODAY() → 27/05/2026
NOW()	Returns current date and time	=NOW() → 27/05/2026 14:30
DATE(year,month,day)	Creates a date from parts	=DATE(2024,12,25) → 25/12/2024
DAY(date)	Returns day number (1-31)	=DAY(TODAY()) → day of month
MONTH(date)	Returns month number (1-12)	=MONTH(TODAY()) → current month
YEAR(date)	Returns year	=YEAR(TODAY()) → 2026
WEEKDAY(date,type)	Returns day of week (1=Sun, 2=Mon with type=1)	=WEEKDAY(TODAY(),2) → 1=Mon,...7=Sun

Function	Description	Example
DAYS(end,start)	Number of days between two dates	=DAYS("31/12/2024","01/01/2024") → 365
EDATE(start_date,months)	Date months before or after start	=EDATE(TODAY(),3) → date 3 months from now
NETWORKDAYS(start,end)	Working days between two dates (excl. weekends)	=NETWORKDAYS(A1,B1) → business days

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SECTION 5: RELATIVE AND ABSOLUTE CELL REFERENCES

5.1 Relative Cell References

> *A relative cell reference automatically adjusts when a formula is copied to another cell. The reference changes relative to where the formula is moved.*

```
Cell C1 has formula:  =A1+B1
Copy C1 to C2:        =A2+B2  (row changed from 1 to 2 automatically)
Copy C1 to D1:        =B1+C1  (column changed from A,B to B,C
automatically)
```

- Relative references are the DEFAULT in Excel — most common type
- Useful when: applying the same formula to many rows/columns (e.g., calculating marks for each student)

5.2 Absolute Cell References

> *An absolute cell reference does NOT change when the formula is copied. You lock it by adding $ (dollar sign) before the column letter and row number.*

```
=$A$1          -- both column A and row 1 are locked
Cell B1: =A1*$C$1   -- A1 is relative (changes), $C$1 is absolute (stays
C1)
Copy to B2:    =A2*$C$1   -- A1 became A2, but $C$1 stayed $C$1
```

- Use absolute reference for: tax rates, discount percentages, fixed constants that don't change
- Shortcut: Click in formula on the cell reference → press F4 → toggles through A1 → A$1 → $A1 → A1

5.3 Mixed Cell References

> *A mixed cell reference locks either the row or the column (but not both).*

Reference	What's Locked	Column Changes When Copied?	Row Changes When Copied?
A1	Nothing (relative)	Yes	Yes
A1	Both (absolute)	No	No
$A1	Column locked	No — column stays A	Yes — row changes
A$1	Row locked	Yes — column changes	No — row stays 1

```
Example: Multiplication table using mixed references
Cell B2: =$A2*B$1
   $A2 = column A locked, row changes as we copy down
   B$1 = row 1 locked, column changes as we copy right
Copy this formula to all cells in the multiplication table!
```

> **Exam Tip:** $ before column = column locked ($A1). $ before row = row locked (A$1). $ before both = both locked (A1). F4 key toggles between all four options when cursor is on cell reference.

SECTION 6: CHARTS IN EXCEL

6.1 Why Use Charts?

> *Charts (graphs) provide visual representation of data — patterns, trends, and comparisons become immediately obvious. A well-designed chart communicates information more quickly than rows of numbers.*

Chart Type	When to Use	Example
Column Chart	Compare values across categories at a specific time	Monthly sales comparison across 12 months
Bar Chart	Same as column but horizontal — better for many categories or long labels	Comparison of countries or products by sales
Line Chart	Show trends over time — continuous data	Stock prices, temperature over a year, growth trend
Pie Chart	Show parts of a whole — proportions adding to 100%	Market share, budget allocation, vote percentage
Area Chart	Like line chart but filled — shows cumulative totals	Website traffic over time, revenue growth
Scatter (XY) Chart	Show relationship between two numeric variables	Height vs Weight, study hours vs marks
Bubble Chart	Like scatter but bubble size represents third variable	Sales vs profit, bubble size = market share
Doughnut Chart	Like pie but with hole — can show multiple rings	Market share comparison across two years
Radar / Spider	Compare multiple attributes for multiple entities	Player stats, product feature comparison
Histogram	Show frequency distribution	Test score distribution, age distribution
Box and Whisker	Show data spread and outliers statistically	Statistical data analysis
Waterfall	Show running total with positive/negative additions	Financial statements, budget variances
Combo Chart	Combine two chart types (column + line)	Sales bars + profit margin line on same chart

6.2 Creating a Chart

Step	Action	Details
1	Select data	Select cells containing data including headers
2	Insert Chart	Insert tab → Charts group → choose chart type (Column, Line, Pie etc.) OR press F11 for chart on new sheet OR Alt+F1 for embedded chart
3	Choose subtype	Select specific chart subtype (Clustered, Stacked, 100% Stacked)
4	Chart appears	Chart inserted as object in worksheet — click and drag to reposition

Step	Action	Details
5	Chart Design tab	Appears when chart is selected → Quick Layout, Chart Styles, Switch Row/Column, Select Data, Change Chart Type
6	Format tab	Appears when chart selected → format chart elements, shape styles, WordArt

6.3 Chart Elements and Formatting

Chart Element	Description	How to Format
Chart Title	Main title above chart	Click to select → type new title. Or Chart Design → Add Chart Element → Chart Title.
Axis Titles	Labels for X and Y axes	Chart Design → Add Chart Element → Axis Titles
Legend	Key showing what each colour/line represents	Chart Design → Add Chart Element → Legend → position
Data Labels	Show exact values on each bar/point/slice	Chart Design → Add Chart Element → Data Labels
Data Table	Shows data values below chart in table form	Chart Design → Add Chart Element → Data Table
Gridlines	Horizontal/vertical guide lines	Chart Design → Add Chart Element → Gridlines
Plot Area	The inner area where data is plotted	Click to select → Format → fill colour, border
Chart Area	Entire chart including title and legend	Click outside plot area but inside chart border → Format

- Move chart: Click chart → drag. Resize: Drag corner or edge handles.
- Move to new sheet: Right-click chart → Move Chart → New Sheet
- Change chart type: Right-click chart area → Change Chart Type

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SECTION 7: WORKING WITH GRAPHICS — CLIP ART AND SMARTART

7.1 Inserting Images

Method	Steps	Notes
Picture from file	Insert → Illustrations → Pictures → This Device → browse → Insert	Supports JPEG, PNG, GIF, SVG, BMP etc.
Online Pictures	Insert → Pictures → Online Pictures → search → Insert	Stock images from Microsoft; requires internet
Screenshot	Insert → Screenshot → Screen Clipping OR select open window	Captures any visible screen content
Copy-Paste	Copy image from browser/other app → Ctrl+V in Excel	Quick method for any image

7.2 Clip Art

> *Clip Art refers to pre-made images, illustrations, icons, and symbols used to illustrate documents. In Excel 2013 and later, traditional Clip Art gallery was replaced by Bing image search and Microsoft's Stock Images/Icons library.*

- Modern equivalent: Insert → Icons (for vector icons) OR Insert → Pictures → Online Pictures (for photos and illustrations)
- Thousands of free icons available: Insert → Icons → search by category or keyword → Insert
- Icons are SVG (scalable vector) — resize without losing quality; can change colour
- Format Icons: Picture Format tab → change colour, size, add artistic effects

7.3 SmartArt

> *SmartArt is a visual tool for creating professional diagrams — org charts, process flows, hierarchies, cycles, lists, matrices, and pyramids — from simple bulleted text lists, with automatic formatting.*

SmartArt Category	Description	Use Case
List	Shows non-sequential information as a visual list	Feature lists, bullet points with icons
Process	Shows steps in a sequence or timeline	Step-by-step procedures, workflow, installation steps
Cycle	Shows circular or repeating processes	Business cycle, recurring workflow, feedback loops
Hierarchy	Shows hierarchical relationships — org chart style	Organisation chart, family tree, reporting structure
Relationship	Shows connections or overlapping relationships	Venn diagrams, interconnected concepts
Matrix	Shows how parts relate to a whole in 2×2 grid	SWOT analysis, BCG matrix, 2×2 decision matrix

SmartArt Category	Description	Use Case
Pyramid	Shows proportional or hierarchical relationships in layers	Food pyramid, skill levels, priority levels
Picture	Incorporates pictures into the SmartArt layout	Photo timelines, picture lists, image hierarchies

- Insert SmartArt: Insert tab → Illustrations → SmartArt → choose category → select design → OK
- Enter text: Click placeholder text → type. OR click Text pane button to use outline view.
- Format: SmartArt Design tab → change layout, change colours, SmartArt styles
- Add/Remove shapes: SmartArt Design → Add Shape → Before/After/Above/Below

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SECTION 8: PIVOT TABLES AND PIVOT CHARTS

8.1 What is a Pivot Table?

> *A Pivot Table is a powerful data summarisation tool that dynamically reorganises, groups, and summarises large datasets without writing formulas. You can 'pivot' (rotate) data to view it from different angles and perspectives.*

Pivot Table Concept	Description
Source Data	Your original data table — must have column headers; no blank rows/columns
Row Labels	Fields placed in the Rows area — each unique value becomes a row
Column Labels	Fields placed in the Columns area — each unique value becomes a column header
Values	Numeric fields placed here — summarised by Sum, Count, Average, Max, Min etc.
Filters	Fields for filtering entire pivot table — like a global filter for the report
Pivot Table Report	The result — automatically grouped, summarised data from your source

8.2 Creating a Pivot Table

Step	Action	Details
Step 1	Prepare data	Ensure data has headers, no blank rows/columns, no merged cells
Step 2	Select data	Click anywhere inside the data table
Step 3	Insert Pivot Table	Insert tab → PivotTable → choose location (New Worksheet recommended) → OK
Step 4	Field List appears	PivotTable Fields pane opens on right — shows all column headers as fields
Step 5	Drag fields to areas	Drag fields to Rows, Columns, Values, Filters areas
Step 6	Values summary	Click dropdown next to field in Values area → Value Field Settings → choose Sum/Count/Average/Max
Step 7	Format numbers	Right-click value in pivot → Value Field Settings → Number Format → choose format
Step 8	Refresh data	Right-click pivot → Refresh — updates pivot if source data changed

8.3 Pivot Table Example

> *Example: Sales data with columns: Salesperson, Region, Product, Month, Sales Amount*

What You Want to See	Row	Column	Values (Sum)	Filter
Total sales by salesperson	Salesperson	—	Sales Amount	—
Sales by region and product	Region	Product	Sales Amount	—
Monthly sales for each salesperson	Salesperson	Month	Sales Amount	—
Sales in North region only	Region	Product	Sales Amount	Region = North

8.4 Pivot Table Features

- Slicers: Insert → PivotTable Analyze → Insert Slicer → click buttons to filter visually
- Timeline: Insert → Timeline (for date fields) → slide to filter by date range
- Group: Right-click date field in pivot → Group → group by Month, Quarter, Year
- Calculated Field: PivotTable Analyze → Fields, Items, Sets → Calculated Field → create new formula field
- Show Values As: Right-click value → Show Values As → % of Grand Total, % of Row, Rank, Running Total
- Design: PivotTable Design tab → Layout, Grand Totals, Report Layout, Banded Rows, PivotTable Styles
- Refresh All: Data tab → Refresh All — updates all pivot tables when source data changes

8.5 Pivot Charts

> *A Pivot Chart is a chart that is linked directly to a Pivot Table — it automatically updates when the pivot table changes, and has interactive filtering buttons.*

Step	Action
Create from Pivot Table	Click inside pivot table → PivotTable Analyze tab → PivotChart → choose chart type → OK
Create directly	Insert → PivotChart → choose data source → set fields → chart and pivot created together
Field Buttons	Interactive filter buttons appear on chart — click to filter data shown
Hide/Show Buttons	PivotChart Analyze → Field Buttons → hide if needed for clean printout
Move to new sheet	Right-click chart → Move Chart → New Sheet → separate chart sheet
Link to Pivot	Pivot Chart always stays linked to its source Pivot Table — they update together

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SECTION 9: QUICK REVISION POINTS

Key Points for Exam

Excel Shortcuts — Must Know

Action	Shortcut	Action	Shortcut
New workbook	Ctrl+N	Save	Ctrl+S
Save As	F12	Open	Ctrl+O
Print	Ctrl+P	Bold	Ctrl+B
Cut	Ctrl+X	Copy	Ctrl+C
Paste	Ctrl+V	Select All	Ctrl+A
Undo	Ctrl+Z	Redo	Ctrl+Y
AutoSum	Alt+=	Find	Ctrl+F
Go to cell	Ctrl+G or F5	Current date	Ctrl+;
Current time	Ctrl+Shift+;	Delete cell	Delete key
F4 (toggle $)	F4 in formula	New line in cell	Alt+Enter

Functions Summary

Function	Use	Function	Use
=SUM(A1:A10)	Total	=AVERAGE(A1:A10)	Mean
=COUNT(A1:A10)	Count numbers	=COUNTA(A1:A10)	Count non-blank
=MAX(A1:A10)	Highest	=MIN(A1:A10)	Lowest
=IF(test,t,f)	Conditional	=VLOOKUP(v,t,c,f)	Lookup
=TODAY()	Today's date	=NOW()	Current date+time
=UPPER(text)	UPPERCASE	=PROPER(text)	Title Case
=LEN(text)	Character count	=TRIM(text)	Remove spaces

Cell References

- A1 = Relative (changes when copied). A1 = Absolute (never changes).
- $A1 = Column locked, row changes. A$1 = Row locked, column changes.
- F4 key cycles: A1 → A1 → A$1 → $A1 → A1
- Error quick guide: #DIV/0!=divide by zero, #VALUE!=wrong type, #REF!=deleted cell, #NAME?=mistyped name

SECTION 10: IMPORTANT MCQ QUESTIONS

Multiple Choice Questions (MCQs)

> *20 important exam questions. Correct answer marked with ✓ and explanation provided.*

Q1. The intersection of a row and column in Excel is called:

(a) Range
(b) Formula
(c) Cell ✓
(d) Workbook

Explanation: *A Cell is the intersection of a row and column in a spreadsheet. Each cell has a unique address like A1, B3, Z100. A cell can contain text, numbers, formulas, or be empty.*

Q2. What is the default file extension for Excel 2007 and later?

(a) .xls
(b) .xlsx ✓
(c) .csv
(d) .xlsm

Explanation: *.xlsx is the default format for Excel 2007, 2010, 2013, 2016, 2019, 2021, and Microsoft 365. .xls = old format (Excel 97-2003). .xlsm = macro-enabled. .csv = comma-separated values.*

Q3. In Excel, all formulas must begin with:

(a) @
(b) #
(c) = ✓
(d) +

Explanation: *All Excel formulas must start with = (equals sign). This tells Excel to calculate the expression. Examples: =A1+B1, =SUM(A:A), =IF(A1>0,"Positive","Negative"). Without =, Excel treats it as text.*

Q4. The keyboard shortcut for AutoSum in Excel is:

(a) Ctrl+S
(b) Alt+= ✓
(c) Ctrl+Sum
(d) Alt+S

Explanation: *Alt+= (Alt plus equals sign) inserts AutoSum instantly. It detects the data range above or to the left and creates =SUM() formula. Also accessed via Home → AutoSum button or Formulas → AutoSum.*

Q5. What does the A1 reference mean in Excel?

(a) A is a text value, 1 is a number
(b) The reference is invalid
(c) Absolute reference — neither column A nor row 1 changes when formula is copied ✓
(d) Relative reference — both change when copied

Explanation: *A1 is an absolute reference — $ before A locks the column, $ before 1 locks the row. When the formula is copied, A1 always refers to cell A1. Press F4 to toggle between reference types.*

Q6. When you see '####' in an Excel cell, it means:

(a) The formula has an error
(b) The number is negative

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(c) The cell contains a date

(d) The column is too narrow to display the value ✓

Explanation: *#### means the column is too narrow to display the complete value. Simply widen the column by dragging the column border or double-clicking for AutoFit. This is NOT a formula error.*

Q7. Which function counts the number of NUMERIC cells in a range?

(a) COUNTA

(b) COUNTIF

(c) COUNT ✓

(d) COUNTBLANK

Explanation: *COUNT counts only cells that contain numbers. COUNTA counts all non-empty cells (any data type). COUNTBLANK counts empty cells. COUNTIF counts cells meeting a specific criterion.*

Q8. The formula =VLOOKUP(A1,B:D,3,FALSE) will:

(a) Look for value in A1 in column D, return value from column B

(b) Look for value in A1 in FIRST column (B), return value from 3rd column of range (D) ✓

(c) Count values in columns B to D

(d) Average values in the 3rd row

Explanation: *VLOOKUP looks for A1's value in the FIRST column of the table array (column B), then returns the value from the 3rd column (column D). FALSE = exact match. The result is the value in column D where column B = A1's value.*

Q9. What type of chart is BEST for showing how parts make up a whole (percentages adding to 100%)?

(a) Line Chart

(b) Bar Chart

(c) Scatter Chart

(d) Pie Chart ✓

Explanation: *A Pie Chart is ideal for showing proportions — how parts make up a whole. Each slice represents a percentage of the total. Best used with 2-6 categories. For more categories, consider a bar chart instead.*

Q10. Which error appears when a formula tries to divide a number by zero?

(a) #VALUE!

(b) #REF!

(c) #DIV/0! ✓

(d) #N/A

Explanation: *#DIV/0! (Divide by Zero) error appears when a formula has division and the denominator is zero or empty. Fix: =IF(B1=0,0,A1/B1) — check if denominator is zero before dividing.*

Q11. What does a Pivot Table do?

(a) Creates bar charts automatically

(b) Summarises and analyses large datasets by grouping and aggregating data ✓

(c) Spins the worksheet view 90 degrees

(d) Checks data for duplicate values

Explanation: *A Pivot Table dynamically summarises, groups, and analyses large datasets without writing formulas. You drag fields to different areas to instantly see totals, averages, counts by category — from any perspective.*

Q12. The formula =IF(B2>=35,"Pass","Fail") will show 'Pass' when:

(a) B2 is exactly 35

(b) B2 is 35 or more ✓
(c) B2 is less than 35
(d) B2 is empty

Explanation: *=IF(condition, value_if_true, value_if_false). The condition is B2>=35 (greater than or equal to 35). If TRUE, shows 'Pass'. If FALSE (B2 < 35), shows 'Fail'. Condition B2>=35 means 35, 36, 37... are all Pass.*

Q13. SmartArt in Excel is used for:

(a) Creating mathematical formulas
(b) Building database queries
(c) Creating professional diagrams like org charts, process flows, hierarchies ✓
(d) Filtering data in pivot tables

Explanation: *SmartArt creates visual diagrams — org charts, processes, cycles, hierarchies, matrices, pyramids — automatically formatted and professional-looking. Insert tab → SmartArt.*

Q14. What keyboard shortcut refreshes a Pivot Table?

(a) Ctrl+R
(b) F9
(c) Alt+F5
(d) Right-click → Refresh ✓

Explanation: *Right-click the pivot table → Refresh updates it with latest source data. Also: PivotTable Analyze tab → Refresh. If you add new rows to source data, you must refresh the pivot for it to include new data.*

Q15. Which function returns TODAY's date in Excel?

(a) =DATE()
(b) =NOW()
(c) =TODAY() ✓
(d) =CURRENT_DATE()

Explanation: *=TODAY() returns the current date (without time). It auto-updates every time the worksheet recalculates. =NOW() returns current date AND time. There is no =DATE() or =CURRENT_DATE() with no arguments.*

Q16. What is the purpose of the Fill Handle in Excel?

(a) Changes cell fill colour
(b) Formats cell border
(c) Small green square used to extend/copy data and create series by dragging ✓
(d) Autosaves the file

Explanation: *The Fill Handle is the small green square at the bottom-right corner of the selected cell. Drag it to copy the cell OR auto-complete a series (dates, months, numbers, days of week, custom patterns).*

Q17. Which function finds the HIGHEST value in a range?

(a) =HIGH(A1:A10)
(b) =HIGHEST(A1:A10)
(c) =MAX(A1:A10) ✓
(d) =TOP(A1:A10)

Explanation: *=MAX(range) returns the maximum (highest) value in the range. =MIN(range) returns the minimum. =LARGE(range,2) returns 2nd largest. =SMALL(range,2) returns 2nd smallest.*

Q18. What does the VLOOKUP parameter FALSE (or 0) specify?

(a) Return FALSE if not found
(b) Look for approximate match
(c) Require EXACT match of the lookup value ✓

(d) Search from bottom to top

Explanation: *The 4th parameter of VLOOKUP is range_lookup: FALSE (or 0) = exact match — finds exact value. TRUE (or 1) = approximate match — finds closest value (requires sorted data). Always use FALSE for reliability.*

Q19. To print only a selected range of cells (not the entire sheet), you should:

(a) Delete all other cells before printing

(b) Use File → Print and enter cell addresses

(c) Select the range, then Page Layout → Print Area → Set Print Area ✓

(d) Use the View → Print Selection option

Explanation: *Select the range you want to print → Page Layout tab → Print Area → Set Print Area. Now only that range will print. To clear: Page Layout → Print Area → Clear Print Area. You can also select range → File → Print → Print Selection.*

Q20. In a Pivot Table, the 'Values' area typically shows:

(a) Filter criteria

(b) Row and column labels

(c) Summarised numeric data (Sum, Count, Average etc.) ✓

(d) The source data table

Explanation: *The Values area in a Pivot Table shows summarised/aggregated numeric data — Sum, Count, Average, Max, Min of the selected field. Row Labels and Column Labels show categories. Filters filter the entire report.*

Best of Luck for Your Exam!

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