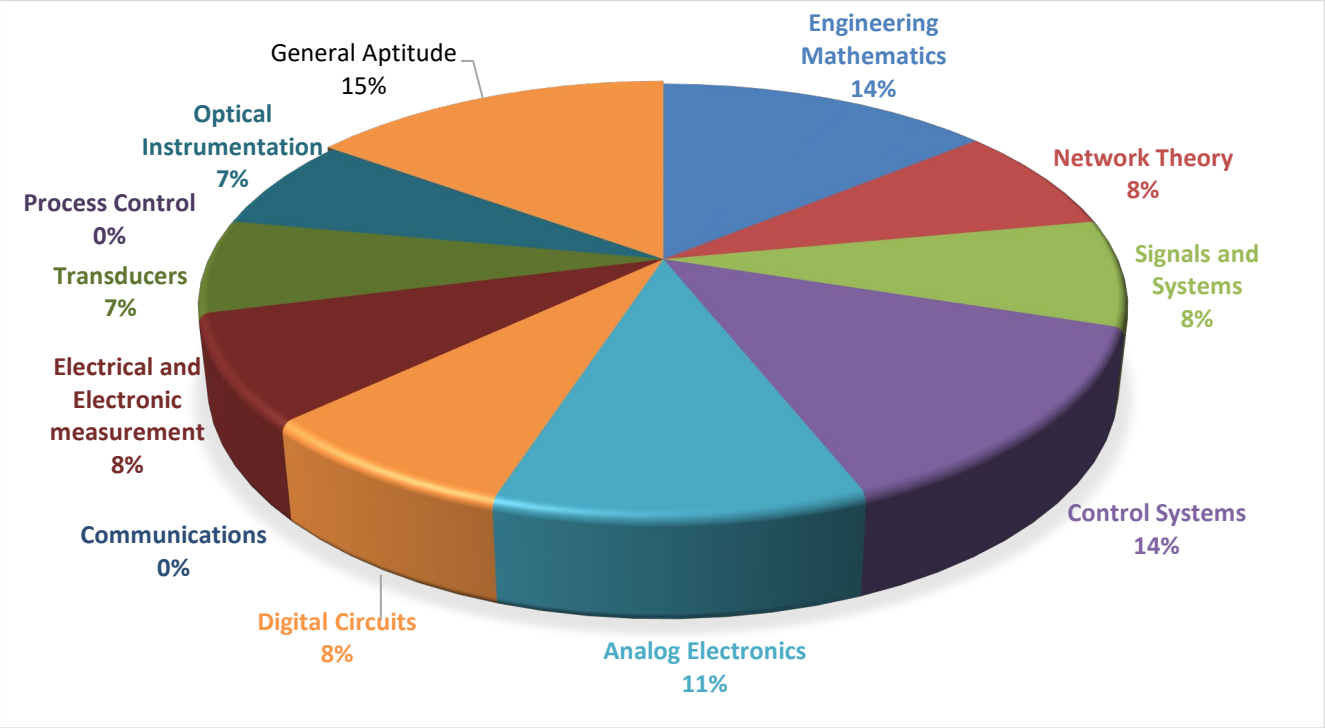
ANALYSIS OF GATE 2020

Memory Based

Instrumentation Engineering



IN ANALYSIS-2020_Feb-1_Morning

SUBJECT	No. of Ques.	Topics Asked in Paper(Memory Based)	Level of Ques.	Total Marks
Engineering Mathematics	1 Marks:4 2 Marks:5	Complex variable, Numerical methods, Differential equations, Linear algebra	Easy	14
Network Theory	1 Marks:4 2 Marks:2	Mesh, Two-Port	Easy	8
Signals and Systems	1 Marks:2 2 Marks:3	Sampling, DFT, Period	Easy	8
Control Systems	1 Marks:2 2 Marks:6	Phase margin, Time response analysis, Nyquist Plot	Easy	14
Analog Electronics	1 Marks:3 2 Marks:4	Miller effect	Easy	11
Digital Circuits	1 Marks:2 2 Marks:3	DAC, Boolean simplification, Venn diagram, Multiplexer	Easy	8
Communications	1 Marks:0 2 Marks:0	-		0
Electrical and Electronic measurement	1 Marks:2 2 Marks:3	Three phase circuit	Difficult	8
Transducers	1 Marks:1 2 Marks:3	LVDT, Piezoelectric, Strain gauge, Capacitive sensor	Easy	7
Process Control	1 Marks: 2 Marks:	-		0
Optical Instrumentation	1 Marks:1 2 Marks:3	-		7
General Aptitude	1 Marks:5 2 Marks:5		Average	15
Total	65			100
Faculty Feedback	Overall paper is straight forward with no twist and tricks . Cut-off will be high.			

GATE 2020 Examination* (Memory Based)

Instrumentation Engineering

Test Date: 1st Feb-2020

Test Time: 9.30 am to 12.30 pm

Stream Name: Instrumentation Engineering

General Aptitude

Q.1 - Q.5 Carry One Mark each.

1. I do not think you know the case well enough to have opinions. Having said that, I agree with your point.
What does the phrase "having said that" mean?
(A) in addition to what I have said
(B) in opposed to what I have said
(C) contrary to what I have said
(D) despite what i have said
[Ans. D]

2. He is known for his unscrupulous ways. He always sheds_____tears to deceive people.
(A) crocodile
(B) fox
(C) crocodile's
(D) fox's
[Ans. A]

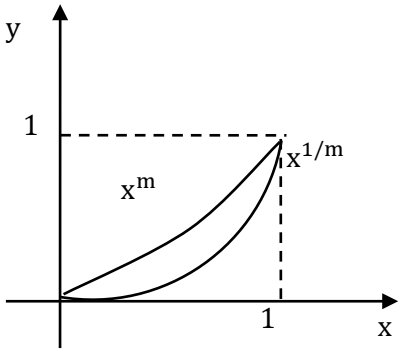
3. P, Q, R & S are uniquely coded using α & β. If P is coded as αα and Q is coded as αβ then R & S respectively. It can be coded as
(A) βα & ββ
(B) αβ & ββ
(C) ββ & αα
(D) αα & ββ
[Ans. *]

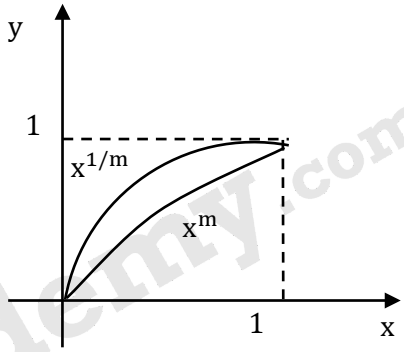
4. Build: Building, Grow:_____
(A) Grew
(B) Grown
(C) Growth
(D) Grow
[Ans. C]

5. Jofra archer, the England fast bowler is _____ than accurate.
(A) More fast
(B) More faster
(C) Faster
(D) Less faster
[Ans. *]

Q.6 - Q.10 Carry Two Mark each.

6. Select the graph that schematically represents both $y = x^m$ and $y = x^{1/m}$ properly in the interval $0 \leq x \leq 1$ for integer value of m, where m>1

(A)


(B)


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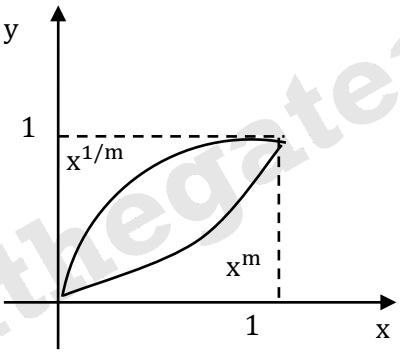

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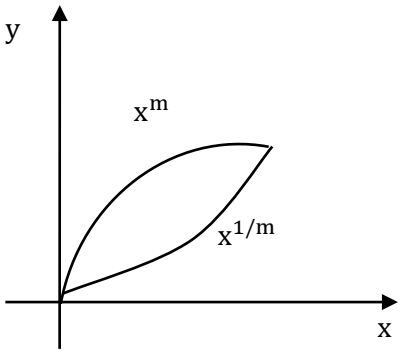
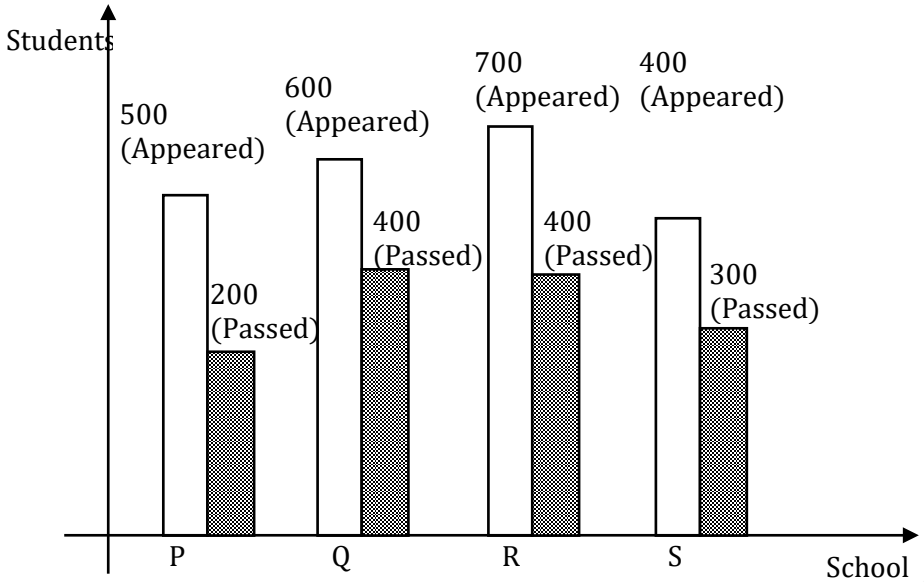


[Ans. C]

7. The sum of the first n terms in the sequence 8, 88, 888, 8888, ... is _____
(A) $\frac{80}{81}(10^n - 1) + \frac{8}{9}n$
(B) $\frac{80}{81}(10^n - 1) - \frac{8}{9}n$
(C) $\frac{81}{80}(10^n - 1) + \frac{8}{9}n$
(D) $\frac{81}{80}(10^n - 1) - \frac{8}{9}n$
[Ans. B]

8. What is the success of student of school P, Q, R, S in the given bar graph?



(A) 59.3%
(B) 52%
(C) 53%
(D) 50%
[Ans. A]

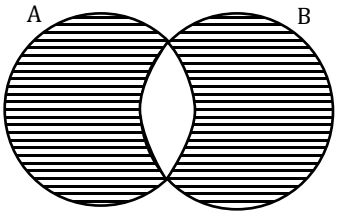
9. If x indicates greatest integer function such that [x]: greatest integer less than equal to x. If y = [x], then area under y for is $x \in [1,4]$is
(A) 4
(B) 1
(C) 3
(D) 6
[Ans. *]

10. A

Technical

Q.1 - Q.25 Carry One Mark each.

1. What is the logical expression for the shaded region given in the Venn-Diagram



(A) $(\overline{A}+B)(A+\overline{B})$
(B) $AB+\overline{A}\overline{B}$
(C) $(A+B)(\overline{A}+\overline{B})$
(D) $(A+\overline{A})(\overline{A}+\overline{B})$
[Ans. C]

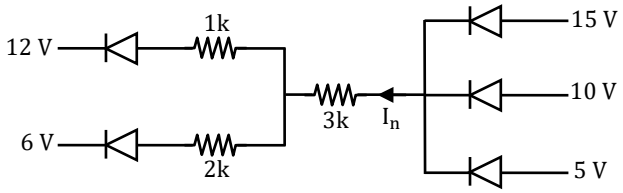
2. samples/sec and passed through a low pass filter having cut off frequency of 25 kHz then the frequencies at the output of filter is _____
[Ans. *] Range: 5 to 5

3. $x(t)=e^{-|t|};\ -\infty \le t \le \infty$. $X(\omega)$ is Fourier Transform of $x(t)$ then the value of $X(0)$ is _____
[Ans. *]Range: 2 to 2

4. $\hat{i},\hat{j},\hat{k}$ are mutually orthogonal vectors along x, y, z axes. Plane x y equation $z=0$ are having vectors such that $\vec{a} \neq \alpha\,\vec{b}$. What is the vector perpendicular to $z=0$ plane
(A) $\hat{i}-\hat{j}$
(B) $\hat{k}$
(C) $\hat{i}+\hat{j}$
(D) $-\hat{j}$
[Ans .B]

5. Period of $\sin(2n\pi);\ n=0,1,2\cdots$ is _____
[Ans. *]Range: 1 to 1

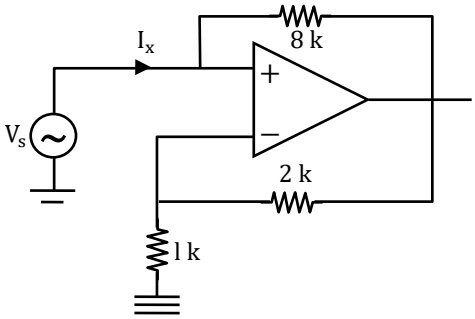
6. For circuit shown below



The value of I_x =? Assume all diodes to be ideal.

[Ans. *]

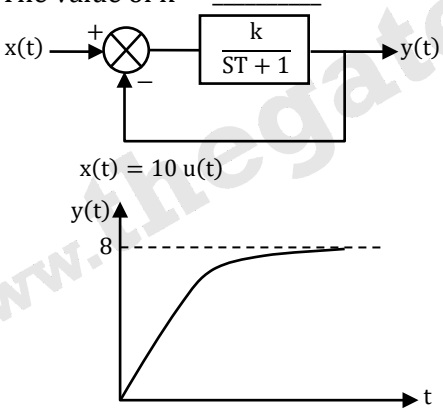
7. For the circuit shown below



The ratio V_s/I_x is _____Ω.

[Ans. *]

8. The value of k = _____



[Ans. *]

9. A second order system has poles at $-3 \pm 4j$. The system will reach the maximum output for a step input at _____ Sec.

[Ans. *]Range: 0.7854 to 0.7854

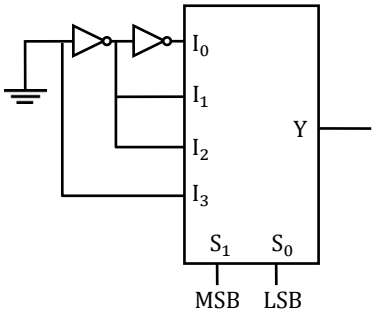
10. Transfer function $C(s) = \frac{1+0.2\,s}{1+0.05\,s}$.The compensator will have a maximum lead or lag at frequency of _____rad/s

[Ans. *]Range: 10 to 10

11. Value of 'k" at the breakaway point for a system having OLTF $\frac{k}{s(s+2)(s+6)}$ is _____

[Ans. *]Range: 5.049 to 5.049

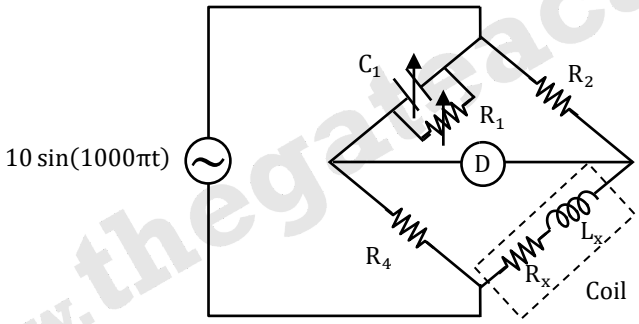
12. The experience of Y in below circuit is _____



(A) $S_1 + S_0$
(B) $S_0.\bar{S}_1$
(C) $S_1 \oplus S_0$
(D) $S_1\,\bar{S}_0$

[Ans. C]

13. A bridge was balanced at C = 10nF, R = 100 kΩ



The Q factor of the coil is _____

[Ans. *]Range: 3.14 to 3.14

14. Two 100 Ω resistors having tolerance of 3% and 4% are connected in series. The tolerance of the overall resistance obtained is ± _____%.

[Ans. *]Range: 3.5 to 3.5

15. In half effect sensor the current in the conductor I, perpendicular magnetic field B and voltage E are related as

(A) $E \propto B, I$

(B) $E \propto \frac{1}{B}, I$

(C) $E \propto B, \frac{1}{I}$

(D) $E \propto \frac{1}{BI}$

[Ans. *]

16. A

17. A

18. A

19. A

20. A

21. A

22. A

23. A

24. A

25. A

Q.26 - Q.55 Carry Two Mark each.

26. If the 3-point DFT of a signal x[n] is given as $X\{k\} = \{1, 2, 1\}$ then the value of X[2] is _____

[Ans. *]Range: 0 to 0

27. Bag 'A' contains 7 red and 3 blue balls and bag 'B' contains 3 red and 7 blue balls. Find the probability that if ball drawn is red is from the bag A.

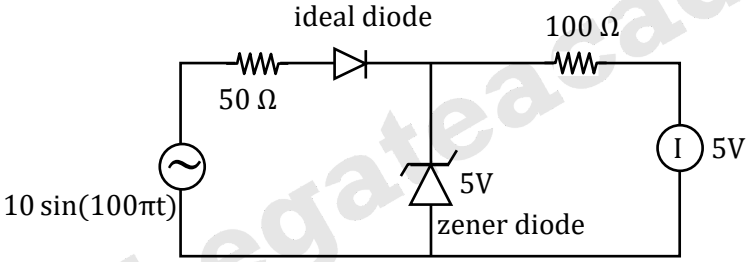
[Ans. * Range: 0.7 to 0.7

28. Given $f(z) = \frac{1}{z+a}$ in the circle having center at $(-a, 0)$. Find the value of $\oint f(z)dz$ when 'a' is greater than zero.

(A) $2\pi i$
(B) $4\pi i$
(C) $8\pi i$
(D) 0

[Ans. A]

29. For the circuit shown in figure



Power dissipation in 100Ω resistor is _____ W. (upto two decimal places)

[Ans. *]

30. For 10-bit DAC having full scale value of 1.023V. What is the change of output voltage if bits (D_7 to D_0) are changed from 1010 1010 to 1010 1011 is _____(in mV)

[Ans. *]Range: 1 to 1

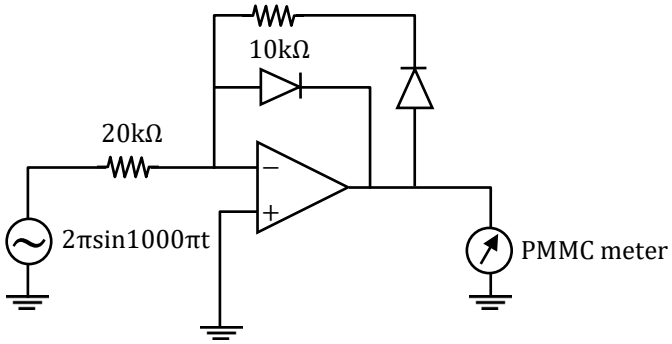
31. The present state of synchronous counter is $Q_A Q_B = 1, 1$ if x = 1 0 1 in the subsequent clock cycles, the decimal value of $[Q_A\ Q_B\ Y]_2$ is _____

[Ans. *]Range: 7 to 7

32. A 3 phase 400V power supply is connected to a balanced load of 400 Ω. The power is measured using 2 wattmeters, one wattmeter reads '0W' and the current is $\sqrt{2}$ A. The power drawn is _____ Watts.

[Ans. *]Range: 488 to 490

33. Reading of the meter is _____ Volts.



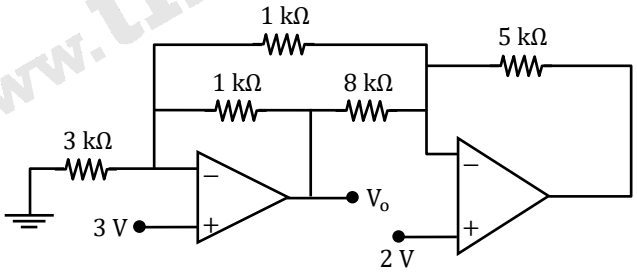
[Ans. *]Range: 1 to 1

34. If $F(A, B, C, D) = \Sigma m(0, 1, 2, 3, 6, 8, 9, 10, 11) + \Sigma d(3, 7, 14, 15)$. The minimized Sum Of Products (SOP) expression is

(A) $\overline{B} + C$
(B) $AB + BC$
(C) $A\overline{B} + \overline{B}C$
(D) $ABC + \overline{A}BC$

[Ans. A]

35. For the Op-Amp circuit shown below, the output voltage V_o is _____V. (round-off to 2 decimal places).

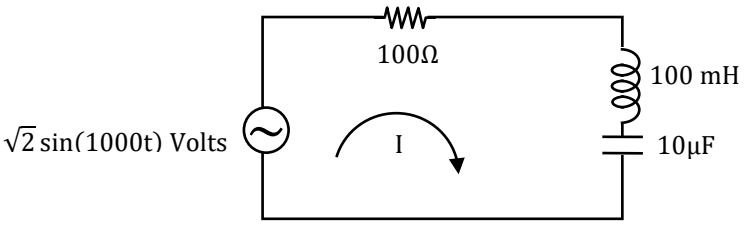


[Ans. *]

36. $G(s)H(s) = \frac{2(s+1)}{s^2}$. The system has a phase margin of _____ degrees

[Ans. *]

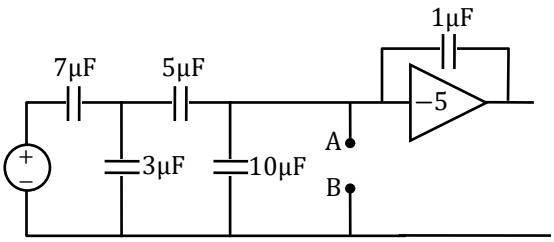
37. For the circuit shown below



The RMS value of I _____

[Ans. *]

38. For the circuit shown below



Equivalent capacitance across AB is _____ μF.

[Ans. *]

39. A

40. A

41. A

42. A

43. A

44. A

45. A

46. A

47. A

48. A

49. A

50. A

51. A

52. A

53. A

54. A

55. A

56. A

57. A

58. A

59. A

60. A

61. A

62. A

63. A

64. A

65. A

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