

EE24BTECH11047 - Niketh Prakash Achanta

- 25) In an 8085 microprocessor, the contents of the Accumulator, after the following instructions are executed will become

**XRAA**  
**MVIBF0H**  
**SUBB**

- a) 01 H  
b) 0F H  
c) F0 H  
d) 10 H
- 26) For the Y-bus matrix of a 4-bus system given in per unit, the buses having shunt elements are  $Y_{BUS} = j \begin{pmatrix} -5 & 2 & 2.5 & 0 \\ 2 & -10 & 2.5 & 4 \\ 2.5 & 2.5 & -9 & 4 \\ 0 & 4 & 4 & -8 \end{pmatrix}$
- a) 3 and 4  
b) 2 and 3  
c) 1 and 2  
d) 1, 2 and 4
- 27) The unit-step response of a unity feedback system with open loop transfer function  $G[s] = K/(s+1)(s+2)$  is shown in the figure. The value of  $K$  is

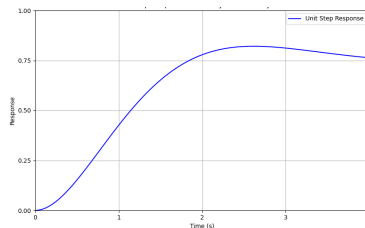


Fig. 27

- a) 0.5  
b) 2  
c) 4  
d) 6

- 28) The open loop transfer function of a unity feedback system is given by  $G(s) = \frac{(e^{-0.1s})}{s}$ . The gain margin of this system is
- 11.95 dB
  - 17.67 dB
  - 21.33 dB
  - 23.9 dB

- 29) Match the items in List-I with the items in List-II and select the correct answer using the codes given below the lists.

**List I**

- improve power factor
- reduce the current ripples
- increase the power flow in line
- reduce the Ferranti effect

**List II**

- shunt reactor
- shunt capacitor
- series capacitor
- series reactor

- $a \rightarrow 2, b \rightarrow 3, c \rightarrow 4, d \rightarrow 1$
- $a \rightarrow 2, b \rightarrow 4, c \rightarrow 3, d \rightarrow 1$
- $a \rightarrow 4, b \rightarrow 3, c \rightarrow 1, d \rightarrow 2$
- $a \rightarrow 4, b \rightarrow 1, c \rightarrow 3, d \rightarrow 2$

- 30) Match the items in List-I with the items in List-II and select the correct answer using the codes given below the lists.

**List I**

- Short Line
- Medium Line
- Long Line

**List II**

- Ohm Relay
- Reactance Relay
- Mho Relay

- $a \rightarrow 2, b \rightarrow 1, c \rightarrow 3$
- $a \rightarrow 3, b \rightarrow 2, c \rightarrow 1$
- $a \rightarrow 1, b \rightarrow 2, c \rightarrow 3$
- $a \rightarrow 1, b \rightarrow 3, c \rightarrow 2$

- 31) Three generators are feeding a load of 100 MW. The details of the generators are

	<b>Rating(MW)</b>	<b>Efficiency (%)</b>	<b>Regulation (p.u.) on 100 MVA base</b>
Generator-1	100	20	0.02
Generator-2	100	30	0.04
Generator-3	100	40	0.03

In the event of increased load power demand, which of the following will happen?

- All the generators will share equal power
  - Generator-3 will share more power compared to Generator-1
  - Generator-1 will share more power compared to Generator-2
  - Generator-2 will share more power compared to Generator-3
- 32) A 500 MW, 21 kV, 50 Hz, 3-phase, 2-pole synchronous generator having a rated p.f.=0.9, has a moment of inertia of  $27.5 \times 10^3 \text{ kg-m}^2$ . The inertia constant ( $H$ ) will be
- 2.44 s
  - 2.71 s
  - 4.88 s
  - 5.42 s

- 33)  $f(x, y)$  is a continuous function defined over  $(x, y) \in [0, 1] \times [0, 1]$ . Given the two constraints,  $x > y^2$  and  $y > x^2$ , the volume under  $f(x, y)$  is
- $\int_{y=0}^{y=1} \int_{x=y^2}^{x=\sqrt{y}} f(x, y) dx dy$
  - $\int_{y=x^2}^{y=1} \int_{x=y^2}^{x=1} f(x, y) dx dy$
  - $\int_{y=0}^{y=1} \int_{x=0}^{x=1} f(x, y) dx dy$
  - $\int_{y=0}^{y=\sqrt{x}} \int_{x=0}^{x=\sqrt{y}} f(x, y) dx dy$
- 34) Assume for simplicity that  $N$  people, all born in April (a month of 30 days), are collected in a room. Consider the event of at least two people in the room being born on the same date of the month, even if in different years, e.g., 1980 and 1985. What is the smallest  $N$  so that the probability of this event exceeds 0.5?
- 20
  - 7
  - 15
  - 16
- 35) A cascade of 3 Linear Time Invariant systems is causal and unstable. From this, we conclude that
- each system in the cascade is individually causal and unstable
  - at least one system is unstable and at least one system is causal
  - at least one system is causal and all systems are unstable
  - the majority are unstable and the majority are causal
- 36) The Fourier Series coefficients, of a periodic signal  $x(t)$ , expressed as  $x(t) = \sum_{k=-\infty}^{\infty} a_k e^{j2\pi kt/T}$ , are given by  $a_{-2} = 2 - j1$ ;  $a_{-1} = 0.5 + j0.2$ ;  $a_0 = j2$ ;  $a_1 = 0.5 - j0.2$ ;  $a_2 = 2 + j1$ ; and  $a_k = 0$  for  $|k| > 2$ . Which of the following is true?
- $x(t)$  has finite energy because only finitely many coefficients are non-zero
  - $x(t)$  has zero average value because it is periodic
  - The imaginary part of  $x(t)$  is constant
  - The real part of  $x(t)$  is even