SETHU INSTITUTE OF TECHNOLOGY, KARIAPATTI

(An Autonomous Institution, Affiliated to Anna University, Chennai)

Regulation – 2015

PERIODICAL TEST - II

ELECTRICAL AND ELECTRONICS ENGINEERING

15UEE504 – ELECTRICAL MACHINE DESIGN

PART -- A (16*1=16 Questions)

UNIT- II

1.	Gap contraction factor with slots and no ducts is a)Kg= 0 b) Kg= 1 **c) Kg= Kgs** d)Kg=2	(CO2)	(R)
2.	Real flux density is 2.2 T and permeability is 31.4 x 10 -6 H/m. the magnetic field intensity a)70.063 AT b) 70.063 AT/ m2 **c) 70.063 AT /m** d) 70.063 AT /m3	(CO2)	(Ap)
3.	MMF for air gap is 3100 AT and MMF for field is 3900 AT.The MMF for iron is a) 3100 AT b) 5000 AT **c) 800 AT** d) 1000AT	(CO2)	(Ap)
4.	When ducts are present a)Slot pitch reduces b) length reduces c) diameter reduces **d) None of the above**	(CO2)	(U)
5.	The gap contraction factor is a) Kg< 1 **b) Kg= 1** c) Kg> 1 d)Kg=2	(CO2)	(R)
6.	Width of slot=0.5 mm , slot pitch= 1mm width of tooth is a)1 b) 0 **c) 0.5 mm** d) None of the above	(CO2)	(Ap)
7.	Kgd > 1 since a)Kg > Kgd b) Kg > Kgs **c) L > L'** d) None of the above	(CO2)	(R)
8.	When commutation is obtained by increasing the current density at the leading edge and decreasing the same at trailing edge, it is known as (A) under commutation (**B) over commutation** (C) straight commutation (D) sinusoidal commutation.	(CO2)	(U)
9.	In dc machines the number of poles is generally decided by (A) frequency of flux reversals (B) weight of iron parts (C) weight of copper **(D) all of the above**.	(CO2)	(U)

10.	In dc machines by increasing the number of poles, all of the following reduce except: (A) weight of copper (B) weight of iron parts **(C) frequency of flux reversals** (D) overall size of the machine.	(CO2)	(U)
11.	Iron losses of a machine are **(A) directly proportional to flux density** (B) directly proportional to the square of flux density (C) inversely proportional to flux density (D) inversely proportional to the square of flux density.	(CO2)	(R)
12.	The shaft of electric motors is generally made of **(A) mild steel** (B) cast iron (C) copper (D) aluminium alloy.	(CO2)	(R)
13.	The critical speed of the shaft for an electric motor should be (**A) away from the operating speed** (B) exactly the same as operating speed (C) half the operating speed (D) double of the operating speed.	(CO2)	(U)
14.	The shaft of electric motors is generally supported in (A) magnetic bearings (B) bush bearings (**C) ball or roller bearings** (D) cast iron bearings.	(CO2)	(U)
PART -- B (12 x 2 Questions)			
UNIT- II			
15.	What is meant by magnetic circuit calculations?	(CO2)	(R)
16.	How the MMF of a section of magnetic circuit is determined?	(CO2)	(R)
17.	Outline the formula for computing the MMF for air-gap length	(CO2)	(U)
18.	Explain total gap contraction factor.	(CO2)	(U)
19.	Outline the relationship between real and apparent flux density	(CO2)	(U)
20.	What is fringing flux?	(CO2)	(R)
21.	Define slot leakage Reactance	(CO2)	(R)
22.	What is unbalanced magnetic pull	(CO2)	(R)
23.	What is Carter’s co-efficient?	(CO2)	(R)
24.	Write the output equation of DC machine	(CO2)	(R)
25.	Analyze the factors which affect the proportion of the armature core in DC machine	(CO2)	(An)

26.		Identify the advantages and disadvantages of large number of poles		(CO2)	(Ap)
PART -- C (5 x 16 = 80 Marks)					
UNIT - II					
27.	(a)	Develop the output equation of DC machine in detail	16	(CO2)	(Ap)
OR					
	(b)	Calculate the mmf required for the air gap of a machine having core length 0.32m including 4 ducts of 10mm each pole arc=0.19m;slot pitch= 65.4mm ;slot opening =5mm;air gap length=5mm; flux per pole=52mWb.Given carter's coefficient is 0.18 for opening/gap=1,and is 0.28 for opening/gap=2.9	16	(CO2)	(Ap)
28.	(a)	Develop the relationship between real and apparent flux densities in a DC machine	16	(CO2)	(Ap)
OR					
	(b)	Determine the air gap length of a dc machine from the following particulars :gross length of core=0.12m;number of ducts=1;and is 10mm wide;slot pitch =25mm;slot width=10mm;carter's coefficient for slot and ducts=0.32;gap density at pole center=0.7Wb/m^2;field mmf/pole=3900AT,mmf required for iron parts of magnetic circuit=800AT	16	(CO2)	(Ap)
29.	(a)	Determine the apparent flux density in the teeth of the dc machine when the real flux density is 2.15Wb/m^2; slot pitch = 28mm ; slot width = 10mm ; and the gross core length = 0.35m; number of ventilating duct is 4;each 10mm wide. The magnetizing force for a flux density of 2.15 Wb/m2 is 55000A/m.The iron stacking factor is 0.9.	16	(CO2)	(Ap)
OR					
	(b)	A design is required for a 50KW, 4 pole 600 rpm dc shunt generator, the full load terminal voltage behind 220V .If the maximum gap density is 0.83Wb/m^2 and the armature ampere conductor per metre are 30000. Calculate the suitable dimension of armature core to give a square pole face. (16m)	16	(CO2)	(Ap)
30.	(a)	Develop the output equation of DC machine in detail	16	(CO2)	(Ap)
OR					

	(b)	Find the main dimension of number of poles of a 37 KW, 230 v , 1400 rpm dc shunt motor , so that a square pole face is obtained . the average gap density is 0.6Wb/m^2 and the ampere conductors per metre are 24000. The ratio of pole arc to pole pitch is 0.67. and the full load efficiency is 90 percent. (16m)	16	(CO2)	(Ap)
31	(a)	Explain the design procedure for armature winding of DC machine	16	(CO2)	(U)
	(b)	Explain the design procedure for commutator and brushes of DC machine	16	(CO2)	(U)

Question Number	CO Mapping(Indicate the course outcome achieved by the Question	Marks	Percentage
1-31	CO2 - Determine the main dimensions and various parameters of DC Machine **(Applying)**	50	100%

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

PERIODICAL TEST – II (SCHEME OF EVALUATION)

15UEE504 – ELECTRICAL MACHINE DESIGN

PART -- A (6*1=6)

1. c) 70.063 AT /m
2. c) 800 AT
3. c) 0.5 mm
4. (A) directly proportional to flux density
5. (A) mild steel
6. (C) ball or roller bearings

PART -- B (6 x 2= 12 Marks)

7. 2 factors (2*1=2Marks)
8. 2 advantages & 2 disadvantages (4*1/2=2Marks)
9. Formula (2 Marks)
10. Explanation (2 Marks)
11. Definition (2 Marks)
12. Definition (2 Marks)

PART -- C (2 x 16= 32 Marks)

13.a) Design procedure + Explanation (12+4=16Marks)

(OR)

13.b) Design procedure + Explanation (12+4=16Marks)

14.a) Derivation (16Marks)

(OR)

14.b) Air gap length = 4.702mm (16 Marks)

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