AFI Form No. 9
Rev. 15 Oct. 1943

(postmark 5/31/45)

HEADQUARTERS
UNITED STATES ARMED FORCES INSTITUTE
MADISON 3, WISCONSIN

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Fill in numbers 1, 2, 3, below and leave number 4 blank:

1. Course No. ~~5448A~~ J. 314
2. Lesson No. ~~1~~
3. Textbook No. ~~6448A~~
4. Lesson Grade 93

J. F. SWARNER
88314

1. E.M.3/c FRANK FYAZITTA, 825 42-22
2. D.E. 667, U.S.S. Wiseman
3. c/o F.P.O.
San Francisco, Calif.

Reserved for instructor.

1. Capacitor start & Capacitor run, Two value capacitor motor, Single phase Capacitor motor, Reversible capacitor motor, Two speed, single-voltage, multispeed capacitor motor and also the capacitor start motor.

2. 10% above or below the name-plate or normal voltage and variation of 10% in frequency, below or above the frequency stamped on the name plate.

3. Usual clearance limit between bearing & shaft with a 5/8 in. diam. shaft or smaller, is .0005 in.

4. Five types of single phase motors are: repulsion, shaded-pole, reactor, capacitor and split-phase motors

5. Bearings and lubrication

6. A split phase motor is a self starting motor by means of a split phase winding which is about 90 electrical degrees from the main winding. The starting winding & the main or running winding are connected in parellel to the line. After the motor gets up at a certain speed, the starting winding is disconnected by an automatic switch or device.

7. Starts with a high value of capacity & runs on a lower value of capacity when operating. The starting winding stays in the circuit when running; but has the value of capacity for the run [illegible]. It thus makes a 2 phase motor operate on a single phase line. It operates on a higher power factor & has greater efficiency.

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8. Reversing direction of rotation of a split phase motor can be reversed without removing one of the end bracket. It can be changed by interchanging the starting-winding leads with respect to the main-winding leads & vice-versa.

9. Medium or light automobile oil, medicated vaseline, petroleum jelly, non-fluid & household oils are used all by means of an oil cup & wick with pressure, waste-packing, wick oilers on side, top, or bottom, oil ring & oiless type bearing metal.

10. Squirrel cage rotor motor & a single phase induction motor. See Article #22 - (Resistance or Reactor -)

11. First you must remove the motor end bracket. Remove the brush holder bracket. Interchange the 2 copper clip leads which are connected to terminals inside the slip rings.

12. Has a single voltage operation & has a common two-phase wound stator, and is used on intermittent duty, such as automatic voltage regulators, hoists, where plugging service is required & where the motor is stopped by means of a brake for each reversal.

13. Ten percent in the frequency above or below the frequency stamped on the name plate data

14. By hand or mechanical means.

15. Best kind of oil for sleeve bearings should be good grade medium or light automobile oil which is free from dirt or grit. Most of the sleeve bearings are oiled by an oil wick.

16. If the torque is 10 ounce feet, R.P.M. 1650 & you want the H.P., then the formula will be $H.P. = \frac{T(12) \times R.P.M(1650)}{84,000 \text{ constant}}$

17. Because there is a possibility of shearing off some of the wick or waste as the shaft is forced through the bearing

18. Because it enables the motor to start at heavy loads, it takes less starting current in proportion to starting torque than the other split-phase motors.

19. yes Explain - Incomplete

20. No

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1. E.M. 2/c Frank M. Frazitta - 825-12-22
2. D.E. 667, U.S.S. Wiseman
3. c/o F.P.O.
San Francisco, Calif.

Fill in numbers 1, 2, 3, below and leave number 4 blank:

1. Course No. J-314
2. Lesson No. 8
3. Textbook No. 2724 B
4. Lesson Grade 97

J. F. SWARNER

113127

Reserved for instructor.

1. By varying the applied voltage of the primary winding by an auto transformer or a variable res. and also by shifting the brushes
2. The repulsion-start Induction motor has a short circuiting device in which when the motor gets up to a predetermined speed the centrifugal force of the shaft throws out the short circuiting device which shorts out the commutator bars, thus the arm. coils are shorted + it runs as a squirrel cage winding
3. (a) The repulsion motor, (b) The electrically reversible motor. (c) The repulsion-Induction motor (d) repulsion start-induction motor
4. Because they have no commutating poles
5. Loads where the armature can slow down it's speed before the reversing connection is made so that the short circuiter will work and make the motor run as a repulsion motor
6. A rocker ring type of brush holder is locked in position by screws. All the brush holders are fastened to this ring holder, and all are shifted when the rocker ring is turned
7. There are 2 types of brushholders on repulsion-start-induction motors. One type is called brush-riding and the brushes are not lifted from the commutator when it is shortcircuited. after the commutator is shorted out the brush does not carry current The other type of brush is called a brush lifting device. The brushes are lifted by weights + springs only after the commutator is short circuited. This type uses a radial type commutator
8. The universal motor corresponds to a direct series motor in regards to its winding + characteristics and may be used on alternating + direct current
9. A reactor type motor with a fixed resistance may be installed by having the fixed resistance

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placed in one of the stator slots of the motor along with the copper coils, ② may be wound around the outside base, ③ around the coil extension of the stator winding.

10. The speed of an universal motor may be adjusted by the change in applied voltage, change in load and change in the frequency of the circuit. All of which increases or decreases proportionally with the voltage + frequency + inproportionally with the load.

11. The governor device is placed on the motor shaft and at a pretedetermined speed the device operates a contact pin which puts resistance in series with one side of the line and the speed of the motor drops to a point where the governor acts to cut out the resistance. This keeps up until the motor is able to operate at a satisfactory speed according to load.

12. ⓐ The speed varies opposite with the load, ⓑ the speed varies with the frequency ⓒ the speed varies with the voltage

13. Two types of universal motors are non-~~concentrated~~ compensated or concentrated pole type and also the distributed field compensated type

14. These types of universal motors may have the rotation changed by removing the name plate, the connectors loosened and the brush holder leads interchanged with the field coil leads

15. More care should be given to universal motors with respect to armature windings, balancing of armature + the commutator owing to the very high speeds of this type motors than to direct-current motors with slower speeds

16. To change to rotation of a shaded pole motor, you take out the stator + reverse it's position or shifting the shading coils opposite to what they have been. The rotation is thus governed by position of the shading coil to the wound coil on the same pole

17. The compound wound motor is used more extensively than the series or shunt wound D.C. motors in that it requires less starting current + has a high starting torque

18. Two mechanical means for changing direction of rotation of a shaded-pole motor are ① removing the laminated core with its winding and reverse it opposite to what it was. ② remove the stator and reverse it end to end with relation to the rotor

19. Is like the capacitor type and is designed for variable + single speeds. Has a varying torque characteristic and is used where definite loads are concerned. Is designed for continuous operation and both phase windings are connected to the line when in operation. It also resembles a single-value capacitor motor

20. Ninety (90) mechanical degrees for a 4 pole repulsion motor with 2 or 4 brushes