

**DETAILED SYLLABUS FOR THE POST OF
OPERATOR IN KERALA AGRO MACHINERY CORPORATION LIMITED**

(Category No: 148/2019).

Module.1

Safe working practice and house keeping.

Marks.5

1. personal protective equipments (PPE).
2. List of tools and machinery used in the trade.
3. First aid method and basic training.
4. Safe disposal of waste materials.
5. Types of safety sign's.
6. Safety precautions about personal,workshop,machinery.

Module.2

Basic fitting.

Marks.15

1. Steel rule least count.
2. Hammer types & uses.
3. Divider uses.
4. Punch types & uses.
5. Bench vice construction Types & uses.
6. Hacksaw frame and Blade,types and uses
7. File Elements,Types,and their uses.

8. Methods of filing.
9. Measuring standards English and metric units.
10. Pedestal grinding machine uses & parts.
11. Scribing block construction and uses.
12. Combination set parts and uses.
13. Marking media types.
14. Surface plate and marking off table uses.
15. Drill types and uses.
16. Tap and Die uses and application.
17. Tap drill size.
18. Screw thread terminology.
19. Reamer material and types.
20. Hole size for reading.
21. Vernier height gauge reading and construction.
22. Deviation, tolerance and different standard system of limits and fits.
23. Vernier calipers. principle and uses.
24. Outside micrometer parts and uses.
25. Vernier micrometer principle and reading.
26. Dial test indicator parts and uses.
27. Pillar and radial Drilling machines construction and uses.
28. Counter sunk, counterbore and spot facing tools nomenclature.
29. Cutting speed, feed and depth of cut in Drilling machines.
30. Try square construction and uses.
31. Ordinary depth gauge uses.
32. Use of V blocks and parallel blocks.
33. Angle plate's types and uses.

Module.3

Lathe machine.

Marks.10

1. Lathe introduction and centre lathe parts.
2. Definition of machine and machine tool.
3. Lathe construction function of parts and specifications.
4. Lathe cutting tools types , material and various angles.
5. Types of chips and chip breaker.
6. Tool life,factors affecting tool life.
7. Driving mechanism,speed feed mechanism.
8. Concept of Orthogonal and oblique cutting.
9. Different types of work holding devices.
- 10.Mounting and dismounting of Chucks.
- 11.Vernier bevel protractor parts construction and uses.
- 12.Lathe operations facing,turnig,parting off ,grooving ,chamfering,boring,knurling.
- 13.Taper turnig methods and taper standards.
- 14.Sine bar and slip gauges uses and application.
- 15.Calculations of taper turning by offsetting tail stock.
- 16.Different thread forms and screw pitch gauge uses .
- 17.Turning of taper by taper turnig attachment.
- 18.Uses of mandrel,centres,catch plate,driving plate and rests.
- 19.Terms relating screw thread,pitch lead .
- 20.Simple and compound gear train.
- 21.Square thread and its forms.

22. Difference between single and multi start threads.

Module.4

Functions of different electrical equipments.

Marks.5

1. Study of voltage and current.
2. Working of solinoids, inductors, motors, generator.
3. Electromagnetic induction principle.
4. Switches, fuse and circuit breakers.
5. Fundamentals of sensors.
6. Proximity sensor classification and their industrial application.
7. Sensors for distance and displacement-LVDT-linear.
8. Potentiometer-Ultrasonic and optional sensors-industrial application.

Module.5

Slotter.

Marks.5

1. Slotter classification and principle.
2. Rotary table indexing process.
3. Driving mechanism ,quick return motion and speed ratio.
4. Job holding devices.
5. Slotting tool types, tool angles.
6. Tool holder internal operations.
7. Chain sprocket uses and their applications.

8. Spline types and uses.
9. Coolant and Lubricant types, properties and application.

Module.6

Milling machine.

Marks.20

1. Milling machine introduction,types,parts,construction and specification.
2. Driving and feed mechanism of Milling machine.
3. Different types of Milling cutters & their use.
4. Cutter nomenclature.
5. Different Milling operations:plain Milling,face Milling,angular Milling,form Milling,slot Milling,gang Milling,straddle Milling,Up & Down Milling.
6. Different types of Milling attachments and their uses.
7. Jigs and fixtures: principle,types,use,advantage & disadvantages.
8. Properties of metals: physical and mechanical properties,colour,weight,hardness,toughness,malleability,ductility & machinability.
9. Heat treatment: Introduction,necessity,types,purposes,different methods of heat treatment and heat treatment of plain carbon steel.
- 10.Indexing introduction types, indexing head types,constructional details.
- 11.Function of indexing plates and the sector arms.
- 12.Calculations for various types of indexing.
- 13.Geometrical tolerance,definition, symbol,and their application.
- 14.Depth micrometer: Parts,reading,uses and safety.
- 15.Different types of micrometer and their uses.
- 16.Inside micrometer_ Its parts, reading and uses.
- 17.Bore dial gauge_ its parts,reading(both in Metric and English)and uses.
- 18.Telescopic gauge: Different types and their uses.

19. Difference between gauges and template.
20. Gear : introduction,use and types.
- 21.Elements of a spur gear,types of gears.
- 22.Merits and demerits of each type.
- 23.Rack. Types,uses and Calculations.
- 24.Selection of gear cutter.
- 25.Various methods of checking gear and its parts.
- 26.Vernier gear tooth caliper _ Its construction and application in checking gear tooth.
- 27.Spur gear Calculations.
- 28.Use of gauges and template.
- 29.Vertical milling machine _ its parts.
- 30.Method of boring in vertical milling machine.
- 31.Difference between horizontal and vertical milling machine.
- 32.Helix and Spiral introduction,types and elements.
- 33.Difference between helix and Spiral.
- 34.Difference between RH helix and LH helix.
- 35.Helical gear: elements,application.
- 36.Calculations for cutting helical gear.
- 37.Reamer _ types,elements and uses.
- 38.Calculations for cutting Reamer.
- 39.Twist drill nomenclature,cutter Selection.
- 40.Calculations for cutting twist drill.
- 41.Bevel gear elements,types application & Calculation for cutting bevel gear.
- 42.Cam types,elements & application,plate cam manufacturing & Calculations.
- 43.Drum cam its Calculation,advantages,types of follower & its purposes.
- 44.Worm wheel application,elements & Calculation,worm Calculation.

45.Types of keys and their uses.Testing of gear .

Module.7

Grinding machine.

Marks.10

1. Grinding ;_Introduction .
2. Grinding wheel _ abrassive,types,bond, grade,grid,structure,standard marking system of grinding wheel and selection of grinding wheel.
3. Dressing _ types of dresser.
4. Glazing and loading of grinding wheel, its causes and remedies.
5. Roughness values and their symbols.
6. Explain the importance and necessity of quality.
7. Surface grinder:
8. Types,parts,construction,use,methods of surface grinding, specification and safety.
9. Cylindrical grinder : Introduction,parts,specification,safety,different methods of cylindrical grinding.
- 10.Cutting speed,feed,depth of cut and machining time Calculation.
- 11.Wet grinding and dry grinding,various types of grinding wheels and their applications,grinding defects and remedies.
- 12.Tool and cutter grinder : Introduction,parts,construction,use and specification,different types of tool rest & their application.
- 13.Various methods of cutter grinding.
- 14.Various cutter grinding attachments and their uses.

Module.8

CNC.Turnig centre..

Marks.10

1. Personal safety, safe material handling, and safe machine operation on CNC turning centres.
2. CNC technology basics, comparison between CNC and conventional lathes.
3. Concepts of positioning accuracy, repeatability.
4. CNC lathe machine elements and their functions _ bed, chuck, tail stock, turret, ball screws, guide ways, LM guides, coolant & hydraulic system, chip conveyor, steady rest, spindle motor, tail stock , encoders & control switches.
5. CNC interpolation, open and close Loop control system, concept of co-ordinate geometry, work zero machine zero.
6. ,Absolute and incremental programming.
7. Programming codes and words, ISO G codes and M codes for CNC turning.
8. Program execution in different modes like MDI, single block and auto.
9. Canned cycles for stock removal, grooving, threading, for external and internal operations.
10. Tool nose radius compensation (TNRC) and why it is necessary
11. Cutting tool geometry for internal and external turning, grooving, threading, drilling.
12. ISO nomenclature for turning & boring tool holders, indexable inserts.
13. Cutting parameters : cutting speed, feed rate , depth of cut, constant surface speed, limiting surface speed.
14. Tool wear, tool life,
15. Writing part programs as per drawing & checking as using CNC program verification /simulation software.
16. Collisions due to program errors, effects of collisions.
17. Entering and editing programs on machine console, entering offset data's in offset page.
18. Use of emergency stop, reset, feed rate over ride, spindle speed override , edits lock on/off buttons keys.
19. Program checking in single block and dry run method.

20. Find out alarm codes and meaning of those codes.

Module.9

CNC.Vertical Machining centre.(VMC)

Marks.15

1. Safety aspects related to CNC VMC.
2. Comparison between CNC VMC and conventional Milling machines. Elements and their functions, bed, auto tool Changer(ATC), ball screws, guide ways, coolant system hydraulic system, chip conveyor, rotary table, pallet changer, console, spindle motor and drive, axis motors, encoders & control switches.
3. Feed back, CNC interpolation, open and close Loop control system.
4. Machining operations _ Face Milling, side Milling, pocket Milling, drilling, counter sinking, rigid taping, floating taping, Reaming, Rough boring, Finish boring, Spot facing.
5. Concept of co-ordinate geometry & polar coordinates points.
6. Absolute & incremental programming.
7. ISO G & M codes for CNC Milling.
8. Canned cycles for drilling, peck drilling, reaming, tapping, finish boring.
9. Sub programming.
10. Cutter radius compensation(CRC).
11. Cutting tool materials types.
12. Cutting tool materials, application .
13. Cutting parameters- cutting speed, feed rate, depth of cut.
14. Tool wear , tool life,
15. Writing part programs as per drawing & check using CNC program verification/simulation software.
16. Collisions due to program errors, effects of collisions.
17. Program execution in different modes like manual, single block & auto.

18. Work offset, tool length offset, tool radius offset.
19. Entering and editing programs on machine console, entering offsets data in offset page.
20. State the importance of helical interpolator and thread milling.
21. Tool wear and necessity for wear offsets change, entering wear offsets in offsets page.
22. Restarting machine from sudden stoppage.
23. Means of program transfer through electronic media.
24. Productivity concepts, cycle time, machine down time, machine Break down, inspection.
25. Calculations of machine cost.
26. Importance of technical English terms used in industry. Technical forms, process sheet, activity log, job card, in industry.

Module.10

Overhauling Machines

Marks.5

1. Maintenance : definition, types and its necessity.
2. System of symbol and colour coding.
3. Possible causes for failure and remedies.

NOTE: - It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper

